How to Navigate the Technical Sessions

There are four primary resources to help you understand and navigate the Technical Sessions:

- This Technical Session listing, which provides the most detailed information. The listing is presented chronologically by day/time, showing each session and the papers/abstracts/authors within each session.

The Session Codes

SA01

Room number. Room locations are also indicated in the listing for each session.

Time Block. Matches the time blocks shown in the Program Schedule.

The day of the week

Time Blocks

Thursday

TA 9:00am – 10:00am

TB 10:15am – 11:15am

TC 11:30am - 12:30pm

TD 12:45pm - 1:45pm

Friday

FA 9:00am – 10:00am

FB 10:15am – 11:15am

FC 11:30am - 12:30pm

FD 12:45pm - 1:45pm

Saturday

SA 9:00am – 10:00am

SB 10:15am – 11:15am

SC 11:30am - 12:30pm

SD 12:45pm - 1:45pm

Thursday, 9:00AM - 10:00AM

■ TA01

Virtual Room 01

Competitive Strategy

Contributed Session

Chair: Yuanfang Lin, University of Guelph, School of Business and Economics, Waterloo, ON, N2L 3C5, Canada

1 - Analyzing Customer Engagement in Response to Pricing Strategies for Over-the-top (OTT) Platform

Roopendra Roopak, Doctoral Student, Indian Institute of Management Kashipur, Kashipur, India, Asit Tripathy, Abhishek Srivastava

OTT industry is facing intense competition from big players like Apple, Disney, Amazon, and Hulu. Moreover, the influx of big players is a severe challenge for present industry leaders like Netflix. They believe that they are experiencing stagnation in customer growth rate or erosion in some cases because of other players entering the industry. When competition is such intense, firms need to keep their customers more engaged to maximize overall firm profit. However, the effort to engage customers is a costly activity. Thus, deciding the optimal level of engagement effort is critical for the firm. Given the aforementioned scenario, we attempt to develop analytical models to understand the role of the engaged customer in response to the pricing strategies on OTT platforms. To address the gap in the literature, we broadly like to answer the following research questions: RQ1: How do various pricing strategies (pricing plans) impact a firm's revenue when the strategic customers are considered, and heterogeneity among customers exists? RQ2: How do various pricing plans and different levels of engagement affect consumer surplus and social welfare at large? Past work in information goods has enabled us to develop an effective way to represent the OTT parameters into an analytical model. The above research questions have been answered by developing a stylized game-theoretical model. The analysis of the obtained closed-form solutions has enabled us to address the problems in an interesting way.

2 - The Ultimate, Most Revolutionary Paper Ever! How Bragging Affects New Product Success

Christian Schulze, Frankfurt School of Finance & Management, Frankfurt am Main, Germany, Daniel Blaseg

When new ventures introduce a new product to the market, they face an important decision: Should they be modest, or should they brag about their product? We investigate bragging (i.e., the use of superlatives) by studying 360,412 new products launched on Kickstarter. We find that the relationship between bragging and new product success follows an inverse U-shape. Ideally, about one in thirteen words should be a superlative. The right amount of bragging can help new ventures increase product success by up to 66%. Competitive intensity moderates the results. The greater the competition from other ventures in the same product category, the higher the optimal bragging density. Finally, results depend on competitors' bragging. Contrary to conventional wisdom, it is not optimal to "stand out" (i.e., to be modest when everybody else brags). Instead, when the competition brags aggressively, the new venture should increase their own bragging density to hit the optimum.

3 - Multidimensional Targeting and Consumer Engagement

Jungju Yu, City University of Hong Kong College of Business, Kowloon, Hong Kong, Stylianos Despotakis

The advancements in targeting technology have allowed firms to engage in potentially more precise and intricate targeting based on several distinct aspects of customer preferences. Exposed to more targeted ads, consumers are becoming increasingly aware of being targeted and respond accordingly. It may seem obvious that if targeting is based on more detailed customer data, then consumers are more likely to respond (e.g., by paying attention to and clicking ads), and firms should be more profitable. This research provides a theoretical analysis of multidimensional targeting in which consumers draw inferences about their expected utility from the advertised product based on whether or not they are targeted. First, we identify a firm's equilibrium multidimensional targeting strategy. Second, by comparing this result with the benchmark of unidimensional targeting, we show that the firm can be worse off under multidimensional targeting. This is because, given the possibility of targeting based on various component of preferences, a targeted consumer can be more uncertain about their expected utility compared to a unidimensional targeting case. When this result holds, the firm may want to adopt a unidimensional targeting strategy. However, we show that the firm cannot credibly commit to such a strategy once given access to multiple dimensions of customer data. We further find that the firm's commitment problem can be mitigated with a higher advertising cost, which can counterintuitively lead to a greater profit.

4 - Equilibrium Product Pricing When Competing for Seasonal Consumers

Yuanfang Lin, University of Guelph, Waterloo, ON, Canada, Li Yang, Amit Pazgal

For service providers of seasonal products (e.g. pool opening and closing, roof gutter cleaning, automobile winter maintenance, etc.), demand at the beginning of a new period typically consists of some existing consumers from previous season plus new consumers just arriving or thinking about switching from competitors. In this paper, we analyze the evolution of two rival companies' pricing strategies when trying to maximize total profits over multi-period market competition for two substitutable seasonal service products. We derive open-loop Nash equilibrium strategies by distinguishing two cases of the duopolists' pricing game: the case of known finite periods versus the case of infinite-period competition. The analytical solutions and numerical analyses indicate that in equilibrium prices are increasing over time, and a firm's total profit over T periods is greater than T times a single-period profit. In an extension we model the proportion of returning customers as function of changes in price. While in a second extension we consider the strategic choices between offering "early bird rate" (to old customers) and promoting "first time discount" (to new customers) and conduct behavioral experiments to test the predictions from our analytical models. Our study thus provides important managerial implications for pricing and promotion considerations in the industries that are characterized by cyclical demand and seasonal service patterns.

■ TA02

Virtual Room 02

Behavioral Economics 1

Contributed Session

Chair: Khai Chiong, Hamedan

1 - Utility Shading in Quantal Choice Theory with Rational Inattention

Steven Mark Shugan, McKethan-Matherly Eminent Scholar Professor, University of Florida, Gainesville, FL, United States, , Man Xie, Yanping Tu

Rational consumer decision-makers must consider the cost of acquiring information. For example, house buyers must decide what costly and perishable information to acquire from inspections, inquiries, research, hiring specialists, visiting local schools, talking to neighbors, etc. as houses enter the market. Measuring information using Shannon entropy, Rational Inattention research shows that optimal information acquisition implies a Multinomial Logit model. Logit choice probabilities depict the chance each product in a choice set appears best given stochastic information acquisition. Our analysis shows that rationality also requires consumer utility shading (CUS) because the expected utilities of every product in the choice set, conditional on looking best, exceeds the unconditional or true utilities. Analogously, auction bids, conditional on winning, tend to exceed true asset values causing bid shading. We also show that CUS should increase with choice set size, decrease with set variance, and not depend on changes in the average set utility, providing the first rational microfoundation for these effects. However, our empirical analysis (both experimental and observational) in some settings observes insufficient CUS providing numerous and interesting implications. For example, insufficient CUS can cause negative post-purchase reviews, diminished social media brand persona, and decreased repeat sales. We discuss remedies and additional implications for product lines, bundling, pricing, and advertising.

2 - The Effect of Reference Fair Prices on Consumer Behavior: Formation and Asymmetric Effects

Gil Peleg, Clinical Assistant Professor of Marketing, Yeshiva University, NYC, NY, United States, Oded Lowengart

In the recent past, consumers worldwide have expressed their dissatisfaction with the fairness of business activities. This research investigates the: 1) Formation of fairness perception reflected by service prices, 2) Effect of price fairness on preference formation for service industries, and 3) Choice process of a service provider in a competitive setting. Price fairness formation is examined by customers' perceptions of different cost items. Three studies reveal that (1) Customers make a distinction between salient and non-salient costs items; (2) Both salient and non-salient costs items are associated with price fairness formation, and (3) Mangers' salaries have a negative association with price fairness (i.e. excessive salaries decrease the fairness perception of price). Two more studies examined the role of price fairness on preference and choice formation and reveal that (1) Price fairness is positively associated with preference and choosing one service provider over others and (2) Price fairness can be a representation of reference price such that losses loom larger than gains in preference and choice situations.

3 - Behavioral Pricing in the Housing Market

Sridhar Moorthy, University of Toronto, Toronto, ON, Canada, Lu Han, Ben Sand

The $1.99 price in the supermarket is an everyday sight, beloved of shoppers everywhere. But what about prices in the housing market? The typical house price is in the hundreds of thousands of dollars, and in certain jurisdictions, in the millions of dollars. Moreover, unlike in the grocery store, house prices are typically negotiated between the seller and the buyer. Does psychological pricing have any role to play in such an environment? We examine the Toronto real-estate market over a roughly twenty-year period in which the average detached house sold in excess of $500,000. We find that list prices are bunched "just-below" round numbers and sale prices are bunched at round numbers. We then ask whether the popularity of just-below-round-number-pricing is justified. The answer is in the negative: on both sale-to-list-price ratio and days-to-sell, outcomes are worse when list prices are just-below round numbers (rather than round numbers or just-above).

4 - Grandfather Pricing and Anticipated Regret

Khai X. Chiong, University of Texas at Dallas, Richardson, TX, United States, Tuan Phan, Jingcun Cao

Grandfather pricing is widely used as a pricing strategy in software as a service (SaaS) and other subscription-based platforms. Existing subscribers can keep paying the old prices, while new subscribers would pay a higher current price. If grandfathered subscribers churned and resubscribed, they would have to pay a higher price. We develop and estimate a model of grandfather pricing when users are uncertain about their future usage. We show that there are two main effects. First, grandfather pricing has the direct economic effect of reducing the option value of resubscribing if the user decides to leave the platform. This economic effect leads to lower users' churn rates and higher subscription revenues. Second, grandfather pricing has an indirect effect of anticipated regret. If users leave the platform, they anticipate the possibility of rejoining the platform and resubscribing at a higher price. Users then act to minimize this anticipated regret. As such, the reduction in the option value of resubscribing due to grandfather pricing is further amplified for users with higher degrees of regret aversion. In this paper, we separately identify the economic effect of grandfather pricing from its behavioral effect due to anticipated regret. To achieve this, our structural estimation uses data from a video-streaming platform that had run a field experiment to implement grandfather pricing. We find that grandfather pricing has a positive effect on the likelihood of subscription renewal and a negative effect on subscribers' weekly video viewing intensity. We then decompose the total effect into its economic component and its behavioral component. Finally, we use our model to optimize grandfather pricing for the firm, by targeting grandfather pricing based on the estimated users' regret aversion parameters.

■ TA03

Virtual Room 03

Influencer Marketing I

General Session

Chair: Reto Hofstetter, University of Lucerne, Luzern, 6002, Switzerland

Co-Chair: Andreas Lanz, HEC Paris, Jouy-en-Josas, France

1 - The Evolution of the Influencer Industry: Insights from Advertising Professionals

Gillian Brooks, Assistant Professor, King's Business School, King's College London, London, United Kingdom, Jenna Drenten, Mikolaj Piskorski

Current research on influencer marketing analyses the effectiveness of campaigns, influencer labour and content creation and the intersection of these two - such as the impact of influencer disclosure. Much attention has been given to "using" influencer marketing or "defining" influencer marketing - but minimal research has examined how it is actually executed and how that process has evolved in an industry that has rapidly professionalized. We know what influencer marketing is, but not how it functions. Social media influencer advertising is a new industry relative to traditional advertising media; however, the industry itself has rapidly professionalized. Influencers themselves have become entrepreneurs, launching their own new product lines and hiring agents to negotiate their contracts. The myth of the homegrown influencer is just that: a myth.To better understand how influencer advertising is executed, the purpose of this study is to examine the evolution of the influencer industry from the perspective of those who shaped it: advertising professionals, influencer agents, and early star influencers. Specifically, we examine practitioners' tacit knowledge of leveraging influencers for cross-platform advertising. We draw on over 30 depth interviews with online influencers, talent agencies, PR firms, and brands. Findings highlight the characteristics, practices, and benefits of leveraging influencers for cross-platform advertising in an increasingly interconnected media landscape.

2 - Effectiveness of Influencer Marketing for Political Campaigns

Beth Fossen, Indiana University, Bloomington, IN, 47401-4391, United States, Philip Kim

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

3 - The Ripple Effect of Firm-generated Content on New Movie Releases

Shijie Lu, Univeristy of Houston, Houston, TX, 77401, United States, Isaac Dinner, Rajdeep Grewal

Marketers create social media, in the form of firm-generated content (FGC), to ignite interest in new products such as movies; in turn, there is a clear need to understand whether and how FGC influences demand and associated user-generated content (UGC). The authors investigate two potential mechanisms by which FGC may drive box office revenues: (1) a direct mechanism, such that users who see FGC directly drive revenue, and (2) a "ripple effect," by which FGC increases movie-related UGC, which then drives consumption. By analyzing 145K firm-generated and 5.9 million user-generated Twitter posts associated with 159 movies, the authors find a positive and significant effect of FGC on movie sales, which UGC fully mediates, supporting a ripple effect. Impressions of FGC by followers rather than non-followers of firm accounts mainly drive the effect of FGC on UGC. In addition, FGC by movie accounts is more effective than that by stars and studios, and firms' regular posts with a movie-specific hashtag are more effective than a reply, a retweet, and a post without the hashtag. The finding of ripple effects suggests that movie executives should not focus solely on gaining followers but rather on creating FGC that sparks conversations among these followers.

4 - Influencing on Short Leashes: How Contract Design Drives Influencer Marketing Performance

Reto Hofstetter, University of Lucerne, Luzern, 6002, Switzerland, Andreas Lanz, Navdeep Sahni, Martin Faltl

In the context of influencer marketing, the common belief among managers is that they should avoid managing and briefing influencers too closely. The rationale is that influencers may better understand their follower base and should thus be given full autonomy when creating their content. In contrast to this common belief, we find that more (versus less) constraining contracts can actually be beneficial for bottom-line results. We argue based on organizational control theory that managers (principals) and influencers (agents) may diverge in objectives when it comes to content creation, causing precontractual problems between the principal and the agent. However, effective contract design can overcome such precontractual problems. Taking into account that influencers may pursue egocentric goals that deviate from corporate objectives, managers should adapt the (behavior-based) contracts and constrain influencers' behavior to align objectives in influencer marketing campaigns. Indeed, preliminary evidence from the analysis of over 4,427 influencers and 500 actual Instagram campaigns carried out via the influencer marketing platform Reachbird.io indicate that contracts imposing stronger behavioral constraints with respect to content creation are associated with higher engagement with the Instagram posts. The result is robust to various model specifications (including brand and influencer fixed effects) and it is emphasized among (micro) influencers with a smaller following. Effective constraints specify the visual characteristics of the post but do not enforce purely product-centric imagery. Although fewer influencers decide to participate in campaigns when contracts are more constraining, such campaigns ultimately generate higher engagement.

■ TA04

Virtual Room 04

Reviews/UGC 1

Contributed Session

Chair: Megan Kelly Hunter, Boston College, Carroll School of Management, Stanford, CA, 94305-7728, United States

1 - Bad Review System Drives Out Good?

Sylvia Xiaoyi Gao, University of Auckland, Auckland, New Zealand, Jinan Lin

Review systems for consumers to disclose numerical rating and textual comments after consumption are crucial to online marketplaces and sharing economy platforms. It helps potential customers' searching process and decreases their uncertainty of the product or service. The literature documents the existence of review inflation that seemingly majority of sellers obtain over-high average review score close to full marks. Scholars find various reasons like consumers feel pressure to leave bad comment and hurt the owners' business, or consumers are afraid of sellers' retaliation. To the best of our knowledge, little is known about how review inflation influences sellers' strategic pricing decision, sales, profit and the platforms' welfare. Our paper fills in this gap by developing a theoretical framework, inducing testable hypotheses and providing empirical evidence from Airbnb. We first build a vertical differentiation model where two sellers with different product qualities compete in terms of price in two periods. Consumers in the Period 2 infer the product quality of sellers from the inflated reviews left in Period 1, then determine the purchase decisions. Our model captures the strategic influence of review inflation contingent on different levels of product quality. We then test the analytical propositions using the occupancy rate, listing price and revenue for all Airbnb listing from a major city in United States in 2019. We first proxy the review inflation by weekly change for zip-code level average rating, and we ensure our measurement robustness by extracting the residual components of general rating from 6 sub-scores. We find that first review inflation enhances sellers' price competition because the perceived quality difference is lower. Second, review inflation hits the sellers who produce medium quality product and high quality product, but benefit the low product quality sellers. We explain these findings and their welfare implications on review systems' design.

2 - Assessing the Sources of Selection Bias in User Reviews

Masakazu Ishihara, New York University, New York, NY, United States, Hiroshi Kumakura

The reliability of user reviews as an information source hinges on the degree to which users' propensity to write a review is correlated with their satisfaction. For example, past studies have pointed out that users with extreme experiences are more likely to write a review, leading to a biased distribution of review ratings. Such selection bias is more serious trouble in research than other bias, e.g., sampling bias, because selection bias inevitably and directly distorts the results to be analyzed. This paper uses a unique data set that combines a survey data on forced reviews with online review data for the Japanese hotel industry, and studies the sources of selection bias in user ratings. Specifically, we investigate factors that influence the relationship between users' satisfaction and their propensity to write a review. We propose a simple Bayesian statistical model that recovers those factors. Our main findings suggest that factors such as price paid relative to regular prices, consumer characteristics, and time to write a review influence how different satisfaction levels induce users to write a review. These results suggest that different consumers and marketing strategies generate different degrees of selection bias in user reviews, and as a result, some products/services are more likely to suffer from selection bias than others due to differences in target consumers' characteristics and marketing strategies. Our estimated model also provides insights for how firms can recover the true distribution of review ratings based on the data they can observe.

3 - Seeing is Believing? What Do Fake Online Reviews Do?

Vanessa Tianying Song, The University of Sydney, Sydney, Australia, Steven Qiang Lu, Jia Li

The shares of e-commerce grow rapidly over the past 10 years with US$4206 billion retail e-commerce sales worldwide in 2020. Many studies examine the impacts of fake online reviews on the decision making of consumers and the sales of businesses. However, although some methods have been used to detect fake reviews, accurate detection of fake reviews is still challenging. In our study, we first develop a machine learning method to detect fake reviews using a unique dataset from a large group buying platform. We then examine the impacts of fake reviews on different types of restaurants, as well as how fake positive and negatives reviews, and the different characteristics of fake reviews can impact the reputation and performance of a restaurant.

4 - Chasing Stars: Firms' Strategic Responses to Online Consumer Ratings

Megan Hunter, Assistant Professor, Boston College, Carroll School of Management, Newton, MA, United States

In this paper, I show that a common way that platforms display firms' quality ratings incentivizes firms to strategically take costly short-run actions that improve their ratings. Most review platforms display star ratings of goods and services rounded to a half star, rather than display the exact average rating. Since the true average rating is not shown, firms have an incentive to remain just above the rounding threshold in order to have a higher displayed rating. However, once a firm's rating passes the rounding threshold, the incentive to improve the ratings drops as their rating moves farther from the threshold. I study this phenomena in the context of auto repair. I find that there is an excessive amount of bunching around ratings thresholds. The firms' actions toward improving their ratings are typically unobserved, but due to my novel data and the discontinuity of displayed ratings, I can model and infer firm behavior. Specifically, I provide evidence that firms change the services they provide and exert extra effort when they are close to rounding thresholds. Finally, I provide a theoretical framework in order to quantify the actions and provide optimal policies for firm actions depending on their rating and number of reviews in a variety of counterfactual settings.

■ TA05

Virtual Room 05

Offline Shopping

Contributed Session

Chair: Yi-Chun Ou, University of Leeds

1 - Understanding the Role of New Product Launches in Driving Offline Virality and Store Visits

Sri Harsha Kamatham, University of Manitoba, Winnipeg, MB, Canada, Ashutosh Bhave

We study the case of initial product launch, associated online chatter and subsequent change in demand for the new product of a firm operating in the fast food industry. In August 2019, Popeye's launched a new product (brand extension). The new product became extremely popular, resulting in a nationwide shortage of these products within two weeks of the launch. We further study the effect of the relaunch of the product. In this paper, we study the effect of a new product launch on offline store-visits. We follow the synthetic difference-in-differences framework proposed by Arkhangelsky et al. (2020). We use the placebo variance estimation method to build confidence intervals for our point estimates. Using anonymized cellphone location data, we study the popularity of the new product across multiple markets. We estimate that the new product launch led to an increase of 26.3% visits per week to Popeye's locations relative to other restaurants in the same industry. We observe that the new product launch by Popeye's has a long-lasting effect that continued during March-April 2020 when several counties went into lockdown due to COVID-19. We discuss implications for brand extensions and promotions.

2 - Modeling Store Choice Behavior of Multiple Retail Formats

Takuya Satomura, Keio University, Minato-ku Tokyo, Japan, Eisaku Sato

This study aims to analyze the retail store competition across formats in multiple categories. Consumers use multiple retail formats, such as supermarkets, discount stores, drug stores, or convenience stores, according to their shopping purposes and shopping occasions. Our study explores whether overlap usage of retail formats causes store competition between the retail formats and, if so, in which category competition across formats exists, and what factors affect the across formats competition. In order to explore these questions, we develop a consumers' store choice model of multiple retail formats. The proposed model considers the consumers' shopping transaction cost for shopping, the attractiveness of the store location, the shopping occasion, as well as the purchased categories. The transaction cost for shopping consists of physical and psychological costs. The shopping occasion refers to the type of shopping trip, e.g., major shopping trips or quick stop shopping trips. The retail formats include both large-format retailers and small-format retailers. Consumer geodemographic factors are also included in the model to explain the variance of consumer choice. The proposed model is applied to the longitudinal data of purchases across categories and across retail formats in Japan. The data also contains the geodemographic information of the consumers. Implications for competing strategies for retail formats are explored.

3 - A Model of Product Return Behavior in Offline Grocery Purchases

Boram Lim, Assistant Professor of Marketing, University of Kansas, Lawrence, KS, United States, Kissan Joseph, Ram Janakiraman

Product returns are an integral component of the consumption experience. Extant research has conceptualized returns as an option that provides measurable value in high-value, infrequently purchased product categories (Anderson, Hansen, and Simester 2009). In contrast, we investigate product returns in low-value, frequently purchased product categories. Analyzing grocery purchase data at a Korean grocery chain, we find support for the notion that the value of the return option varies predictably with basket and consumer characteristics. However, while the option perspective would argue for returns to be zero-order, we find strong evidence of return event feedback. Specifically, returns beget more returns! Indeed, while the unconditional probability of returns is about 1%, each return instance increases the probability of a subsequent return by approximately 1%. Moreover, this feedback is attenuated by the temporal distance from the return. Next, comparing consumers who exhibit return incidence with a matched sample of consumers who do not, we find that return incidence enhances several dimensions of subsequent retail engagement such as weekly spending, weekly shopping frequency, total items per week, and total number of unique categories purchased per week. As in the case of return incidence, this enhanced engagement increases with each additional return but decays with temporal distance from the return. Finally, we conceptualize the underlying mechanism for enhanced retail engagement as stemming from increased reciprocation pressure. In this connection, we find that the return of products that provide higher option value (perishables) stimulates stronger increases in subsequent retail engagement. We conclude by outlining implications for the design of optimal return policies.

4 - Feeding Off Each Other: Physical Stores vs. Platform Apps

Yi-Chun Ou, University of Leeds, Leeds, United Kingdom, Sha Zhang, Scott Andrew Neslin

Physical stores are adding platform apps (e.g., US' Grubhub, UK's Just-Eat, German's Delivery Hero, China's Ele.me) to their channel portfolio. Platform apps promise much larger exposure. However, a key concern is whether adding platform apps is a win-win proposition for both the physical store and the platform. For example, recent tensions between local restaurants and food delivery platforms (e.g., Doordash) revolve around this issue. Ideally, the two channels would feed off each other - platform sales enhance physical store sales, and vice versa. However, the channel addition literature mainly focuses on one-way cross effects and non-platform channels. Little is known about the dynamic interplay between physical stores and platform apps. Do the store and platform feed off each other? Does this vary across stores? By ignoring these two-way cross effects, firms may miscalculate the effectiveness of the platform app. We use experiential learning theory to develop hypotheses. To test the hypotheses, we draw on a unique dataset where 31 stores from a restaurant chain that added three food-delivery platform apps. We use a random-intercept joint equation model and account for endogeneity and autocorrelation. The results show that store sales and platform sales feed off each other and the effect varies across stores. Interestingly, the cross-effect of platform sales on store sales is larger than the reverse. This study paints a comprehensive picture of the dynamic interplay between stores and platforms, which is important for improving the overall performance of these channels.

■ TA06

Virtual Room 06

Crowdfunding I

Contributed Session

Chair: Paul R. Hoban, University of Wisconsin, Madison, WI, 53706-1324, United States

1 - Crowdfunding Projects in the Presence of Anxiety, Externality and Warm Glow

Wei-Shi Lim, National University of Singapore, Singapore, Singapore, Ziqiu Ye, Christopher S. Tang

Crowdfunding has been recognized as an efficient mechanism for entrepreneurs to raise funds for their projects. We consider a reward-based crowdfunding project that enables entrepreneurs to pre-sell their innovative products. We develop a model that captures three elements: (a) externalities generated by the pre-orders; (b) anxiety experienced by consumers when making their pledging decisions; and (c) warm glow derived from the pledge as a show of support for innovation. By considering the interactions among these three elements and their impact on entrepreneur's crowdfunding and retail strategies, we show that the success of crowdfunding and the entrepreneur's entry into the retail market depends on the interaction between the extent in which the strength of the externalities alleviates consumer's anxiety about the new product and warm glow. Our results provide managerial implications on the entrepreneur's optimal market entry strategy.

2 - A Deep Learning Approach for Image and Video Analysis of Online Crowdfunding Campaigns

Masoud Moradi, Texas State University, San Marcos, TX, United States, Fereshteh Zihagh, Vishag Badrinarayanan

This project aims to analyze online crowdfunding images and videos to examine the following questions: How does the presence of human faces in image and video affect an online campaign's success? Which signal is more influential: expressed emotions in image or video? How does the congruency between expressed emotions in image and video influence the performance of crowdfunding campaigns? To answer these questions, we focused on images and videos of 150 projects in the apparel category that are posted to the Kickstarter website, which is a popular crowdfunding platform for entrepreneurs. To analyze the data, we utilized a deep neural network (DNN) model consisting of multiple neural network layers between the inputs (campaigns images and videos) and outputs (facial emotions). Preliminary results show that advertising images and videos that include human faces are more effective than those without human faces. We also found that particular facial expressions in images and videos play different roles in the success of crowdfunding campaigns. Regarding the facial expressions in images, we found that happiness, surprise, and neutral emotions positively affect crowdfunding outcomes. However, expressed anger, fear, and sadness in images negatively impact crowdfunding success. Regarding the videos, we found that happiness and neutral emotions positively affect campaign success. In contrast, videos displaying faces with anger, fear, disgust, and sadness result in less successful campaigns. Results also show that different modes of communication jointly impact the effectiveness of online crowdfunding campaigns. In other words, congruency between image and video intensifies the effects of expressed emotions.

3 - With a Little Help from Friends: Entrepreneurs' Strategic Crowdsourcing

Tingting Fan, Assistant Professor, The Chinese University of Hong Kong, Hong Kong, Yizhou Xiao, Sudipto Dasgupta

Although mass media and crowdfunding websites advocate the practices of asking supports from friends, it remains unclear of the information role of friends vis-à-vis external funders. While some theories suggest that friends' supports signal good project quality because friends may possess inside information, others argue that it signals poor project quality as getting funding supports from friends is costly and only serves as the last fundraising resort. A challenge of studying the information role of friends on crowdfunding is that funders are anonymous and researchers cannot identify which funders are entrepreneurs' friends. Our paper collected a unique data set which combine the individual funders' contributions on a reward-based crowdfunding platform with those funders' social network data. With this comprehensive data set, we show that contributions from an entrepreneur's friends can signal entrepreneurs' manipulation of fundraising. By carefully investigating the amounts and timing of friends' contributions, we show that entrepreneurs with mediocre funding performance strategically solicit contributions from their friends to encourage other funders to contribute money. Specifically, we find that there are two critical time windows when entrepreneurs are manipulating funding performance: the first day of a crowdfunding launch and the last two days before a crowdfunding project reaches its funding deadline. More importantly, we show that not all funders can be manipulated. Sophisticated funders discern entrepreneur's manipulation and are less likely to contribute, while naïve funders simply herd regardless of the manipulation. When sophisticated funders have significant market power, crowdfunding projects with fundraising manipulation eventually raise less money, attracted fewer funders, and are less likely to reach its fundraising goal. Our research contributes to the literature on social influence, crowdfunding, and consumers' financial decisions.

4 - Writing More Compelling Creative Appeals: A Deep Learning Based Approach

Paul R. Hoban, Assistant Professor of Marketing, University of Wisconsin - Madison, Madison, WI, United States, Jiyeon Hong

We present a deep learning algorithm to provide personalized feedback on written creative appeals. Such appeals are widespread in marketing, including advertising copy, RFP responses, call center scripts, product descriptions, and many others. While marketing research has produced several tools to help managers glean insights from online word-of-mouth, less attention has been paid to creating tools to assist the innumerable marketers responsible for crafting effective marketing messages. Our approach leverages the hierarchical structure of written works, associating words with sentences and sentences with documents, and the linguistic relationships developed therein. We score each sentence by its centrality to the document's message and its expected contribution to success. Those sentences with the lowest scores are important to the document's message, but written in a manner that negatively impacts outcomes. For the author, these are the most effective points to focus a revision. Using data from DonorsChoose.org, we find that deleting the lowest scoring sentence from each essay could increase K-12 funding by $2.6 million (1.17%). This is a conservative estimate as revisions likely impact multiple sentences and modify rather than delete problematic sections. For researchers, we show how the method can produce substantive insights and suggest promising avenues for future research.

■ TA07

Virtual Room 07

Computer Vision and Design Analytics

General Session

Chair: Alex Burnap, Yale University, New Haven, CT, United States

1 - Identifying Profitable and Feasible "Design Gaps" for New Products

Alex Burnap, Yale University, New Haven, CT United States, John R. Hauser

Successful firms develop 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 Bayesian optimization 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.

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

Ryan Dew, University of Pennsylvania, Philadelphia, PA, 19104, United States

In this project, I develop methods for adaptive preference measurement when the focal product is described using unstructured data like images or text. Building on ideas from adaptive conjoint, I propose measuring individual-level preferences through a combination of representation learning, to embed products in a common latent space, and Bayesian optimization, to quickly find customer ideal points within this space. In addition to facilitating the use of textual and visual data in conjoint settings, this methodology also solves an increasingly common problem in recommendation systems for subscription businesses: how can these businesses optimally make recommendations to new subscribers? The need to assess a new customers' preferences quickly, and without prior purchase data, has led to the increasing prevalence of customer onboarding surveys, wherein companies ask potential or current customers a series of questions aimed at understanding their preferences, without having observed any purchasing. I apply my methodology to this task by reframing the on-boarding task as an adaptive preference measurement task. Then, in an empirical application, I illustrate how my proposed methodology performs in both classic preference measurement, and when paired with recommendation systems to solve the on-boarding problem.

3 - Category Learning Through Experiential Product Images

Liu Liu, University of Colorado Boulder, UCB, Boulder, CO, 80309, United States, Natasha Zhang Foutz, Masakazu Ishihara

Consumers face great uncertainty of product content and quality before purchasing experiential products. We hence quantify the impact of product images on sales and post-purchase satisfaction. Specifically, we focus on product images used in advertising and packaging to address the following key questions. (1) Do these images provide consistent information about product contents? And (2) How does the extent of match between product images and product contents impact sales and post-purchase satisfaction? We empirically examine these questions using a canonical example of experiential products - motion pictures. Analyzing 10,000+ movies' poster images and synopsis texts via deep learning image and text classification models, we construct a product typicality metric and link it to box office and consumer reviews. We further discuss the substantive and strategic implications of our findings.

4 - First Law of Motion: Influencer Video Advertising on TikTok

Jeremy Yang, MIT, Cambridge, MA, 02139-4230, United States, Juanjuan Zhang, Yuhan Zhang

This paper develops an algorithm to predict the effect of influencer video advertising on product sales. We propose the concept of motion-score or m-score, a summary statistic that captures the extent to which a product is advertised in the most engaging parts of a video. We locate product placement with an object detection algorithm and estimate pixel-level engagement as a saliency map by fine-tuning a deep 3D convolutional neural network on video-level engagement data. M-score is then defined as the pixel-level, engagement-weighted advertising intensity of a video. We validate the algorithm with nearly 40,000 influencer video ads on TikTok, the largest short video platform in the world. We leverage variation in video posting time to identify the causal effect of video ads on product sales. Videos of higher m-score indeed lift more sales. This effect is sizable, robust, and more pronounced among impulsive and lower-price products. We trace the mechanism to influencers' incentives to promote themselves rather than the product. We discuss how various stakeholders in entertainment commerce can use m-score in a scalable way to optimize content, align incentives, and improve efficiency.

5 - Serving with a Smile on Airbnb: Analyzing the Economic Returns and Behavioral Underpinnings of the Host's Smile

Shunyuan Zhang, Harvard Business School, Boston, MA, 02163-1011, United States, Elizabeth Friedman, Xupin Zhang, Kannan Srinivasan, Ravi Dhar

Non-informational cues, such as facial expressions, can significantly influence judgments and interpersonal impressions. Past research has explored how smiling affects business outcomes in offline or in-store contexts, yet relatively little is known about how smiling influences consumer choice in e-commerce settings. This paper explores the effect of smiling in the growing sharing economy context, specifically examining how a smile in an Airbnb host's profile photo affects property demand. The study uses a facial attribute classifier to determine whether the host is smiling in their profile picture or not, and estimate the influence of a host smile in a longitudinal dataset of Airbnb bookings, controlling for a rich set of variables such as reviews, property characteristics, and the host's age and gender. A smile in the host's profile photo increases property demand by 1.9% on average. Further, gender moderates this effect, with smiling increasing demand for male hosts by 6.8%, compared to an insignificant increase for female hosts. An online experiment confirms this pattern, and explores the underlying mechanism. In particular, a moderated mediation analysis shows that smiling increases perceptions of the host's warmth—to a greater extent for male than female hosts—which increases the likelihood of booking their property.

■ TA08

Virtual Room 08

Digitization 1: Influencers

General Session

Chair: Pinar Yildirim, University of Pennsylvania, Philadelphia, PA, 19104, United States

Co-Chair: Georgios Zervas, Boston University School of Management, Brookline, MA, 02445-7610, United States

1 - Marketing with Shallow and Prudent Influencers

Xudong Zheng, Johns Hopkins University, Baltimore, MD, United States, Ron Berman

Marketers often utilize social media influencers to reach audiences with more authentic and credible messaging. While some influencers are prudent and carefully test products before promoting them, many others are shallow and merely post the marketer messaging as is. We analyze the impact of shallow and prudent influencers on marketer profits, customer satisfaction, and influencer payoffs. Counter to intuition, we find that shallow influencers increase market transparency, consumer satisfaction and marketer profits, while prudent influencers entice the marketers to reduce information efficiency in the market, and increase the share of unsatisfied consumers. In a market where both shallow and prudent influencers exist, prudent influencers may increase their payoff even further by extracting additional information rent. The results provide insight into the value that shallow influencers bring to the market and guidance for marketers considering the use of influencer marketing.

2 - Creators of Engagement: The Role of Co-followership Patterns and Content Similarity in Choosing an Optimal Influencer Set

Mengjie Cheng, Harvard Business School, Cambridge, MA, United States, Tomomichi Amano, Elie Ofek

Brands increasingly seek to work with influencers to promote their products through social-media posts. Yet the success of any such campaign largely depends on the marketer's ability to select the right influencers for their product. In this paper, we examine this problem by identifying several key factors that impact how likely consumers are to engage with the content of a set of influencers in a given category. We collect a unique data set on Instagram beauty influencers, which contains past content posted, followers, and profile information, and employ natural language processing and image analysis techniques to generate various measures of similarity among influencers. We analyze the engagement level (likes, comments) with each influencer's posts over time as a function of how similar their content is with that of other influencers in the set and of the extent of follower overlap. We find that influencers with more overlapping followers are likely to post more similar content, which in turn leads to an inverted-U pattern of engagement. Thus, a moderate amount of overlap and content similarity across influencer posts generates an echo-chamber like effect. We contextualize our findings by partnering with a prominent influencer marketing agency and use our model to predict the change in engagement of an actual campaign. To the best of our knowledge, this is the first empirical attempt to study influencer-brand matching dynamics. We discuss the managerial implications of our findings for brands planning to embark on influencer marketing campaigns, offering guidance on how to construct an optimal set of influencers.

3 - Do Suspense and Surprise Drive Entertainment Demand? Evidence from Twitch.tv

Andrey Simonov, Columbia University, New York, NY, 60615-3663, United States, Raluca Ursu, Carolina Zheng

We measure the relative importance of suspense and surprise in the entertainment preference of viewers of Twitch.tv, the largest online video game streaming platform. Using detailed viewership and game statistics data from broadcasts of tournaments of a popular video game, Counter Strike: Global Offensive, we compute measures of suspense and surprise for a rational Bayesian viewer. We then develop and estimate a stylized utility model that underlies viewers' decisions to both join and to leave a game stream, allowing for a differential effect of suspense and surprise on these decisions. The estimates reveal that suspense enters the consumer utility but provide little evidence of the effect of surprise. The magnitudes imply that a one standard deviation increase in round-level suspense decreases the probability of leaving a stream by 0.2 percentage points. Consistent with the observation that only current viewers of a game observe the amount of suspense and surprise revealed in the game, we find no detectable effect of suspense and surprise on the decision to join a game. In a simulation exercise, we show that a change in game's realized suspense explains 8.1% of the observed range of the evolution of streams' viewership levels. Our results provide a general tool for content producers and platforms to use when designing and evaluating media products.

4 - Competition, Politics, & Social Media

Benson Tsz Kin Leung, University of Cambridge, Cambridge, United Kingdom, Pinar Yildirim

An increasing number of politicians are relying on cheaper, easier to access technologies such as online social media platforms to communicate with their constituency. These platforms present a cheap and low--barrier channel of communication to politicians, potentially intensifying political competition by allowing many to enter political races. In this study, we demonstrate that lowering costs of communication, which allows many entrants to come into a competitive market, can strengthen an incumbent's position when the newcomers compete by providing more information to the voters. We show an asymmetric bad-news-good-news effect where early negative news hurts the challengers more than the positive news benefit them, such that in aggregate, an incumbent politician's chances of winning is higher with more entrants in the market. Our findings indicate that communication through social media and other platforms can intensify competition, however incumbency advantage may be strengthened rather than weakened as an outcome of higher number of entrants into a political market.

■ TA09

Virtual Room 09

Customer Relationship Management

Contributed Session

Chair: Victoria Kramer, University of Muenster, Muenster, Germany

1 - Having Your Cake and Eating it too: Investigating the Effects of Cross-selling in the Freemium Game Context Through a Field Experiment

Yashar Bashirzadeh, Rennes School of Business, Rennes, France, Stacey L. Malek, Andrew Petersen, Amanda P. Yamim, Ali Nadalizadeh

In this research, we examine the effectiveness of a cross-selling campaign on the engagement (time and money spent with a brand) of customers in a low-risk purchase context (offerings involving greater time than monetary investment). Further, we investigate the role of customer dispositional engagement (prior time and money spent with a brand) and incentives as moderators of relationships between the cross-selling campaign and engagement outcomes. We collect a rich dataset through a large-scale randomized field experiment involving two freemium mobile game apps of the same game developer: An existing game and a newly developed game. The cross-selling campaign promotes the newly developed game to the users of the existing game through emails and in-app messages. Our findings suggest that cross-adoption (adopting a new offering based on a cross-selling campaign) has a positive impact on total engagement with the brand (time and money spent on both offerings) regardless of dispositional engagement; the effect is stronger among users with high dispositional engagement. We further find that the positive relationship between cross-adoption and situational engagement with the newly developed offering is reduced when incentives are used. Finally, we find that cross-adoption has a positive impact on situational engagement with an existing offering because customers not only try the newly developed (cross-promoted) offering but also return to the existing offering as a result of the cross-selling campaign.

2 - The Effect of Co-branded Credit Cards on Consumer Loyalty

Nan Zhao, Washington University in St. Louis, Saint Louis, MO, United States, Arun Gopalakrishnan, Chakravarthi Narasimhan

We study how co-branded credit cards, a program in which a firm partners with a bank to market credit products leveraging its brand, affect its customers' behaviors. Towards this end, we explore three dimensions of customer loyalty that may be impacted: purchases made with the firm, loyalty points consumption, and customer attrition. Leveraging a comprehensive longitudinal data set from a major North American airline firm, we carefully estimate treatment effects for co-branded credit card adopters by using a combination of propensity score matching and Difference-in-differences methods to account for selection effects. Using pre-post data from adopters and our matched control group, we find that card adoption increased the frequency of flying, flight spend, and miles earned and consumed with the focal airline. Further, card adoption decreased customer attrition. We find heterogeneous treatment effects for business versus leisure travelers. Notably, positive treatment effects for business travelers persisted over time, whereas they are short-lived for leisure travelers.

3 - Does Self-declaration of Goals Change Customers' Shopping Behaviors? Effects of New Campaign Formats on Customers in Field Experiments

Keiko Yamaguchi, Nagoya University, Nagoya, Japan, Hiroshi Yamada, Tetsufumi Fujita, Shintaro Hanatani

Consumers join numerous loyalty programs simultaneously. To enhance their loyalty and attraction to the programs, firms offer temporal campaigns, such as a double point campaign. Most loyalty programs and their temporal campaigns are a trading stamp format, and shopping goals to earn rewards from the campaigns are usually prefixed by firms. Under these circumstances, firms find it difficult to differentiate their programs from those of others, and temporal campaigns might change customers to point pickers. Some studies proposed new campaign formats, such as incorporating gamification to support and activate loyalty programs. However, this is an ongoing research field. This study proposes a "declarative stamp-rally" campaign, a new type of campaign format that allows customers to set their shopping goals beforehand and encourages them to achieve their goals with a little fun. To evaluate this new format's effect on shopping behaviors, we developed an application user interface (UI) for the campaign and conducted online experiments and a field experiment. Through online experiments, we confirmed that the proposed UI and its operability enable participants to feel higher self-efficacy to achieve more goals while having fun. Further, we conducted a field experiment with a company that manages multiple shopping malls in station buildings. A one-month "declarative stamp-rally" campaign was held in a shopping mall in the station building located in western Japan by installing the proposed UI on the mobile application for the company's loyalty program. We verified how the proposed format could affect customers' shopping behaviors through this experiment, especially the achievement of the campaign goals and motivations for subsequent shopping. Our results reveal the significance of the self-declaration format that allows customers to set their shopping goals to change their shopping behaviors. They also imply the possibility that the proposed format could contribute to planning more productive shopping experiences.

4 - Relationship Configurations for Selling Servitized Offerings: A Fuzzy-set Qualitative Comparative Analysis

Victoria Kramer, Research Assistant and PhD Student, University of Muenster, Muenster, Germany, Manfred Krafft, Kaj Storbacka

Business-to-Business suppliers are increasingly employing servitized offerings such as solutions to generate and sustain a competitive advantage. Selling such offerings is often associated with a long-term relational process, during which customers and suppliers closely engage, build relational ties, and exchange valuable information and resources. However, throughout these processes, suppliers have to overcome several barriers, as selling involves many different actors and their interactions are highly context-dependent. Thus, choosing an unsuitable selling approach combined with a certain type of offering can lead to suboptimal business outcomes for both the supplier and the customer. Therefore, our study aims to shed light on the configurations of customer-supplier relationships that are associated with a rather transactional vs. a more relationship-oriented selling approach given a certain type of offering that is more or less servitized. We build a conceptual framework based on 13 in-depth interviews with industrial suppliers and their customers as well as an extensive literature review to characterize the configurations of customer-supplier relationships in the context of servitized offerings. To empirically investigate this framework, we conducted a survey with 182 industrial salespeople from three different industries and analyzed the data using fuzzy-set Qualitative Comparative Analysis. Thereby, our research extends the current body of literature investigating customer-supplier relationships in the context of complex servitized offerings using a configurational approach. The results provide industrial salespeople with valuable insights on the configurations of customer-supplier relationships that are associated with a more relationship-oriented vs. a more transactional selling approach given a certain degree of servitization of offerings.

■ TA10

Virtual Room 10

Advertising 1

Contributed Session

Chair: Nico Neumann, Melbourne Business School, Carlton, 3053, Australia

1 - Pacing in Real-time Bidding for Online Display Advertising

Ugurcan Dündar, Vienna University of Economics and Business, Vienna, Austria, Nadia Abou Nabout, Bernd Skiera

In real-time bidding, advertisers use different heuristics to allocate their budget over a certain time span (e.g., hours or days). The most common heuristic is even pacing and aims at an equal spend across time intervals of equal length. Even pacing is often the standard option in a real-time bidding campaign system. Yet, many industry experts claim that waterlevel pacing is a better option: While even pacing tries to spend the same budget even when there are few ad impressions in the market (e.g., at night), waterlevel pacing spends the budget according to fluctuations in traffic and, therefore, exhausts the budget faster when traffic increases. Yet, advertisers use waterlevel pacing rarely as real-time bidding campaign systems do not offer it as a standard option. Obviously, a pacing model superior to even pacing or waterlevel pacing should allocate the budget such that it maximizes profit over all time intervals. Yet, advertisers might avoid using such a pacing model because it requires accurate prediction of various input metrics (i.e., win rate, number of auctions, clickthrough rate, conversion rate, margin per conversion) for each time interval. In this paper, we aim to explore the profitability of even pacing and waterlevel pacing under various circumstances. Specifically, we answer the questions: (1) Which pacing heuristics do advertisers use and why? (2) Since calculating the profit maximum may not be feasible when advertisers cannot predict the required input metrics accurately, how close are even pacing and waterlevel pacing to a profit maximum? Which heuristic is superior under what circumstances? To answer these questions we develop a profit-maximizing pacing model. We then compare profits from even pacing and waterlevel pacing under various circumstances by adjusting the quality of our predictions for several input metrics. To this end, we use a unique real-time bidding data set comprising three different ad campaigns from different industries.

2 - The Effect of In-app Advertising on App Installation and Usage

Ammara Mahmood, Wilfrid Laurier, Waterloo, ON, Canada, Stefan Bernritter, Caroline Wiertz

The most common type of in-app advertisement pertains to app-install ads (i.e., encouraging users to install an app) and some estimate the revenue of app-install ad campaigns will surpass $7 billion by year-end 2020 in the US alone (BI Intelligence, 2016). While these campaigns might indeed increase adoption of the advertised apps, it is questionable how exposure to such campaigns would affect post-installation usage of these apps. We use actual app usage data from a large-scale randomized field experiment in conjunction with an in-app install advertising campaign for a leading Dutch online shopping platform from. During the campaign 5,067,885 mobile users were exposed to the in-app install advertisements and 137,463 users in the control group had no exposure to the campaign. We find that usage rates for users exposed to an in-app advertising campaign are higher during the campaign period and the effect persists even after the end of the campaign. This suggests that not only did the campaign help reinforce usage during the exposure period, but there was also a lagged effect that dissipated after 3 weeks. This effect was robust to the effect of newness and frequency of exposure. Drawing on persuasion knowledge theory and literature on cognitive dissonance we further explore the underlying reason for the increase in usage in three controlled experiments. We show that users exposed to in-app mobile ads who were aware of the ad exposure experience less post-purchase doubt and use the app more frequently compared to control users who were not exposed to the ad campaign. We further find that the effect is conditional on whether or not consumers externalize the installation decision after they have seen an ad. In our final study we manipulate externalization to understand why externalization reduces cognitive dissonance associated with post-purchase doubt. Our findings highlight the importance of in-app advertising for subsequent app usage decisions.

3 - Structural Changes in a Paid Search Advertising Market During the Early Stage of the COVID-19 Pandemic

Sungha Jang, San Francisco State University, San Francisco, CA, United States, Alex Kim

This study examines structural changes in a paid search advertising market due to the COVID-19 pandemic in 2020. Focusing on the relevant search advertising metrics such as the number of advertisers and keywords, bids, impressions, clicks, click-through-rate (CTR), cost-per-click (CPC), and the total advertising spending, we examine how a series of events related to COVID-19 affect the search advertising market. Our data, provided from the largest search engine in Korea, include the top 500 most frequently searched keywords around the outbreak of COVID-19 for the 18-month-period. We analyze several time-series intervention models with the data on search advertising metrics summarized weekly. We find that advertisers increased the number of keywords used while decreasing their bids on them. Consumer searches and clicks for the keywords in our data increased right after the breakout of COVID-19. However, the number of search and keywords seem to return to the pre-COVID-19 level within two months. Combining the changes in advertising strategy and consumer search and click, we find that CPC made by advertisers decreased while CTR does not seem to have any significant changes. Our study provides both theoretical contributions to digital advertising literature regarding how unexpected events affect digital advertising markets and practical insights to marketing managers in managing their digital marketing campaigns.

4 - Targeting it Decision-makers: What Type of Digital Advertising is Most Effective for B2B Prospecting?

Nico Neumann, Assistant Professor, Melbourne Business School, Carlton, Australia, Catherine Tucker, John Marshall

B2B marketers face the challenge of how to best communicate with prospective customers who have the required commercial responsibility. Advances in digital advertising technology allow B2B marketers to use a variety of targeting methods, including specifically-created B2B audience segments based on prospect lists or other proprietary methods. However, in this paper we present evidence that these specific B2B segments are not performing better at reaching IT decision-makers (ITDM) than basic prospecting from a publisher network. We further show that other privacy-friendly methods, such as first-party data targeting based on age tiers and gender or based on stated content-interest, do not only outperform the B2B audience segments at finding ITDM, but are also independent of third-party cookies. Our findings have significant implications for the discussion about the future of cookie tracking on the internet.

■ TA11

Virtual Room 11

Causal Effects and Policy Decisions

General Session

Chair: Sridhar Narayanan, Stanford University, Stanford, CA, 94305, United States

Co-Chair: Venkatesh Shankar, Texas A&M University, College Station, TX, 77843, United States

1 - Soda Taxes and Habit Reversal

Michael Patrick Palazzolo, University of California - Davis, CA, 95618, United States, Zoey Hu, Adithya Pattabhiramaiah

Sugar consumption has been linked to a variety of health conditions, including diabetes and obesity. To curb consumption of a common source of sugar   sugary sweetened beverages (SSBs)   local governments in the United States have begun implementing taxes on their purchase. While previous research has shown that these taxes have been largely effective at reducing consumption of SSBs, the downstream consequences of these taxes on other eating behaviors have not been documented. Unhealthy eating has often been linked to habit, both in academic research (e.g., Verhoeven, et al. 2012) and in the popular press. In this paper we aim to answer the question: does a reduction in households' demand for sugary sweetened beverages (induced by soda taxes) have a downstream impact on their inclination for purchasing sugary foods, more generally? We find evidence that supports this view. To investigate this further, we examine (i) which foods are purchased less frequently, and (ii) when households' gravitation away from sugary foods sets in. Lastly, we comment on the extent to which shifts in habit (a drop in SSB purchases leading to an organic decline in the demand for sugar over time) and supplier-actions or product complementarity (households reducing their purchases of foods that were often purchased together with SSBs) are driving such a shift in households' purchases away from sugary foods.

2 - Is Videogaming Addictive? An Empirical Analysis

Bruno Castelo-Branco, University of Michigan, Ann Arbor, MI, United States, Puneet Manchanda

We leverage video-game play data from a leading digital distribution platform for computer games to study video-game addiction. Following economic theory, we define addiction as the presence of a temporally-interdependent consumption pattern. We cast the model in a hierarchical Bayes framework that allows us to test for the presence of addiction at the individual player level. We also apply topic modeling methods to infer game features from user-written reviews to enhance our understanding of the relationship between addiction and game characteristics (e.g., loot boxes). Our results are likely to be relevant to policymakers and game developers seeking a better understanding of gaming addiction and its associations with game content.

3 - Identifying Complementarity in Usage of Subscription Software Products Using Advertising Experiments

Jon Zeller, Stanford University, Stanford, CA, United States, Sridhar Narayanan

In this study, we causally examine complementarity in usage across a set of related products from a multi-product firm. Software products and other digital products such as video streaming services are often developed in terms of integrated suites of products, with the idea that consumers can use them in complementary ways. At the same time, these products often have features or characteristics that make them substitutes in certain situations. We examine the extent to which products in such integrated product suites are substitutes or complements. The challenge in measuring complementarity between products consists of the confounds with correlated preferences and other correlated unobservables. We employ a novel experimental approach to causally measure these effects, leveraging advertising experiments that affect usage of one product but not other products. We develop an approach to measuring complementarity in the absence of price variation. We apply our approach to the context of a multinational firm that sells multiple subscription software products, and use data from a large set of advertising experiments run by the firm. We find evidence for complementarity between two of their most important products in the suite. We also explore heterogeneity in these effects, finding that they vary across both product and consumer segments. We find that accounting for complementarity significantly affects the measurement of ad effectiveness. We also document the impact of our estimates on ad targeting decisions by the firm.

4 - Inference Theory from Synthetic Control Methods for Nonlinear Trending Data of Unknown Form: Does the Lifting of Shelter-in-Place Keep COVID-19 Manageable?

Kathleen Li, University of Texas at Austin, Austin, TX, United States, Venkatesh Shankar

The synthetic control (SC) method is a valuable technique to estimate causal effects, in particular, the average treatment effect on the treated (ATT), in quasi-experimental data. The modified synthetic control (MSC) method is a powerful method for estimating causal effects when the synthetic control parallel trends assumption does not hold. Much of the inference theory for the SC and the MSC methods has been developed for stationary data and non-stationary data of known form. However, in applications such as public health, medicine, and business, the data follow unknown, nonlinear trends. No inference theory relating to the SC and the MSC methods exists for these data. We fill the research void and extend the literature by developing the inference theory for the SC/MSC ATT estimate when the outcome variables exhibit nonlinear trends of unknown form. With the inference theory in this paper, researchers can use the SC/MSC methods to estimate the ATT and conduct inference for a variety of data types, including stationary, unit-root non-stationary, and nonlinear trend non-stationary processes. We demonstrate the usefulness of our inference theory through an empirical application that estimates the effect of the state of Texas lifting the shelter-in-place order on COVID-19 cases in that state.

■ TA12

Virtual Room 12

Sustainability 1

Contributed Session

Chair: Jolie Gutentag, Pepperdine Graziadio Business School, Malibu, CA, United States

1 - Green Advertising Attitude on Behavioral Outcomes in Retailing: The Moderating Effects of Green Perceived Quality & Green Brand Equity

Joseph Lok Man Lee, The Hong Kong Polytechnic University, West Kowloon, Hong Kong, Calvin Cheng, Vanessa Liu

Green issue is a popular and fashionable topic to both Chinese retailers and consumers when consumers make purchase for retailed products and services. A survey of 48,000 consumers in 20 countries conducted by Dutch research agency Motivaction indicated that 64% of respondents from China identified themselves as environmentalists, more than double that of Europe and the United States. Based on the Health Belief Model (HBM), this study develops a predictor model of green advertising attitude to help understand the significant impacts that shape green advertising outcomes. It is crucial for this study to understand how Chinese consumers evaluate green perceived quality and green brand equity for purchasing green products and creating positive word-of-mouth. The model will be empirically tested using survey data collected from 358 consumers in Hong Kong; and analyzed using the partial least squares (PLS) structural equation modeling. This research achieves both theoretical and managerial contributions. The contributions of this paper are to (i) provide new insights regarding how green advertising attitudes are formed; (ii) examine how purchase intentions and word-of-mouth take shape under the moderating effect of green perceived quality and green brand equity; and to (iii) recommend green advertising strategies to retailers.

2 - It is Still Someone Else's!: The Effect of Implicit Theories on the Consumption of Preowned Goods

Sohyun Bae, National Cheng Kung University, Tainan, Taiwan, Natalie Truong, Sharon Ng

With the advent of new technology (e.g., online auction platforms) and increased public awareness about conserving the natural environment, the consumption of preowned goods has grown rapidly. However, despite that phenomenon, research on the consumption of preowned goods remains limited. To fill that gap, in this research we examined whether consumers' implicit theories influence their reactions (i.e., purchase intention and attitude) to preowned goods through the mechanism of psychological ownership. Because entity theorists are more likely than incremental theorists to use products and brands for self-signaling and to regard their possessions as part of their extended selves, we hypothesized that they are also more likely to believe that preowned goods, which were once part of another's extended self, cannot become part of their extended selves. In turn, because that dynamic lessens the psychological ownership of preowned goods, we hypothesized that entity theorists are less likely than incremental theorists to purchase preowned products. To test those hypotheses, we conducted four experiments involving various product categories (i.e., jacket, bicycle, laptop, and backpack) and found that entity theorists are indeed less likely than incremental theorists to purchase preowned goods due to their weaker psychological ownership of such goods.

3 - The Effect of Product Aesthetics on Consumers' Recycling Behavior

Ada Maria Barone, Postdoc, Aarhus University, Aarhus, Denmark

Consumers are responsible for what happens to a product after use and as such they are responsible for both the amount of solid waste generated and the success of recycling programs. However, despite the overall advantages of this practice, consumers are still reluctant to engage in recycling behaviours, with product containers and packaging making up the largest portion of solid waste generated (EPA, 2018). Indeed, while in Europe each consumer is producing an average of half a tonne of waste, only 40 percent of waste is being reused or recycled in the EU (European Commission, 2019). Similarly, the percentage of packaging being recycled has been stagnating in the US in recent years (EPA, 2019). While prior research has shed light on the psychological factors influencing recycling decisions, less is known about how characteristics of the product itself affect consumers' recycling intentions. Building on prior research about the effect of product aesthetics on product usage and consumption, we extend knowledge on this topic by investigating how product aesthetics (high vs. low) affects consumers' likelihood of recycling a product. Results of two studies show that consumers are more likely to recycle products that are more aesthetically appealing than products that are less aesthetically appealing. We show that this effect is driven by perceived product quality. This research contributes to the understanding of the psychological underpinning of consumers' wasteful behaviours and provides useful suggestions for policy makers and companies aiming to foster consumers' sustainable behaviours. Indeed, the findings of our studies provide insights to be used for designing products that are more likely to push individuals toward recycling behaviours. Furthermore, we extend research about the beneficial effects of designing highly aesthetic products. In this sense, we bridge marketing literature on product aesthetics and research on sustainability to explore the effect that product aesthetics has on consumers' recycling behaviours.

4 - Will Consumers Make More Sustainable Choices if They Construe Sustainability More Concretely? Evidence from Four Studies

Jolie Gutentag, Doctoral Candidate, Pepperdine Graziadio Business School, Malibu, CA, United States, Cristel Russell

Despite increasing awareness of the negative impact our lifestyles have on the environment, most consumers have not adequately changed their behavior. One possibility for the disconnect is the perceived abstractness of sustainability. Drawing on construal level theory, this research proposes that framing sustainability as circularity, based on the principles of the circular economy, reduces the abstractness of sustainability, in turn prompting consumers to behave more sustainably. In addition to the effects of circular framing on sustainable behavior, this research assesses the moderating role of consumers' chronic construal level, which captures someone's tendency to think concretely/abstractly. Study 1, a cross-sectional survey of a large national sample, confirmed the need to concretize sustainability: on the one hand, consumers with more concrete construal of sustainability engage in less sustainable behavior; however, amongst those more concrete consumers, the positive relationship between concrete construal of sustainability and engagement in sustainable behavior is greater. Study 2, an experiment manipulating circular versus sustainably framed packaging claims, indicated that, amongst more chronically concrete individuals, circular framing prompts more concrete message interpretation and increases willingness to pay. Results from two additional studies currently in the field will be available for the conference. We expect findings from this research to grow the body of knowledge on communication measures to concretize the concept of sustainability, enabling more widespread adoption of sustainable consumption.

■ TA13

Virtual Room 13

Behavioral Bias in Marketing

General Session

Chair: Kevin Chung, University of Wisconsin-Madison, Madison, WI, United States

1 - Team Composition and the Design of Group-based Commission Contracts

Hua Chen, University of Georgia, Athens, GA, United States, Kevin Chung

Does the design of group-based commission contracts for sales force depend on the ability composition of a sales team? The theory suggests that firms should choose the contract where the largest individual sales output within a team is used to determine the sales output of a team (i.e., maximum contract) when calculate the payoffs, instead of the conventionally used average sales output of a team (i.e., average contract). This is because the former can induce higher team effort from the sales agents. While for the homogeneous team, these contracts are equivalent. Two incentive-aligned lab experiments are conducted to valid the theory and the results provide overall support to the theory predictions. Notably, the low-ability team members exert similar effort across the different contracts, although the theory predicts higher effort under the average contract, which makes the predicted benefits of the maximum contract conservative.

2 - Goal Pursuit Behaviors On Social Media

Nathan Zhi Huang, University of Wisconsin Madison, Madison, WI, United States, Kevin Chung, Keehyung Kim

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 on 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 and creating content with more engagement. The effect becomes larger for those who experienced a greater follower growth rate. This effect is robust across various specifications while the falsification test with random milestones exhibiting null effects. Based on this finding, we construct a dynamic model of users’ posting behaviors where their psychological utility increases as they approach their “milestone”. The estimates show that although it costs users more to create content with more engagement and post more frequently when pursuing goals, their utility gain increases overall as the psychological utility is taken into account.

3 - Reference Points and Asymmetric Effort

Kevin Chung, University of Wisconsin-Madison, Madison, WI, United States, Yepeng Jin

Prospect Theory postulates that agents make reference-dependent decision where outcomes are framed either as losses or gains. In this paper, we examine field evidence of loss aversion in the context of home field advantage in football/soccer. Our study provides field evidence of how ``realized'' deviation from reference point affected experienced agents' subsequent effort provision. Specifically, we assess how removing audience from the stadium post Covid-19 pandemic, affected the performance of both home and away players in professional soccer.

Thursday, 10:15AM - 11:15AM

■ TB01

Virtual Room 01

Information

Contributed Session

Chair: Michelle Y. Lu, McGill University, Desautels Faculty of Management, Montreal, H3A 1P2, Canada

1 - Browse or Experience

J. Miguel Villas-Boas, University of California, Berkeley, CA, United States, Z. Eddie Ning

Consumers gain information about the evolving value of a product both prior to purchase and when owning a product. We consider a model where both these types of gaining information are possible. The information gained when owning the product may affect future product purchases. We characterize when the consumer chooses to purchase the product if the consumer does not own it, the expected interval of time between purchases, and the expected number of product purchases over time. We find that the optimal price is independent of the initial product valuation if that valuation is sufficiently low such that a consumer not owning the product does not purchase it immediately, and characterize how the price charged affects the consumer information gathering strategy. We also characterize how the extent of learning when owning and when not owning the product, the duration of the product, and the discount rate affect the optimal consumer and firm strategies.

2 - The Upsell-Downsell Tradeoff

Rick Harbaugh, Indiana University, Kelley School of Business, Bloomington, IN, United States, Wonsuk Chung, Archishman Chakraborty

Salespeople, influencers, and other product recommenders earn a higher commission by successfully pushing an expensive product, but they are more likely to generate a sale by recommending a cheaper option. We analyze this classic upsell-downsell tradeoff when an informed recommender makes a "cheap talk" product recommendation to buyers who strategically adjust for the recommender's incentives. Based on the quasi-convexity properties of standard discrete choice models, we show that a simple recommendation equilibrium exists that benefits the recommender if upsell incentives are sufficiently weak, downsell incentives are sufficiently countervailing, or the probability of a sale is sufficiently low. Otherwise the recommender does best by withholding their opinion. If buyers are unsure whether the recommender is biased by an upsell incentive, then biased recommenders have an even stronger incentive to upsell, while unbiased recommenders have an incentive to downsell so as to avoid losing sales from appearing to be biased. If some buyers credulously do not adjust for the recommender's bias then upsell recommendations are more exaggerated, and if the fraction of credulous buyers is too high such "puffery" loses all credibility among other buyers. The results show that as long as buyers understand the recommender's incentives, providing upsell and downsell options can facilitate credible communication to buyers, and that higher commissions on pricier goods can paradoxically keep upsell and downsell incentives in balance.

3 - Paying for Consumer Attention

Mengze Shi, University of Toronto, Toronto, ON, Canada, Mohsen Foroughifar, Michelle Y Lu

The prevalent digital advertising practice often leads the platforms to send an excessive amount of advertisements to which consumers pay minimal attention. This paper develops an analytical model to distill the causes for such advertising inefficiency. Consumers will not pay high attention to the ads if the expected value of a possible match is low. Moreover, in response to low attention, the platform may send a maximum number of ads. To mitigate this problem, we propose two solutions: a paying consumers money for attention (PCMA) model and a paying consumers tokens for viewing (PCTV) model. The PCMA model uses monetary payment to incentivize consumer attention and move the ad volume to the first-best level. However, if the platform does not have a reliable attention-monitoring technology, the consumer moral hazard problem can arise to limit the performance. The PCTV model lets the consumers choose the ad volume to view and pays consumers with utility tokens, the value of which is endogenously determined by the equilibrium level of attention. The PCTV model may further reduce the advertising inefficiency while correcting for the consumer moral hazard problem. Our results also inform the role of consumer privacy concerns in advertising efficiency.

4 - A Content Marketing Dilemma: When Will and Will Not Brand-neutral Content Marketing Build Brand Preference?

Michelle Y. Lu, McGill University, Montreal, QC, Canada

To attract consumers, brands are embracing a content marketing strategy - becoming content publishers by producing brand-neutral content without touting brand information. In this research, we highlight a dilemma faced by a content marketer. By becoming a content marketer, it can strategically amplify the hold-up problem for the brand advertiser while precipitating it for itself. We call these two effects "dual hold-up'' problems. First, consumers' primary information needs for generic content lead to the prominence of the content marketer so that it will be visited first. Then the content marketer strategically leverages the hold-up tension between its competitor and consumers. Second, by handicapping itself and excluding brand content, the content marketer can commit not to holding up consumers. Consequently, the content marketer obtains a premium - capturing more consumers at a higher price than its competitor. However, the competitive motive to obtain the dual hold-up premium leads to both firms adopt brand-neutral content marketing, wiping out the existence of the brand premium. We then investigate when and when (not) this type of content marketing can endogenously build rational consumers' brand preference when prices are observable. We show that symmetric firms end up adopting asymmetric content strategies. Whether or not the content marketer obtains brand premium depends on horizontal differentiation and the value of brand-specific information. This endogenous outcome shows a de facto brand preference. The content marketer's premium can also arise under general distributions.

■ TB02

Virtual Room 02

Behavioral Economics 2

Contributed Session

Chair: Avner Strulov-Shlain, University of Chicago, Chicago, IL, United States

1 - Does Price Sensitivity Vary with Sleep Duration? A Cross-category Analysis

Zining Wang, PhD Candidate, University of British Columbia, Vancouver, BC, Canada, Yitian (Sky) Liang, Zhongqiang (Tak) Huang, Gerald J. Gorn, Charles B. Weinberg

Lack of sleep, a threat to both physical and mental health, is increasingly prevalent. Yet, the influence of sleep insufficiency on consumer behavior has rarely been studied. To the best of our knowledge, price sensitivity, one of the most studied phenomena in marketing, has not been associated with physiological factors such as sleep. Consequently, we ask does sleep duration affect price sensitivity? We answer this question by measuring price elasticity using household-level data across 18 grocery categories from 2006-2016. As a later sunset time is negatively correlated with sleep duration, we use the sunset time (by week) for each household (by zip code) as a proxy for sleep duration. For each product category, we estimate a random coefficients nested logit model with category incidence at the upper level and brand choice at the lower level, using control functions to address price endogeneity. Our estimation models also control for brand specific effects, state dependence, features/displays, and seasonality. The identification assumption is that short-term local sunset time variation only affects price sensitivity through its impact on sleep duration after conditioning on the control variables in the model. Our preliminary key result, which holds across most of the product categories we study, is that a reduction of sleep tends to increase price sensitivity. This result largely is related to changes in brand choice. Research on other factors underlying this relationship is currently being pursued. Beyond sleep, our results suggest that a greater understanding of the relationship between price sensitivity and physiological factors is worthy of future research.

2 - Consumer Preference for Mystery Products

Lucas Stich, Ludwig-Maximilians-Universität München, München, Germany, Martin Spann, Gerald Häubl

Selling a “mystery product” is a marketing practice where some aspects of a product are initially concealed and revealed to consumers only once a purchase has been completed. A mystery product is not a specific product, but rather a set of candidate products. Once a consumer has chosen a mystery product, the specific product s/he gets is determined (selected from the set of candidates) by the seller or service provider. Thus, at the time of choosing a mystery product, the consumer does not know which of the candidate products s/he will get. While prior research has thoroughly examined what motivates sellers to offer mystery products and the conditions that make this marketing practice effective, very little is known about consumers’ preferences for such offers. We introduce a theoretical framework that conceptualizes mystery products as relinquishment of control over a product/consumption choice, and we use it to identify driving and restraining forces that promote or prevent consumer choice of mystery products. The results from two consumer surveys and a series of experiments provide evidence in support of our theoretical framework, thus advancing our understanding of when and why consumers have a preference for or against mystery products.

3 - Does Buyer Visit Matter? An Empirical Investigation of Resale House Market

Zhe Lin, National University of Singapore, Singapore, Junhong Chu

Pricing resale products such as pre-owned houses, cars and artistic paintings is a challenging task, especially in a turbulent market. First, sellers face item-specific demand uncertainty when setting prices for their resale products. Due to the lack of ex-ante information about demand for each unique item, sellers have to adjust the list prices for their products according to the arrival of latest demand information. Second, in a competitive market like the resale house market, sellers have to deal with competitive effect from other sellers when making price-setting decisions. In this paper, we develop a dynamic pricing model for a resale house market, in which forward-looking individual sellers make pricing decisions while facing demand uncertainty and competition from other sellers. The model is estimated using a unique dataset from a leading Chinese resale estate agency. Based on the parameters from structural estimation, we simulate the counterfactuals to derive policy decisions for the real estate agency. The results show that the real estate agency could increase its profit either by arranging the buyer visits earlier or by attracting more buyers to visit the houses.

4 - Firm Sophistication: A Natural Experiment on Price Endings

Avner Strulov-Shlain, University of Chicago Booth School of Business, Chicago, IL, United States

Do firms optimize? When consumers are left-digit biased, demand is discontinuous at round numbers, making those prices dominated. I present evidence that firms respond to left-digit bias in the long-run. They act as if they know this demand structure, setting round numbers for only 1%-2% of posted prices and just-below prices for 45%. However, due to a slight reform in the set of admissible prices, supermarket chains in Israel fail to respond optimally. Round numbers post-reform account for 20% of prices, making pricing sub-optimal. Even though the true price change is only a cent, I estimate demand lower by 7%-10% at the round prices. After about a year, firms respond again as the shares of round numbers drop. Combining the well-understood bias, data, and reform allows a unique window to look into firms sophistication level. I consider various explanations to the findings, and conclude that the most likely explanation is that firms do not optimize in the usual sense but follow rule-of-thumb heuristics.

■ TB03

Virtual Room 03

Influencer Marketing II

General Session

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

Co-Chair: Andreas Lanz, HEC Paris, HEC Paris, Jouy-en-Josas, France

1 - Playing the Game: Reimagining Video Games as a Dynamic Marketing Communication Channel

Michael Haenlein, ESCP Europe, Department of Marketing, Paris, 75011, France, Roman Welden, Kelly Hewett

Although video games are generally viewed as a form of entertainment for a small subset of people, in reality, they provide a channel for nearly 2.2 billion consumers to interact with others and offer multiple paths for marketers to interact with them. However, up to this point, marketing research has not explored how this channel is structured and which strategies marketers can use to interact with consumers successfully. This manuscript provides a definition of video games that aligns with the marketing perspective to help marketers understand which types of games are best suited for marketing content. Next, using flow theory feelings as information theory, we outline the consumer experience within video games and present a conceptualization of an interconnected ecosystem that highlights significant parties involved with the channel. From here, ten propositions are identified that meaningfully direct current marketing practice while shaping the future of marketing research from three perspectives: marketers looking to utilize the video game ecosystem for promoting content, understanding the opportunities generated by live streaming by influencers, and strategy formation for VGCs (video game companies) to expand the marketing potential of the ecosystem. From these propositions, we provide strategies to direct current marketing practice and identify relevant future research directions.

2 - Influencer Follower Count and Social Media Engagement

Alexander Edeling, University of Cologne, Albertus-Magnus-Platz, Cologne, 50923, Germany, Simone Wies, Alexander Bleier

Follower count, an influencer’s number of followers, is a key criterion for firms’ staffing and devising of influencer marketing campaigns. However, to which extent a larger or smaller follower count renders an influencer more effective in generating social media engagement is still a much-debated question. Previous studies on influencer marketing campaigns moreover remain inconclusive about the functional relationship between follower count and social media engagement. In addition, extant research focuses on a limited set of engagement metrics (usually likes and comments) and investigates individual influencer effectiveness without accounting for the networks of the different influencers that are staffed onto a particular campaign. This research investigates the relationship between influencer follower count and engagement with her sponsored content across a set of eight key social media performance metrics. Based on a sample of Instagram marketing campaigns involving influencers contributing both sponsored post and story content, the authors demonstrate an inverted U-shaped effect of follower count on all engagement metrics. In addition, the results show that engagement elasticities are strongest for metrics associated with content observation and weaken considerably for metrics associated with content propagation. Finally, the degree to which followers overlap between influencers of a particular campaign moderates the follower count-engagement relationship. The results enrich theoretical knowledge about social media marketing effectiveness and provide social media managers with clear strategic guidelines for their influencer marketing efforts.

3 - Survival of the "Fittest": Brand-Influencer Collaborations and Brand Engagement

Anwesha De, Indiana University, Bloomington, IN, 47408, United States, Beth Fossen

Social media has emerged as a dominant platform for engaging consumers, motivating brands to increase their presence on the medium. Despite the increase in social media investments, the contribution of these investments to firm performance has been stagnant, indicating that brands haven't mastered effective social media strategies. We explore how brands may leverage their presence on social media to drive engagement with two stakeholders - consumers and investors - through social media influencer marketing. Although using influencers to persuade consumers has been a well-established marketing strategy, the pervasiveness of social media has made this strategy considerably more appealing to marketers. Thus, brands now have an opportunity to leverage influencer marketing to enhance their engagement with the stakeholders. While literature highlights the importance of social media influencer marketing for marketers, research on how brands may effectively increase engagement with consumers using influencers is still nascent. Additionally, our understanding of the impact of the fit between the characteristics of the influencer, brand, and the content on brand engagement is limited. The fit between these drivers of brand engagement on social media is particularly important given the repercussions a brand might face in case of misalignment. To study this phenomenon, we use tweets from 400 social media influencers across three industries - beauty, health and wellness, and fashion - and stock information of firms to provide insights into (1) the characteristics of social media influencers, brands, and content that may drive consumer engagement and (2) the impact of social media marketing efforts on investor reactions.

4 - Who to Target? Low- Versus High-Status Seeding in User-Generated Content Networks

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

Recently, there have been more and more industry articles pointing out the value of low-status influencers. This goes against seeding literature in marketing, which almost unanimously recommends targeting high-status influencers. Since the common (mostly implicit) assumption is that high-status influencers generate a high return, our goal is to fill this research gap and consider the whole influencer marketing funnel, i.e., conversions from followers (e.g., on Instagram) to views (on the sponsored post), to engagement (with the sponsored post), to landing page views (on the firm's website), to sales. Given the accumulating empirical evidence that optimal seeding policies may very well be reversed, does it really pay off to engage high-status influencers as opposed to low-status influencers when considering the whole influencer marketing funnel? To shed light on this question, we conducted two field experiments and find supportive evidence that high-status influencers may indeed not be as effective. Although they perform better regarding views, in the subsequent stages of the funnel they seem to underperform: They are less effective in terms of engagement as well as concerning sales. More specifically, an engagement from low-status influencers costs about half and regarding sales a conversion costs about a tenth. Surprisingly, for sales the difference in effectiveness holds not only in relative but even in absolute terms: High-status influencers generated a third of the conversions compared to low-status influencers. However, both groups disappoint when considering the return on spending (ROS), where return is the revenue after spending: Both feature negative ROS, however, with low-status influencers the manager loses only about 50% compared to well over 90% on the Euro.

■ TB04

Virtual Room 04

Reviews/UGC 2

Contributed Session

Chair: Ibrahim Cikrikcioglu, Erasmus University-Rotterdam, Rotterdam, 3072NE, Netherlands

1 - The Influence of Culture and Dialectical Reasoning on Amazon Product Reviews

David DeFranza, PhD Candidate, University of Utah, Salt Lake City, UT, United States, Pronobesh Banerjee, Promothesh Chatterjee

There is a well-documented polarity and positive imbalance in online review ratings, especially those posted to Amazon. In other words, reviewers tend to assign either one- or five-star ratings to products, but most often assign five-star ratings. However, little research has considered whether this phenomenon is unique to the United States. In the present work, we model both review ratings and the sentiment of review text across a variety of product categories in the United States and Japan. We find that for the same products, reviewers in Japan are significantly more likely to assign two-, three-, and four-star ratings than those in the United States. Using natural language processing methods, we find evidence of dialectical reasoning, a logical tendency to balance positive and negative evaluations regardless of overall opinion, in the reviews written by consumers in Japan. Among reviews written by consumers in the United States, we find evidence of non-contradiction in that five-star review text is significantly more positive than one-star review text. Finally, the sentiment of review text is found to significantly mediate the relationship between culture (United States, Japan) and likelihood of assigning a given star rating. This work provides ecologically valid support to the predictions of naïve dialecticism and suggests that culture may play an important role in consumer evaluations of products and subsequent expressions of opinions based on these evaluations.

2 - In the Eye of the Reviewer: An Application of Unsupervised Clustering to User Generated Imagery in Online Reviews

Bill Rand, North Carolina State University, Raleigh, NC, United States, Gijs Overgoor, Rohan Mestri

Mining opinions from online reviews has been shown to be extremely valuable in the past decades. There has been a surge of research focused on understanding consumer brand perceptions from the textual content of online reviews using text mining methods. With the increase in smartphone usage and ease of posting images, these reviews now often contain visual content. We propose an unsupervised cluster method to understand the user-generated imagery (UGI) of online reviews in the travel industry. Using the deep embedded clustering model, we group together similar UGI and examine the average review ratings of these clusters to identify imagery associated with positive and negative reviews. After training the method on the entire dataset, we map out individual hotels and their corresponding UGI to show how hotel managers can use the method to understand their performance in particular areas of customer service based on UGI. The performance in a cluster relative to the population can be a clear indicator of areas that need improvement or areas that should be highlighted in the hotel's marketing efforts. Overall, we present a useful application using visual analytics for mining consumer opinions and perceptions directly from image data.

3 - Emotions in Review Texts & Social Influence

Moamen Elsherbiny, Luiss Guido Carli, Rome, Italy, Feray Adiguzel, Evangelos Syrigos

The popularity of consumer-generated reviews and their influence on potential customers is indubitably one of the most important issues that are of considerable interest to both practitioners and academics. Consumers are increasingly relying on the aggregated opinion of others by reading online reviews to make purchase decisions. Extant literature has already acknowledged that previously posted ratings create significant social influence bias in individual rating behavior, but there is hardly any study to understand whether the impact of social influence changes with rating context (emotions embedded in the text), product, and reviewer characteristics. The authors employed the latest text mining technique, employing different machine learning algorithms, to extract emotions embedded in reviews using a large data set of online reviews—over 150 thousand reviews from two major online platforms and fitted a multilevel ordinal logistic model. The results show that reviewers who expressed contempt (i.e., anger and disgust) in their reviews increased their ratings after exposure to high prior ratings, while reviewers who expressed love (i.e., joy and trust) and despair (i.e., fear and sadness) decreased their ratings. Interestingly, the social influence effect of prior ratings on subsequent ratings was significantly positive for budget hotels, anonymous and non-repeated reviewers; but it was not significant for luxury hotels. We further discuss the implications of our findings for both theory and practice.

4 - Personalized Reviews: A Deep-learning Based Review Ranking Model

Ibrahim U. Cikrikcioglu, PhD Candidate, Erasmus University Rotterdam, Rotterdam, Netherlands, Gui Liberali

Online reviews have become one of the main tools for assisting people with their purchase decisions. Despite the availability of thousands of reviews per product, consumers are not willing nor able to read all of them. Even if a consumer could read all reviews, her preferences can be substantially different from those of the reviewers who wrote them. This paper builds a personalized-review algorithm that ranks product reviews in line with consumers preferences. While existing algorithms can rank reviews only by recency or helpfulness scores, our personalization method enables potential buyers to focus on the reviews written by similar consumers. Our machine-learning method starts with latent factor models to represent consumers and products in the same high-dimensional vector space. Then, it leverages deep neural networks to model the interaction between these latent representations. Finally, to compare the interaction vectors with reviews, we obtain vector representations of reviews via a state-of-the-art language model. When training the system, we use triplet loss as the cost function. Because of transfer learning, our model can rank reviews for consumers who have not written any reviews in the product category of interest. We test our model on 2.2 million product reviews in the e-books category from Amazon.com. These reviews were written by 139,816 consumers for 98,824 unique products in the years between 1996 and 2018. We assess the performance of our model using ranking-based accuracy metrics. Our initial results indicate that our model achieves a 35.36% ranking accuracy on the test set, as compared to the random baseline of 10%. We close with a discussion of implications for personalization methods and review ranking algorithms.

■ TB05

Virtual Room 05

Online Retailing

Contributed Session

Chair: Koen Pauwels, Northeastern University, Newton, MA, 02459-1134, United States

1 - Augmented Reality as Substitute for Direct Product Experiences? Evidence From Online Consumers' Buying Behavior During the Covid-19 Pandemic

Alexander Pfaff, Ludwig-Maximilians-Universität München, Munich, Germany, Martin Spann

Augmented Reality (AR) is an innovative tool to present products online. It enables consumers to project virtual product models into their surrounding real environment in real time. For online retailers, the tool therefore bears the potential to offer direct product experiences which traditionally can only be provided in brick-and-mortar stores, for instance by tactile and spatial product examination. However, retailers may be hesitant to implement AR in their online shops given the required investments and lack of knowledge about its informative and revenue-related effects compared to conventional online product presentation tools, such as images of a product. To investigate AR's potential, we analyze a unique dataset provided by a European multi-channel home interior retailer. The dataset comprises online purchases of AR and non-AR enabled products before, during and after a countrywide lockdown in course of the COVID-19 pandemic. We make use of this lockdown to isolate the effect of AR when consumers are deprived of their opportunity to directly experience products in store. We derive implications for multi-channel retailers and contribute to digital marketing research by examining a digitization trend accelerated by the pandemic.

2 - Dynamics of Different Spatial Networks and Consumer Channel Choices

Meng Ji, Doctoral Student, Kelley School of Business, Indiana University, Bloomington, IN, United States, Jingcun Cao, Shyam Gopinath, Shibo Li

Consumer channel choice is important for business revenue and profitability and it has received extensive attention in the marketing literature. However, the impact of different types of spatial networks around the consumer on his or her channel choice and the dynamics of these spatial networks remain understudied. In this paper, we propose four types of spatial networks and investigate how these different spatial networks would dynamically influence consumer channel choices of online delivery and buy-online-pickup-in-store (BOPS) based on the social influence theory and transaction cost theory. A unique dataset from a leading online retailer in Hong Kong provides us with rich information to perform in-depth empirical analyses. Our study suggests that the four types of spatial networks influence consumer channel choices differently over time, and these impacts are moderated by consumer experience with the site, the severity of pandemic regulations as well as marketing mix such as product price. Therefore, the study sheds light on consumer channel choices in the presence of various spatial networks and provides important managerial implications to marketing scholars and online managers on multi-channel marketing and customer relationship management.

3 - Peer Motivation in Online Shopping During the Business Shutdown

Rajagopal Rajagopal, Professor and National Researcher, Tecnologico de Monterrey (ITESM), Mexico City, Mexico

The global pandemic of Covid-19 has significantly affected business in the brick-and-mortar stores in Mexico since March 2020 due to movement restrictions and business shutdown. This situation has motivated most customers to lean towards buying products and services from the online retail outlets. Motivation for this study has been derived from three theories- Interactive Learning Theory (digital learning interface), Technology Acceptance Theory (model), and Theory of Planned Behavior (Ajzen, 1985). This study has been conducted in 6 online retail stores with the online survey of 342 buyers in Mexico aged above 40 years. Data has been analyzed using two regression models with dependent variables perceived usefulness of technology and buying decision of customers. Multiple correlations across the variables were computed. In addition, reliability test goodness of fit index was also carried out. Results of this study reveal that as customers found higher ease of use of online shopping, they perceived higher usefulness of online retailing technology; and that the perceived high quality of retailing website positively influences impulsive buying behavior of customers. The results revealed that an increase in coupon promotions has positively enhanced the perceived buying impulsiveness of consumers in online stores; and the perceived usefulness of online redemption of coupons has positively benefited the attitude of customers towards buying. The social media has played an instrumental role in attracting customers to online shopping and positively influencing the buying decision of customers (e. g. Kim et al., 2011)

4 - Measuring Online Brand Mindset Metrics

Koen Pauwels, Northeastern University, Newton, MA, United States

Since the start of online shopping, companies and researchers have proposed online proxies for customer mindset metrics, such as brand awareness and consideration, often consisting of a single metric, such as website visits, engagement or share of search. Unfortunately, these proxies suffer from limited construct development and validation, and recent empirical studies have demonstrated low correlation with survey-based measures and power to predict brand sales (Dotson et al 2017, Pauwels and van Ewijk 2020). Based on years of construct development and testing at a large online retailer, we start from 446 measures of potentially relevant online behavior to construct awareness and consideration indices and demonstrate their correlation with survey metrics across brands and categories. Next, we examine whether the constructed metrics meet the 4 criteria of (1) advertising responsiveness, (2) sales conversion, (3) stability over time and (4) potential (Hanssens et al. 2004). To the best of our knowledge, ours is the first successful attempt to examine these criteria for online metrics, which are unobtrusive to consumers and less expensive to collect and use at scale. Finally, we demonstrate how brand managers use these metrics to inspire new marketing actions.

■ TB06

Virtual Room 06

Digital Advertising

Contributed Session

Chair: Dinah Cohen-Vernik, University of Houston-Downtown, Marilyn Davis College of Bus. Houston, TX, 77002-1018, United States

1 - Don't Invade My Personal Space! Strength of Ties in Social Media and Paid Ad Intrusiveness

Elham Yazdani, University of Georgia, Athens, GA, United States, Anindita Chakravarty

With the surge of paid ads on social media, the perception of customers towards this kind of advertising has changed. While exposure to customized ads can increase the efficiency of customer purchase, it can be considered intrusive for other users. In this research, we apply the strength of ties theory to understand if a user's perceptions of ad intrusiveness might depend on the user's strength of ties with 'friends' whose posts are visible before the ad. We propose that stronger the tie, the higher the perceived ad intrusiveness. Strong interpersonal ties with friends involve more intimacy and higher emotional involvement with the content posted by those friends, while users might be non-involved with information posted by weak friendship ties. Thus, an ad that appears after a flow of posts from stronger ties might invade the user's personal space and be considered intrusive to a greater extent than if it appears after posts from weaker ties. To have a deeper understanding of the underlying mechanisms, we also look at different moderators on the impact of friends' strength of ties on perceived ad intrusiveness and creepiness. For example, the strength of user's relationship with the advertised brand or the type of product or service being advertised or the relevance of the ad to the user's needs can impact the intrusiveness perceptions. Our primary data collection is about the activity of real users on Facebook for 15 weeks. We obtain perceptions of posts, ads, and tie strength of friends during users' real time Facebook activity. We also follow up with MTurk experiments to understand causal effects and test moderators. The findings of this research can provide useful insights for the position of paid ads on social media feed of users. Further, unlike existing strength of ties research, which mainly considers the usefulness of the information obtained from ties of different strength, we relate strength of ties to notions of personal space, intimacy and intrusiveness that have implications for advertisers and social media platforms. In this manner, we make a theoretical contribution as well.

2 - Effects of Live Comments and Ads on Social Media Engagement: Application to Online Short Videos

Xiaodan Zhang, University of Science and Technology Beijing, Beijing, China, Junjie Chen, Zhanbo Zhao

Understanding the effect of live comments and advertising on followers' digital engagement is essential for successful social media marketing. This article examines how moment-to-moment (MTM) comments and the interaction with ads affect consumers' responses to online videos, such as like, comment, share, favorite, as well as coin. Using MTM unstructured data collected from a large Chinese online live platform - Bilibili (2081 videos), we conducted statistical and text analysis. Results show that high volume of live comments at the beginning has a negative effect on consumers' engagement, while those at the end has a positive effect. Comparing to implicit ads, explicit ads have positive effects on followers' online engagement. For videos with explicit ads, we find that the mid position receives higher evaluation than the end position, especially for lifestyle and animation videos. For videos with ads, the beginning live comments volume is more likely to amplify the negative effect of placing in-video ads on video evaluation, while the variability of live comments will reverse the negative effect of ads in-video. For explicit ads, the beginning live comments volume is more likely to dampen the negative effect of placing in-video ads on video evaluation. The moment-to-moment effects are mediated by sentiments of live comments.

3 - Shopping Cart Retargeting

Arun Gopalakrishnan, Rice University, Houston, TX, United States, Young-Hoon Park

Firms use online retargeting as a means of reaching out to consumers based on their previous internet actions. While retargeting has been extensively studied in the context of serving online advertising to prospective customers, limited research has examined retargeting in the context of an e-commerce firm's existing customers based on their past behavior within the firm's website. In this study, we design and implement a randomized field experiment with an online retailer in which customers who left items in their shopping cart without purchase were exposed to one of two shopping-cart retargeting communications, one with a base-level offer and the other with a better offer. Further, a control group received a default retargeting communication which provides a reminder but without an accompanying offer. During the test period, we find shopping-cart retargeting with a base-level offer performed similarly to the control group. However, shopping-cart retargeting with a better offer significantly outperformed the group with the base-level offer and control group across a wide range of measures in the online conversion funnel, including customer engagement with their shopping cart. The primary driver of increased sales was a lift in purchase rate. We also find heterogeneous treatment effects such that customers with more items in their shopping cart experienced larger purchase lifts. Further, in the post-test period, we find no evidence that the shopping-cart retargeting resulted in strategic customer behavior.

4 - Emoji in Subject Lines: Effect on Email Open Rates

Dinah Cohen-Vernik, University of Houston-Downtown, Houston, TX, United States, Michael Pettiette

Email marketing is one of the most cost-efficient ways to get a message out to a specific audience. In the world of digital marketing, where consumers are inundated with ads, "ad blindness" has become a concern. Email marketing is still consistently ranked as one of the most effective marketing channels by practitioners, outperforming even social media and affiliate marketing. Open rate is an important KPI (key performance indicator) for email campaigns. If no one opens the promotional email, it generates neither web traffic nor new business. The subject line is a key factor affecting the likelihood of an email being opened and read, and there are numerous articles studying the composition of a "perfect subject line", written both by academics and practitioners. Despite the usage being controversial, placing emoji in subject lines is a recent trend: online advice columns written by industry experts on whether to use emoji are plentiful, but these anecdotes frequently amount to contradictory advice that does not always meat an evidence-based standard. To the extent of our knowledge, the research literature has not yet addressed the effect of emoji usage in subject lines on email open rates (at least not in an in-depth way). This project attempts to fill this gap by examining data gathered across multiple email marketing campaigns in several different industries, while hopefully examining the extent of the connection between the usage of emoji in email subject lines, and campaign KPIs. The study will specifically focus on the email open rate as the key campaign success predictor. Furthermore, meaningful and actionable insights for digital marketing industry professionals are offered based on the analysis.

■ TB07

Virtual Room 07

Location Big Data and Consumer Location Intelligence (Session A)

General Session

Chair: Natasha Z. Foutz, Charlottesville, VA, 22904, United States

Co-Chair: Baohong Sun, Cheung Kong Graduate School of Business New York, NY, 10022, United States

1 - Panoramic Market Structure Analysis Leveraging Consumer Location Big Data

Eunkyung An, New York University, New York, NY, United States, Natasha Zhang Foutz, Xiao Liu, Baohong Sun

Consumers' daily movements and location visitations reveal their 24/7 lifestyles and brand preferences within and across industries. Compared to the traditional, intra-industry, competition-centric market structure, consumer movement data portray a never-before, cross-industry, customer-centric market structure. We employ the heterogeneous network embedding model to population-scale, granular, behavior-rich, individual-level location data to derive panoramic market structure embedding brand-store-customer networks and lifestyle segments. This analysis offers marketers unprecedented business intelligence for targeting, entry/exit strategy, and cross-industrial promotion and brand alliance.

2 - Analyzing Purchase Decisions Using Dynamic Location Data

Peter Pal Zubcsek, Tel Aviv University, Ramat Aviv, Israel, Tal Shoshani, Shachar Reichman

With a few exceptions, retailers' efforts to monetize consumer location data are still dominated by naïve protocols such as geo-fencing (customizing marketing interactions based solely on the current location of all app users). While past research has noted the inefficiency of such approaches due to ignoring the heterogeneity of app users at any given location, alternative methods to monetize longitudinal consumer mobility data are scant in the literature. In this paper, we extend the methods of Ghose, Li, and Liu (2019) from continuously-measured indoor mobility trajectories to low-granularity urban mobility data. We determine consumers' daily mobility trajectories, and for each day, we define the distance of each store from consumers' "anticipated trajectories" by averaging store distance over all observed trajectories in the prior few days. To test our method, we model gas station choice during a six-month period in Staten Island, NY. Our data, also used to infer gas station visits, contain 11.7 million location records on 273 thousand devices observed near selected retailers including gas stations. We supplement our data with station-level daily fuel prices and, controlling for brand intercepts and station loyalty, estimate a conditional logit model to assess how consumers trade off gas prices versus store distance. We find that accounting for consumers' location histories using our method allows for better out-of-sample predictive accuracy despite the generally strong station loyalty in the market. We also conduct counterfactual simulations, which reveal how the busiest traffic flows affect the geographic structure of competition in gasoline retail.

3 - Balancing Consumer Privacy with Marketing Insights

David A. Schweidel, Emory University, Atlanta, GA, 30322-1059, United States

Mobile location data offers granular detail into consumers mobility patterns. The data reveal the places where consumers spend the majority of their time, which may be indicative of consumer preferences and ultimately consumer behavior. Yet, there are also concerns with regards to consumer privacy. Due to the detailed nature of the data, mobile location data can reveal sensitive information about consumers based on the places that they visit. In addition to aiding in the identification of an individual's home location, such data can also reveal visits to healthcare facilities and educational institutions. Depending on the nature of the locations visited, consumers may prefer that their visits to different locations to remain anonymized. Thus, there is a need to balance marketers' desires to leverage detailed information for predictive purposes with consumers' desires that their behavior remain anonymous. Using device-level data from a mobile location data provider, we directly probe this tradeoff. We propose the aggregation of mobile devices into homogeneous clusters as a means of providing a degree of privacy while also enabling marketers to derive the insights of value to them. We investigate three different bases by which clusters may be formed and vary the size of the clusters. In doing so, we are able to identify the maximum size of the cluster that provides a necessary degree of consumer privacy while not causing the accuracy of marketing predictions to deteriorate precipitously. By identifying the size of the clusters that both maintains privacy and predictive ability, our research offers guidance to data providers who seek to deliver detailed information to their clients without jeopardizing consumer privacy.

4 - The Effects of E-scooters on Commute and Retail Visits: Empirical Evidence from Chicago

Ruichun Liu, University of Illinois at Urbana-Champaign, Champaign, IL, United States, Unnati Narang

Ride-sharing (e.g., Uber and Lyft) and bike-sharing (e.g., Divvy) companies have radically changed the way consumers commute. Most recently, electric scooters (e-scooters, e.g., Bird, Lime, and Lyft) have emerged as an alternative transportation option for consumers in major cities, accounting for millions of rides. Consumers' commuting patterns impact their purchases and consumption. Therefore, it is critical to understand the effects of transportation innovations, such as e-scooters, on consumers' direct commute behaviors (i.e., use of other modes of transport) and their indirect consumption behaviors (i.e., visits to retail stores). We leverage the phased entry of e-scooters in Chicago in June 2019 to empirically investigate the direct and spillover effects of e-scooters on extant modes of transport and retail visits using a difference-in-differences design. Our preliminary results show that the relative number of bike trips at the station-week level decreases by 17.5% in the areas in which e-scooters enter relative to areas without e-scooters during the four months post entry. On the flip side, we predict that the entry of e-scooters will increase the number of retail store visits (particularly, restaurants) due to their "last mile" reach and convenience. We also examine the heterogeneity in this effect based on types of retailers and neighborhoods. Our research contributes to the emerging literature on sharing economy and location marketing. It has important implications for practitioners and policymakers.

■ TB08

Virtual Room 08

Digitization 2: Policy

General Session

Chair: Georgios Zervas, Boston University School of Management, Brookline, MA, 02445-7610, United States

Co-Chair: Pinar Yildirim, University of Pennsylvania, Philadelphia, PA, 19104, United States

1 - Surfacing Norms to Increase Vaccine Acceptance: Evidence From an International Experiment

Dean Eckles, MIT, Cambridge, MA, 02139, United States, Alex Moehring, Avinash Collis, Kiran Garimella, M. Amin Rahimian, Sinan Aral

Despite the availability of multiple safe vaccines, vaccine hesitancy may present a challenge to successful control of the COVID-19 pandemic. As with many human behaviors, people's vaccine acceptance may be affected by their beliefs about whether others will accept a vaccine (i.e., descriptive norms). However, information about these descriptive norms may have different effects depending on people's baseline beliefs and the relative importance of conformity, social learning, and free-riding. Here, using a large, pre-registered, randomized experiment (N=349,664) embedded in an international survey, we show that accurate information about descriptive norms can substantially increase intentions to accept a vaccine for COVID-19. These positive effects (e.g., reducing by 5% the fraction of people who are "unsure" or more negative about accepting a vaccine) are largely consistent across the 23 included countries, but are concentrated among people who were otherwise uncertain about accepting a vaccine. Providing this normative information in vaccine communications partially corrects individuals' apparent underestimation of how many other people will accept a vaccine. These results suggest that public health communications should present information about the widespread and growing intentions to accept COVID-19 vaccines.

2 - Are Political and Charitable Giving Substitutes? Evidence From the United States

Pinar Yildirim, Marketing Suite, University of Pennsylvania, Philadelphia, PA, 19104, United States

We provide evidence that individuals substitute between political contributions and charitable contributions, using micro data from the American Red Cross and Federal Election Commission. First, in a lab experiment, we show that information on the importance of charitable giving increases donations to charities and reduces donations to politics, while information on the importance of political campaigns has the opposite effect. We also show that similar results hold in observational data. We find that foreign natural disasters, which are positive shocks to charitable giving, crowd out political giving. We also find that political advertisement campaigns, which are positive shocks to political giving, crowd out charitable giving. Our evidence suggests that some individuals give to political and charitable causes to satisfy similar needs.

3 - The Platform Value of Incentivized Review Programs: Evidence from a Field Experiment on Airbnb

Andrey Fradkin, Boston University, Cambridge, MA, 02139, United States, David Holtz

Since reviewers on online platforms are typically not compensated, reviews will generally be underprovided in equilibrium. Platforms can correct this underprovision through costly incentives. We use a large-scale field experiment to study the benefits and costs to the platform of incentivizing online reviews. We find that the reviews induced by our treatment have small average effects on platform outcomes (transactions and match quality), even if incentivizing these reviews is relatively cheap. We then discuss implications for marketplace design.

4 - Estimating the Effect of Minimum Wages on Employer Reputation

Hannah Catabia, Boston University, Boston, MA, United States

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 workers' review their jobs and companies on Glassdoor.com before and after minimum wage increases. 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, such as company culture and work-life balance. 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. We focus our study on cities such as Chicago, Illinois and Seattle, Washington, where local governments have enacted minimum wages higher than their state minimum wage.

5 - BEAT Unintended Bias in Targeting Policies

Eva Ascarza, Harvard Business School, Boston, MA, 2163, United States, Ayelet Israeli

Targeting is a fundamental marketing activity that leverages intrinsic differences across customers. Recent research provides firms with Machine Learning (ML) tools that leverage experimentation to precisely estimate customer heterogeneity in treatment effects with the goal of optimizing targeted/personalized marketing interventions. However, an inherent risk of these approaches is to disproportionately target customers from certain groups (or demographic characteristics), even when the firm does not intend to discriminate customers based on those protected characteristics. This unintended discrimination is caused by underlying correlations in the data between those characteristics and the marketing variables that were identified by the ML tool to be optimal targeting variables. We propose the BEAT (Bias Eliminating Adapted Trees) framework to address this issue. This framework allows marketers to target customers based on receptivity to marketing actions — hence capturing value from targeting — while ensuring that the allocation of resources is balanced with respect to the customer base (or population). Essentially, the method only extracts the heterogeneity in the data that is "usable" for targeting, which we define as the variation in the data that is unrelated to the protected characteristics. To do so, we build on the General Random Forest (GRF) framework (Wager and Athey 2018; Athey et al. 2019) and develop a balanced causal forest that is "blind" to demographic characteristics. This framework can be extended to other marketing decisions such as product recommendations or pricing, or more generally, to firm decisions that are based on prediction algorithms.

■ TB09

Virtual Room 09

Customer Journey and CLV

Contributed Session

Chair: Oded Netzer, Columbia University, New York, United States

1 - Incorporating the Firm's Strategic Response into Customer Valuation Models

Mainak Sarkar, ESSEC Business School, Cergy, France, Arnaud De Bruyn

A key idea of customer relationship management (CRM) is that customers are economic assets and therefore, firms should know who their most profitable customers are. This has led to the development of sophisticated customer lifetime value (CLV) models such as the Pareto/NBD. However, most CLV models suffer from two crucial limitations: (1) CLV models struggle to incorporate the strategic marketing action of the firm. The strategic response of the firm during campaign X depends on how the customer responded to earlier campaigns i.e. (X-1) and before. We show that jointly predicting the customer's response to the firm's marketing and the firm's strategic response to the customer's purchase can lead to probabilistically divergent paths of customer-firm interaction. (2) CLV is shown as a point estimate: Whether a customer has 100% chance of being worth $10,000 to a company, or 10% of being worth $100,000, leads to widely different implications for marketers. We also show that incorporating the strategic response of the firm in customer valuation models can lead to both unimodal as well as bimodal CLV distribution. We further explore the implications of unimodal and bimodal CLV distributions for customer prioritization, salesforce allocation, and risk management.

2 - The Long-term and Short-term Effects of Multichannel Advertising

Saman Modiri, Syracuse University, Syracuse, NY, United States, Liangbin Yang, Amiya K. Basu

The literature suggests that there is heterogeneity in the short-term and long-term response to advertisement campaigns. However, the extant literature provides limited insight on the latter. In addition, the advertising environment has become increasingly complex with consumers being exposed to multiple campaigns across different channel repetitively over time. As a result, examining the multidimensional short-term and long-term effects of advertising is especially important in today's market. In this study, we take a closer look at this multi-media advertising environment. Specifically, we explore the attribution of current and previous campaigns, which occur across different channels, products, and brands, to consumers' short-term and long-term behavior. We employ and compare multiple models connecting these campaigns to the conversion probability and customer lifetime value. Using a large advertisement dataset with over 10k brands and a consumer panel with over 5 million purchases and 50k households, we find that there is significant heterogeneity in the short-run and long-run response among different customer groups. Furthermore, we demonstrate spillover and carryover effects for current and previous ads across brands, products, and channels. Our results indicate that by accounting for the long-term response, firms can make more informed decisions and improve their advertising performance. Furthermore, our model provides a robust framework for generating insights from available data to improve decision-making.

3 - The Effect of Online Advertising on the Purchase Funnel

Oded Netzer, Professor, Columbia University, New York, NY, United States, Koen Pauwels, Michael Zhao

Online advertising has brought with it the promise of measurement of advertising effectiveness. More recent research has demonstrated the difficulty of using measures such as click-through rates, or conversions to measure advertising effectiveness and the importance of modeling ad attribution. The accessibility of lower-funnel metrics such as click-through rates and purchase conversion has shifted the focus from thinking of advertising as a brand-building tool, to focusing on return on advertising investment and lower-funnel type effects. In this research we collaborate with a large online retailer, to measure the causal effect of different types of online advertising (lower funnel advertising such as search ads and upper funnel advertising such as display video ads) on both upper-funnel metrics such as brand searches and product views as well as lower-funnel metrics such as purchases. Our unique access to both upper and lower funnel advertising efforts as well upper and lower funnel metrics of success across thousands of advertisers allows us to evaluate a complete full-funnel approach to advertising. We subsequently, make recommendations for brand managers with respect to the allocation of their marketing dollars across the purchase funnel.

■ TB10

Virtual Room 10

Advertising 2

Contributed Session

Chair: Steve Hood, Virginia Polytechnic Institute and State University, Vienna, VA, 22181, United States

1 - Effects of Text Message Screen Positions on Message Attention and Memorability in Video Advertising

Camila Lopez, Researcher in Marketing AI lab, University of New South Wales, Sydney, Australia, Junbum Kwon, Fang Liu, Harmen Oppenwal, Eric Trinh

Video ads are becoming increasingly popular in marketing. Video ads typically include displays of text information that are essential for attention and message retention. However, due to the visual and dynamic nature of videos, it is challenging to get viewers to attend to such embedded text messages and consequently ads may result in poor memory of these key text elements. It is therefore critical for marketers to understand how the positions of text messages in video advertisements affect viewers' attention and memorability. Most prior research on video ad effectiveness relied on (1) lab experiments with only limited numbers of pictorial ads, which hence have limited external validity, or (2) analysis of observed visual contents, which has limited ability to separate causal factors. We instead embed experimentally designed text messages in real video ads and use eye-tracking combined with a memory test to observe the effects of the text content and location relative to focal objects in the video on attention and memorability. We find, first, that a text message in a video clip receives a longer fixation duration and a greater share of total attention when it is located just above a focal object than when it is located equidistant under the focal object. A reverse pattern is observed, for the same screen locations, when there is no focal object present. Second, the increased attention results in better memory for the text message. Our study contributes to the literature on (1) information processing in video ads by finding the most effective location of a text message relative to a focal object, and (2) eye-tracking by proposing a new experimental approach to studying video ads.

2 - Picture or Text Superiority? The Impact of Element Size on Communication Effectiveness

Canice M.C. Kwan, Open University of Hong Kong, Hong Kong, China, Chu (Ivy) Dang, Yang Shi

Element size is a fundamental feature of all visual communications, yet we lack definitive knowledge about whether to maximize picture or text size and how to balance the emphasis of these elements. This research proposes a conceptual framework that stipulates the relative effect of element sizes in regard to the fit between marketing goals (emotional engagement vs. rational persuasion) and processing strategies (visual narrative vs. verbal analytical processing). Leveraging deep learning-based computer vision techniques, we measure and analyze the element sizes of more than 4,000 cover photos on Facebook. Based on the results of multivariate regression models with random effects, we find that enlarging pictures (relative to text) in a presentation such as a cover photo produces more 'likes' for the Facebook pages that extensively embed text in pictures but results in a negative impact for the pages that avoid using text in pictures. Relatedly, enlarging pictures has a positive impact when the brand is high-end and product involvement is high. However, the effect reverses for low-end brands and low-involvement products. Two experiments supplement the findings from the field, collectively providing coherent support for the proposed framework. This research elucidates the boundaries of picture superiority and has strategic implications for visual optimization and content strategies.

3 - Understanding In-Stream Advertising With Granular Unstructured Data

Zhang Qiang, The Chinese University of Hong Kong, Shenzhen (CUHK-SZ), Shenzhen, China, Wang Wenbo, Chen Yuxin

A critical decision in current advertising practice is where to place an ad within a video stream (i.e., determine the timing of mid-roll ads). This research examines the effect of ad timing on ad effectiveness and video viewing experience, using randomized experiments and video content analytics. Specifically, we build a YouTube-like website and randomize advertising insertion points in the videos. We then recruit viewers to collect their clickstream data, video viewing data, and their subjective measures (e.g., liking). Furthermore, to analyze video content, we extract content features from image, audio, and text data in the videos and collect viewer responses to the video content using eye and face tracking. Our empirical analysis shows that ad-skipping and video dropouts are strongly affected by ad timing and the nearby video content including content engagement, content continuity, and information density. Moreover, this ad timing effect varies across viewer and video types. Based on the above analyses, we further show that our optimal ad insertions based on video content analytics outperform ad insertion strategies commonly adopted in existing video platforms. These results have implications for the placement and pricing of in-stream ads on video platforms and TV networks.

4 - Bidding and Post-auction Valuation in Ascending Auctions: The Effects of Assessed Competitor and Self-Expertise

Steve Hood, PhD Candidate, Virginia Polytechnic Institute and State University, Falls Church, VA, United States, Dipankar Chakravarti

Recent research on bidding behavior in ascending auctions shows that bids and post-auction values are influenced by bidders' assessments of the expertise of competitive bidders. Bidders bid differently against competitors they assess to be amateurs, versus experts in the auction process, the product category, or both (hybrid experts). Perceived competitor expertise, contingent on winning or losing, influences how bidders' value the product both immediately after the auction and after a time delay. The present paper builds on these results to examine how bidders' assessment of their own expertise moderates the findings. We manipulate participants' assessment of their own expertise in the context of an ascending auction for a bottle of wine. We use a set of information manipulations to create participant self-perceptions as amateurs, auction experts, wine experts, or hybrid experts. We then examine how these participants bid in an ascending auction against competitors (either amateurs or hybrid experts).Our results show that participants bid differently against both amateur and hybrid competitors as a function of their own expertise. They bid to different levels, assess different post-auction product values contingent on winning or losing, and these values endure differently over time. Our results show that assessed self and competitor expertise influence bidding and value construction in auctions. Regardless of whether these expertise assessments are veridical, they change a bidder's experience of the auction and the product(s) they win or lose.

■ TB11

Virtual Room 11

Data-driven Policy Evaluations in Emerging Markets

General Session

Chair: Shrabastee Banerjee, Boston University, Boston, MA, 02215, United States

1 - Stimulating E-payment Adoption by Retailers: Evidence From a Field Experiment

Shreya Kankanhalli, Stanford University, Stanford, CA, 94305, United States, Stephen J. Anderson, Sridhar Narayanan, Leonardo Iacovone

Across developing economies, cash is the conduit for retail transactions. Policymakers, multinational product manufacturers and marketers of electronic payment systems are interested in understanding how to stimulate the growth of electronic payments in emerging markets. In this paper, we investigate what hinders the adoption of e-payment technology by traditional retailers, in particular, whether barriers to adoption are technological, informational or financial in nature. We do this through a rigorous field experiment, where we randomize 1200 small retailers in Guadalajara, Mexico into four experimental groups: i) N = 300 firms receive an e-payment technology kit; ii) N = 300 firms receive the e-payment technology kit and informational materials to market e-payments to customers; iii) N = 300 firms receive the e-payment technology kit, informational materials, and a 4-month transaction fee waiver; and iv) N = 300 firms constitute a control group who receive no intervention. By comparing the adoption rates of the different treatment groups, we are able to cleanly analyze which barriers are critical to technology adoption. We additionally aim to study the impact of these interventions on e-payment adoption by neighboring retailers, and business performance.

2 - Impact of Marketing Analytics on Entrepreneur and Firm Performance: Field Experiment Evidence From Rwanda

Rupali Kaul, Stanford University, Stanford, CA, United States, Stephen Anderson, Pradeep Chintagunta, Naufel Vilcassim

This work studies the impact of adopting Marketing Analytics 1.0 on small firms and their owners' performance. We provide insights on three questions. (1) What is the effect of adopting Marketing Analytics 1.0 on firm performance? (2) What is the mechanism through which this effect, if any, operates? (3) Does it cause changes in the individual entrepreneurs' analytical ability and decision making? Using a randomized controlled field experiment with 550 firm-owners in Rwanda, we find a positive and significant causal effect of analytics adoption on firm sales and profits. We also show that adoption of Marketing Analytics 1.0 leads to firms' engaging in more analytical activities which are marketing-related (direct effect) and accounting related (spill-over). Finally, we find novel evidence of Marketing Analytics 1.0 leading to an improvement in entrepreneurs' aptitude and reasoning ability. These results have important implications for policy-makers and managers interested in improving firm performance.

3 - Can Selling Change the Salesperson? Evidence from a Randomized Controlled Trial in India

Iris Steenkamp, London Business School, London, NW1 5PT, United Kingdom, Gaurav Mehta, Rajesh Chandy, Om Narasimhan

Most research in the sales literature (and in marketing more generally) has traditionally focused on how selling changes outcomes for firms. In this research, we argue that a reverse relation exists; sales activities can shape how individuals think and behave. We focus on emerging markets, and present insights from a randomized controlled trial with rural women in Uttar Pradesh, India. Working with a local partner addressing the last-mile problem of distributing products and services in poorly served and remote locations in rural India, we examine the impact of selling on the women who sell these products and services. We show that in such contexts, where women have little exposure and interaction outside their immediate contexts, engaging in sales activities can lead to 1) changes in psychology and 2) improvements in gender empowerment. In doing so, we seek to shift the focus of research from the impact of selling on outcomes for the firm to the impact of selling on outcomes for the salesperson. We present midline results from our field experiment, in which 1048 women were randomly assigned to one of the treatment (sales employment) or two control conditions. Our results are based in part on new behavioral and video-based measures of gender empowerment and entrepreneur psychology. Our research approach allows us to make causal inferences on the impact of sales activities in a manner that is more objective and verifiable than approaches used in previous research in development economics and marketing. A primary implication of this research is that ignoring the impact of sales on salespeople causes researchers and practitioners to underestimate the full impact of sales activities. Sales activities - a very common phenomenon in emerging markets - can contribute to (social) development by empowering women. To the best of our knowledge, this is the first research that examines the effect that involvement of sales jobs can have on the individual and on the social consequences of these marketing activities.

4 - An Online Social Knowledge Management Intervention to Enhance the Market Performance of Rural Artisans: Evidence From West Bengal, India

Shrabastee Banerjee, Boston University, Boston, MA, 02215, United States, Sneha Bhattacharyya, Somprakash Bandyopadhyay

Rural entrepreneurs in India commonly suffer from access gaps that prevent linkage to larger metropolitan area opportunities. These access gaps exist despite the recent proliferation of mobile internet infrastructure. Bridging these gaps therefore requires tools that go beyond the simple availability of resources, and are affordable/self-sustaining. To this end, our objective is to demonstrate how current internet-based social technologies can be used to build a social knowledge management framework. We posit that this framework will enhance the knowledge capability of rural entrepreneurs, which in turn will positively affect entrepreneurial competency and performance. Our intervention is targeted towards artisans in Birbhum, West Bengal, and will involve enhancing digital literacy along several axes with hands on training as well as asynchronous material shared via Whatsapp-based communities. In a pre-intervention pilot study, we are able to successfully form active Whatsapp communities with a group of artisans and onboard them to use a digital storefront (ncore.co.in). Using survey instruments on this pilot sample, we first develop reliable scales for measuring the key constructs. Next, we see that knowledge capability strongly correlates with entrepreneurial competency, which in turn correlates with performance. This suggests that any intervention targeted at enhancing capabilities can have positive trickle down effects. Our intervention is now being deployed in the field as a 50-week stepped-wedge RCT for impact assessment. As "social intermediaries", we aim to facilitate re-tooling and community building, both of which can be self-sustaining and have the potential to bring concrete socio-economic benefits even after the intervention. In general, our findings can have large scale policy implications for bottom of pyramid (BOP) entrepreneurs by identifying mechanisms through which digital knowledge management tools can lead to greater entrepreneurial success in emerging markets.

■ TB12

Virtual Room 12

Sustainability 2

Contributed Session

Chair: O. Cem Ozturk, University of South Carolina, Columbia, SC, 29033, United States

1 - Do Energy Efficiency Policies Targeting Consumers Really Save Energy?

Stav Rosenzweig, Ben-Gurion University of the Negev, Beer Sheva, Israel, Aviv Steren, Ofir Rubin

Policies incentivizing the manufacturing and purchasing of energy efficient cars are key practices in moderating the damage caused by the increasing energy demand worldwide. However, as cars become increasingly efficient, the cost of using them decreases, which may, in turn, motivate consumers to increase car usage. The result, in which some of the potential energy savings are lost to increased driving, is known as the rebound effect, which is typically measured as a percentage of the potential energy savings. The literature focuses primarily on rebound effects generated under policies targeting manufacturers by setting fuel efficiency standards. However, some countries introduce policies targeting consumers, incentivizing them to buy energy efficient cars. The literature on policies targeting consumers is very limited but hints that a behavioral licensing effect could also generate a substantial rebound effect. We examine such a policy using data from the Israel Central Bureau of Statistics and supplementary data sources. Employing a rolling window technique, we estimate multiple sets of simultaneous equations to account for the endogeneity of car choice and test the magnitude and persistence of a rebound effect over 10 years. We find a fairly large rebound emerging shortly after the implementation of the policy. Moreover, this effect increases over time to the extent that all potential energy savings are lost to increased driving. The loss of energy savings and the increased driving have substantial consequences, including high emission levels and the associated health problems, traffic congestion, road accidents, etc. We offer potential ways to mitigate these unintended policy consequences.

2 - Sustainable Product Demand and Price Elasticity

Levin Zhu, PhD Student, Duke University - Fuqua School of Business, Durham, NC, United States, Bryan K. Bollinger, Randi Kronthal-Sacco

Much of the growth in consumer packaged goods recently has been due to products with a variety of sustainability claims. However, many categories have very limited sales of sustainable products and there is significant geographic variation as well. In this paper, we examine four CPG categories (coffee, diapers, laundry detergent, and yogurt) to document the trends in the share of sustainable product purchases and the potential underlying factors that affect their purchase, including sustainable product availability, the price premium charged for sustainable products, and the relative price elasticity of demand for sustainable products versus non-sustainable products. Preliminary findings show sustainable products command a price premium in each of the categories nationally for the time frame of our data (2015 to 2019), with coffee having the highest premiums of roughly 65% over their non-sustainable counterparts, followed by yogurt at around 30%. Sustainable product availability is also highest for the two food categories, with approximately 25% and 50% of products in venues being sustainable for coffee and yogurt categories respectively, while diapers and laundry detergent have between 2% and 7% sustainable product availability. Correspondingly, the sustainable products in food categories have large market shares compared to the non-food categories, with sustainable yogurt products taking the lead with a majority share. Finally, we find evidence that sustainable products tend to be less price elastic than non-sustainable products. We further explore both geographic and time variation of these statistics.

3 - An Empirical Investigation of Consumer Shopping Under Air Pollution

Sanghwa Kim, University of Maryland, College Park, MD, United States, P. K. Kannan, Michael Trusov

Air pollution is a major environmental issue that associates with global climate change and poses threats and opportunities to businesses—and for society at large. In this paper, we investigate how consumers' daily shopping can be influenced by air pollution. Specifically, examining consumer-level transactions from a large credit card company merged with comprehensive air quality reading data in South Korea, we explore how daily air pollution affects consumer spending. Analysis of the spend category shows that on polluted days, consumers spend more, their variety-seeking increases and hedonic consumption predominates, suggesting the regulation of pollution-induced mood as a potential underlying process of the impact. The results survive a battery of robustness checks including consumers' backward-looking behavior on the past pollution days. Further supported by an instrumental variable approach, we find that daily air pollution does not necessarily discourage consumers' outdoor (shopping) activities, which makes a policy implication for public welfare. Our paper sheds new light on the consequences of air pollution in consumers' daily shopping and extends the theory of mood regulation. Implications for marketing managers and policymakers are discussed.

4 - Do Consumer Tax Credits for Electric Vehicles Work? Implications for Product Substitution and Carbon Emissions

O. Cem Ozturk, Assistant Professor of Marketing, University of South Carolina, Columbia, SC, United States, Cheng He, Chris Gu, Pradeep K. Chintagunta

Governments worldwide have spent billions of dollars on monetary incentives for consumers, such as tax credits, to encourage the adoption of eco-friendly ("green") products. However, there is little consensus regarding the effectiveness of such incentives. We examine tax credit incentives' impact on vehicle sales and carbon emissions. We study incentive changes across 46 counties in South Carolina and Oregon via various quasi-experimental approaches. Unlike recent studies showing an insignificant or a negative correlation between tax credits and electric vehicle adoption, we find that unit sales of incentivized plug-in-hybrid electric vehicles-PHEVs-increase by an average of 3.7% (up to 52.7% in some counties) following a $2,000 incentive. PHEV sales remain unchanged after the incentive's termination, implying a positive net sales effect. We also explore the incentive's impact on purchase funnel stages. In the awareness stage, the incentive's positive effect on PHEV demand peaks during the consumers' tax-filing period; in the consideration stage, the incentive does not expand the consumer pool considering PHEVs. As for the conversion stage, the incentive generates more sales for PHEVs in counties where 1) consumers are more likely to have PHEVs in their consideration sets regardless of the incentive (i.e., Democratic counties), and 2) consumers value cost-saving more (i.e., counties with lower-middle income). The heightened demand for PHEVs stems from the substitution from gasoline vehicles with high fuel efficiency. The estimated cost of reducing carbon emissions through tax credits is less than the cost of tax rebates for conventional hybrids and subsidies for residential solar panels.

■ TB13

Virtual Room 13

Mental Processing

Contributed Session

Chair: Ana Martinovici, Erasmus University, Rotterdam, Netherlands

1 - Do Product Recommendation Systems Kill the Joy of Online Shopping?

Hanieh Sardashti, University of North Florida, Jacksonville, FL, United States

The product recommendation system literature has focused on the attributes of the recommendation set itself (i.e., task objectivity, diversity of the algorithm, product type) as the key driver of product recommendation aversion. The rise of data-driven marketing has promoted the invention of many types of product recommendation systems (i.e., similar products, sponsored products) frequently featured on pages of online retailers such as Amazon. At the same time, consumers are using small-screen devices such as mobiles and tablets to at least initiate their purchases. We don't know whether consumers pay attention to these many product recommendation systems and whether they enjoy outsourcing decision-making to these algorithms. We bridge the literature gap by studying whether interaction with a product recommendation system leading to consumers' lesser cognitive effort could result in less task enjoyment. We know that consumers like to participate in decision-making and enjoy evaluation. Prior research also found that people stubbornly favor their judgments over others. In this study, via a series of behavioral scenario-based experiments, we found that using a recommendation system results in less task enjoyment versus when a consumer uses external websites such as YouTube to search for product information. Moreover, we found that consumers rarely use more than one product recommendation system. Our findings show that consumers dislike crowded pages with multiple recommendation systems featuring too many products as overwhelming and least helpful to making a purchase decision. Lastly, heightened perceived purchase risk led to relying on external websites to collect information before making a purchase decision.

2 - I'll Try That, Too – The Effect of Variety on Choice

Mareike Sachse, Humboldt University Berlin, Berlin, Germany, Sebastian Oetzel, Daniel Klapper

There is a consensus that variety is generally a good thing for choice. However, a large body of literature has been supporting the notion that too many alternatives may result in choice overload, leading potentially to a reduction of consumers' choice satisfaction or choice deferral - up to the degree of not purchasing a product at all. So far, there has been only little research on the effect of assortment sizes on choice in combination with a price promotion. This is of relevance for retailers and manufacturers: while a shrinkage in sales impacts profit, reducing the number of products may save costs as well (i.e. storage, supply chain). In a field experiment with a major chocolate brand conducted at a German retail chain, we test for choice overload during a promotion and price reduction. The stores in the control group offered 23 (11) different 100g (300g) chocolates on promotion, while test stores displayed a reduced selection of 16 alternatives (8 for 300g, respectively). We find a significantly large positive effect of the display promotion on unit sales in all groups but cannot confirm on choice overload. Further findings show a change in preference order among alternatives during the promotion, only with the full range of alternatives, suggesting a higher willingness to try unknown/unpopular products. We contribute to the literature on choice overload by offering insights from actual purchase decisions with store-level scanner data that consider more alternatives than most experimental studies and by examining the impact on preferences within a choice set. In addition, we examine this effect during a price promotion.

3 - Attention Trajectories Predict Brand Choice

Ana Martinovici, Assistant Professor, Rotterdam School of Management, Erasmus University, Rotterdam, Netherlands, Rik Pieters, Tulin Erdem

Trajectories of attention during a complex brand choice task reflect the accumulation of utility and predict final choice before consumers implement it. Our findings reveal a "double attention lift" of the ultimately chosen brand towards the end of the choice task: it receives more attention than other brands do, and more of that attention is devoted to integrating information about the brand rather than to comparing it with other brands. Attention trajectories predict 85% of brand choices correctly out-of-sample, and 52% one period (29 secs.) before consumers reveal their brand choice. Attention during the choice task reflects sources of utility over and above those from brand ownership and knowledge effects. These results are obtained from a new multivariate attention-and-choice model, using K-fold Cross-Validation, and data from a large scale eye-tracking experiment among 325 regular consumers. The findings support notions from rational inattention theory, reveal the tight, potentially neurological, link between attention and utility accumulation, and have implications for consumer choice theory and managerial practice.

Thursday, 11:30AM - 12:30PM

■ TC01

Virtual Room 01

Policy Implications

Contributed Session

Chair: Shubhranshu Singh, Johns Hopkins University, Baltimore, MD, 21042-2357, United States

1 - Demand Pull, Regulation and Climate Change Impact of Firms

Sumitro Banerjee, Associate Professor of Marketing, Grenoble Ecole de Management, Grenoble, France

Following the recent climate agreements governments of many countries have committed to reduce their carbon emissions for which they have started levying taxes for a net-positive carbon footprint. Some consumers too, with growing concerns about climate change, have modulated their purchase decisions to avoid buying products on account of a high carbon footprint of their producers. The paper analyzes the effects of consumer induced "demand pull" and policy regulation on firms to reduce their carbon emission as a step toward mitigating climate change. In particular, the paper analyzes the impact of the uncertainty about the original rate of carbon emission privately observe by the firm on the optimal decisions. The results suggest an interaction between the demand pull effect, the carbon tax and the original rate of emission on the market outcomes. First, a net-zero emission is found to be achieved only if the original rate of emission is below a threshold. Second, the carbon footprint of a firm increases as it gets more efficient either with increasing product quality or decreasing marginal cost. Firm profit, surprisingly, also increases as the original rate of emission increases if the carbon tax is above a threshold. Finally, under incomplete information, a carbon tax in combination with a carbon audit acts as a simple mechanism causing the firm to disclose its private information through its pricing decisions and thus allaying concerns about whether firms are genuinely committing resources to reduction of carbon emissions.

2 - Explainable Artificial Intelligence (X.A.I): Practical Implications for Businesses and Policy-makers

Behnam Mohammadi, PhD Student, Carnegie Mellon University, Pittsburgh, PA, United States, Kannan Srinivasan, Timothy Derdenger

Recently, much attention has been devoted to explainable Artificial Intelligence (XAI), a subfield of AI whose goal is to offer methods that help explain the reasoning behind the results generated by machine learning (ML) models. While researchers have proposed myriads of algorithms to help firms adopt XAI, to our knowledge, no prior studies have examined whether XAI might actually benefit firms in practice. To fill this literature gap, we analyze a three-stage game in which two firms are allowed to offer explanations at some level of customization to each individual customer. One of our counterintuitive findings is that adopting XAI by both firms is only beneficial in markets that value quality more than explanations. Moreover, we show that in markets that value explanations more than quality, only the firm which offers higher quality may benefit from adopting XAI. But, when the level of customization is low, even the high quality firm is better off not adopting XAI if it uses a different XAI method than the low quality firm. Our results also point to the possible detrimental impacts of XAI regulations for firms in certain markets.

3 - Sustainability and Profit Impact of Durable Goods Innovation

Ramesh Shankar, UConn School of Business, Storrs, CT, United States, K. Sudhir, Yuan Jin

Durable goods innovation induces replacement of currently owned goods by consumers; such dumping harms the environment. But continued use of less efficient goods increases in-use environmental harm. As such harm becomes unsustainable, consumers are increasingly environmentally sensitive and regulators consider interventions to limit harm. This paper develops a modeling framework to study how sustainability interventions impact firm profit and environmental harm in equilibrium when consumers are environmentally sensitive. We develop a two period model where forward looking consumers consider product utility and environmental harm arising from three types of innovation: fashion, function and use efficiency. A forward looking monopoly firm sets prices in response to the consumer choices. Our analysis yields some surprising insights. With fashion and function innovations, we find conditions where increasing consumer sensitivity to environmental harm can surprisingly result in increased environmental harm. Next, we consider firm incentives to pre-announce use efficiency innovations in response to time targeted use efficiency mandates---a common sustainability intervention. Surprisingly, it is not always best for the environment if firms pre-announce such innovations. Further, when consumer environmental sensitivity exceeds a threshold, pre-announcement may not be optimal for the firm even if it reduces environmental harm; therefore a regulator or sustainability advocate may have to inform consumers of the innovation. Thus, contrary to conventional wisdom, consumer environmental sensitivity may not always substitute for sustainability regulations. Our results clarify how to design win-win policies for both firms and the environment; and when advocates/regulators need to be adversarial with firms to achieve sustainability goals.

4 - Overdiagnosis and Undertesting for Infectious Diseases

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

The ongoing discourse about COVID-19 testing revolves around undertesting (i.e., insufficient testing capacity relative to demand). An important yet little studied systematic issue is overdiagnosis (i.e., positive diagnoses for patients with negligible viral loads): recent evidence shows U.S. laboratories have adopted highly sensitive diagnosis criteria such that up to an estimated 90% of positive diagnoses are for minuscule virus loads. Motivated by this situation, we develop a theory of diagnostic testing for infectious diseases that explains both undertesting and overdiagnosis. We show that a laboratory has an incentive to inflate its diagnosis criterion, which generates a higher diagnosis-driven demand as a result of contact-tracing efforts, albeit while dampening demand from disease transmission. An inflated diagnosis criterion prompts the laboratory to build a higher testing capacity, which may not fully absorb the inflated demand, so undertesting arises. Finally, we examine a social planner’s problem of whether to mandate the laboratory to report viral load along with its diagnosis, such that a physician or contact tracer can make informed triage decisions. The social planner may prefer not to mandate viral load reporting initially, because it induces a higher testing capacity and may help reduce disease transmission.

■ TC02

Virtual Room 02

Discounts and Promotions

Contributed Session

Chair: Ziwei Cao, University of Maryland, College Park, MD, 20740, United States

1 - The Cost of Free Offer: When Selling Coupons is Better Than Giving for Free

Zhengyu SHI, PhD Student, The University of Hong Kong, Hong Kong, Jingcun Cao, Jinjie Chen, Echo Wen Wan

Coupons are arguably the most widely used price promotion in marketing. Prior research has primarily focused on comparing the effectiveness between coupon and other types of price promotions, and between the designs and framings of different coupons. This research takes a novel perspective to examine a new but emerging type of coupon, purchased coupon, that is, coupons acquired by paying a relatively small price, and to compare the effectiveness of purchased coupon with free coupon. This research project examines the impact of purchased coupon and explores the following questions: 1) how does the purchased coupon (vs. free coupon) influence coupon usage behaviour (e.g. redemption)? 2) what is the underlying mechanism of the observed effects? 3) what are the boundary conditions that might exacerbate or attenuate the impacts of purchased coupons? We conducted one large-scale field experiment to explore the effectiveness of purchased coupon (vs. free coupon) on consumers’ coupon redemption behaviour. The results showed that purchased coupon (vs. free coupon) can lead to higher conversion rate and overall spending. We also conducted online experiments to explore the underlying role played by perceived deal value and discussed theoretically and practically important boundary conditions of the effect. This research not only contributes to the theory of price promotion, but also provides practical implications to marketing practice of using coupon as a promotion strategy. We plan to conduct more studies to provide more evidence supporting the robustness and underlying mechanism of the effect before the conference.

2 - The Effects of Mobile App User Characteristics and Geo-location on Mobile Coupon Redemption

Sanjana Surange, Texas A&M University, College Station, TX, United States, Venkatesh Shankar

By 2022, mobile coupons are projected to account for nearly 80% of all coupon redemptions. Marketers are constantly looking for insights on how mobile coupons work and for better ways to target shoppers using their user characteristics and real-time location. Previous research focuses primarily on either location factors or contextual factors such as crowdedness, competitors, and promotion type in explaining coupon redemption behavior. We extend prior research by studying location factors and contextual factors in the same framework and dynamically modeling the determinants of coupon redemption behavior. We empirically analyze a unique data set comprising over 427,000 users of a popular mobile app, which allows users to earn points for safe driving and offers mobile coupons for redemption at participating retailers. The app also sends promotional messages from participating retailers to drivers based on their real-time geo-location. We address the following important questions in our empirical analysis: (1) What app user demographic and behavioral characteristics drive mobile coupon redemption? (2) How do current location and travel trajectory of app users influence mobile coupon redemption? (3) How do app users’ responses to geo-targeted promotions vary? and (4) How does app user psychological trait (instant versus delayed gratification seeking) affect mobile coupon redemption behavior?

3 - Promotion Effects in Two-sided Markets

Ziwei Cao, University of Maryland-College Park, College Park, MD, United States, Pallassana K. Kannan, Lingling Zhang

Platform businesses often use price discount and product upgrade to attract customers, just as traditional businesses. However, the implications of promotion are different on platforms due to the network effects between demand and supply. Empirical research on two-sided markets focuses on the network effects but the behavior implications of promotions on consumers are often not considered. The marketing literature, on the other hand, well understands how consumers react to promotions but does not sufficiently consider the effect of promotion on the supply side. In this study, we extend the promotion literature to the two-sided market setting. Using data from a leading shared-ride platform, we specify a structural model to examine the effect of price discount and product upgrade by considering both the demand and supply. Our data include individual-level choices from riders and drivers, enabling us to explicitly model both the behavior implications on consumers and the network effects. The results show that the primary effect of price cut is to increase demand within the same product tier, whereas product upgrades can help attract more valuable drivers. The counterfactual analysis compares the return of invest between the two promotional methods in terms of platform's total profits. Our results help platforms choose when to use what marketing strategy.

■ TC03

Virtual Room 03

Influencer Marketing III

General Session

Chair: Florian Pethig, University of Mannheim, Mannheim, Germany

Co-Chair: Andreas Lanz, HEC Paris, HEC Paris, Jouy-en-Josas, France

1 - Influence Corridors: A New Path to Seeding Targets in User-Generated Content Networks

Andreas Lanz, HEC Paris, Paris, France, Jacob Goldenberg, Daniel Shapira, Florian Stahl

In user-generated content networks, individuals and firms alike seek to build and expand their follower base to increase the reach of the content they upload. This generally belongs to influencer marketing, where the academic literature, especially on optimal seeding policies, suggests targeting users with a large following--the high-status influencers. For unpaid endorsements, however, Lanz et al. (2019) recently showed that targeting low-status influencers (users with just a few followers) may be a more effective seeding policy to build a follower base, because high-status influencers (users with a large following) are associated with a responsiveness that is several orders of magnitudes lower. This shifts the seeding focus to the direct return (the follow-back from the seeding target)--and completely disregards the value of the network. We revisit this conclusion and investigate how the value of the network can directly support seeding efforts. Along these lines, let us consider an unknown content creator who seeks to build and expand the follower base on a user-generated content network, while having no budget and limited network information: How can this creator capitalize on the expanding follower base? In this work, we suggest targeting low-status “friends of friends” based on the rationale that the follower base serves as an intermediary of trust and thereby increases responsiveness. By means of data-based simulations using data from SoundCloud, we demonstrate that using the first-degree followers as influence corridors to target the low-status second-degree followers allows an unknown content creator to much more quickly expand the follower base.

2 - The Curse of Early Adopters' Dominance

Neta Livneh, Hebrew University of Jerusalem, The Hebrew University, Mt. Scopus, Jerusalem, 9190501, Israel, Lev Muchnik, Yoram Louzoun, Jacob Goldenberg

The general conjecture is that successful dissemination of new products is contingent on early involvement of, or even adoption by key types of consumers, such as influentials, experts, or early adopters. In this work, we revisit the assumption of early adopters' imperative role in an online product's final reach. We hypothesize that users who do not adopt frequently tend to adopt products that eventually reach blockbuster success, whereas highly active users tend to adopt products that have a limited potential audience. We test our hypothesis on four distinct digital platforms, Amazon (all-around consumer products), Steam (PC gaming), Fantlab (sci-fi books reviews), and KinoPoisk (movies reviews), which vary in their audience (from 50 thousand to 80 million) and marketplace (from several thousands to several millions). The data contain individual adoption events of all users of these platforms. We empirically confirm that, across all these different domains, blockbusters' spread is characterized by the dominance of less active early adopters. Users who are highly active tend to adopt products that, even if successful, reach a limited number of adopters, and never exceed the number of adopters typical of blockbuster products. Therefore, blockbusters can be predicted based on low activity levels rather than high activity levels of early adopters (as would be expected), already after the first few days or first hundreds of adopters. These results suggest that the focus that is given to encourage adoption by highly active users during a product's development and launch may not guarantee the product's future success.

3 - When Do Style Influencers Affect Consumer Preferences? – A Study of the Used Luxury Market

Amy Pei, Assistant Professor, Northeastern University, Boston, MA, United States, Jin-Hee Huh

Firms are eager to work with style influencers due to their popularity and impact on consumers' fashion choices. However, the effectiveness of style influencers is less clear when consumers choose to follow a particular influencer because they intend to adopt her style. In this case, a subsequent increase in the style similarity between the follower and the influencer may be due to the follower's self-selection rather than the influencer's influence on the follower. We define influence as the ability to change followers' preferences when they did not expect to be changed. We measure the relative strengths of the self-selection effect and peer influence for used luxury handbags. Furthermore, we investigate the conditions under which organic influence is stronger. We use a panel of more than 30,000 users on a major luxury resale platform where users buy and sell used luxury items. On this platform, users can follow another user's profile and see the items that this user has on her wish list. Using a CNN approach, we quantify abstract concepts such as the style, uniqueness, and conspicuousness of a handbag, and measure a user's style based on the items on her wish list. We define users who follow many others as style explorers and show that they are more susceptible to peer influence relative to users who follow few others. Additionally, we show that peer influence is stronger when style explorers are exposed to unique, inconspicuous, and vintage styles.

4 - Helpful or Harmful? Negative Behavior Toward Newcomers and Welfare in Online Communities

Florian Pethig, University of Mannheim, Mannheim, Germany, Hartmut Hoehle, Kai-Lung Hui, Andreas Lanz

Newcomers are important for the survival of online communities, but their contributions often receive downvotes, rejections, and negative comments from established members. Online communities have realized that such negativity can take a toll on newcomers and harm the creation of user-generated content. We study a novel intervention aimed at reducing hostility toward newcomers: a "newcomer nudge," which informs community members when they are interacting with a newcomer post and nudges them to be more lenient toward its creator. Using granular data from a large deal-sharing community and a natural experiment, we employ a difference-in-differences approach and find robust evidence that the newcomer nudge induced established members to give more upvotes to newcomer posts and write more responses with fewer negative words. Preliminary results suggest that the nudge-induced behavior change toward newcomers increased newcomer retention. However, we also observe that prior to the nudge newcomers' second post received more upvotes than the first post. After the nudge, newcomers' subsequent posts were less popular than their first post, which indicates that the nudge interrupted the learning curve of newcomers by suppressing important negative feedback.

■ TC04

Virtual Room 04

Reviews/UGC 3

Contributed Session

Chair: Seyedjavad Mousavi, University of Kansas, Lawrence, KS, 66049, United States

1 - Expert Opinions and Consumer Reviews: Evidence From the Michelin Guide

Xingyi Li, University College London, London, United Kingdom, Yiting Deng, Bert De Reyck

The consumer purchase journey is influenced by both expert opinions and consumer reviews. However, it is not clear whether favorable expert opinions improve or hurt consumers' quality evaluations. On the one hand, positive expert opinions can enhance the reputation of the business and lead to higher consumer ratings; on the other hand, they may raise consumer expectations and lead to lower consumer ratings. This paper explores the effect of expert opinions on consumer reviews in the context of Michelin stars within the restaurant industry. We constructed a data set based on the Michelin Guide for Great Britain & Ireland from 2010 to 2020. For each restaurant that has been awarded Michelin stars in these 11 years, we collected their online consumer reviews from TripAdvisor, OpenTable and Yelp, and retrieved its historical menus from the restaurant's official website. Based on the data, we first estimate the effect of changes in Michelin star status on the valence of consumer reviews. We find that decreases in Michelin star status improve star ratings of consumer reviews. Next, we estimate a Bayesian topic model and analyze the effect of changes in Michelin star status on review topics, and find service to be the main driver of customer satisfaction. Finally, we analyze how restaurants respond to Michelin star status changes by analyzing historical menus, and show that in response to the Michelin star awards, restaurants can modify menu structure to achieve higher consumer satisfaction.

2 - Graphical Displays of Online Consumer Ratings

Seyedjavad Mousavi, PhD Candidate in Marketing, The University of Kansas, Lawrence, KS, United States, Surendra N. Singh, Promothesh Chatterjee, Tamara Masters

Prior literature indicates that consumers' decisions are significantly influenced by online consumer reviews. While existing research has mainly focused on review attributes that are not fully controlled by firms (e.g., average rating), limited research has investigated how controllable attributes (e.g., review display format) would affect consumers. Drawing on research on numerical cognition and the negativity effect, the authors examine the effectiveness of two prominent graphical display formats used by major e-commerce platforms one that displays ratings distributions in the proportional format (e.g., Amazon) and the other that does so in absolute format (e.g., Google). By implementing a multimethod approach (including eye-tracking, field study, and controlled experiments), the authors find that consumers respond less favorably to an item when its ratings distribution is displayed in a graphically proportional format due to the graphical presence of part-to-whole relationships. Further, this negative effect is moderated by the frequency of the distributions' modes. The results suggest that firms can potentially increase their revenue by simply displaying ratings distributions in absolute graphical formats. The authors discuss the contributions to the marketing literature and provide actionable insights that enable managers to make more informed decisions.

■ TC05

Virtual Room 05

Online Shopping

Contributed Session

Chair: Marco Kotschedoff, KU Leuven, Antwerp, B-2000, Belgium

1 - Keypoints of Message Design for Voice Shopping Interactions

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

The current pandemic has further strengthened the growing sector of online shopping. Accompanying this development, voice-assisted commerce is on the rise. Without any visual stimuli, however, consumers have difficulty processing and recalling product and brand related information. Drawing on levels of processing theory as well as literature on imagery and information processing, we examine the impact of the number of product attributes, brand repetitions and imagery level of auditory messages on information processing, brand recall and brand stimulation in an online experiment. Our findings indicate that a higher number of product attributes leads to better information access and product attitude. Setting a high imagery level in auditory messages moreover results in a higher brand stimulation. Furthermore, the recall of brands increases with the number of brand repetitions. These contributions allow further insight regarding the ideal message design in voice-assisted commerce interactions.

2 - The Causal Effect of Store Closure on Mobile App Usage and Shopping Behavior

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

Many chain retailers periodically close some physical stores. A critical question for such retailers is: What is the causal effect of the store closure on offline and online sales from shoppers in the neighborhood? Although prior retailing research has examined the effect of new store openings, not much is known about the effect of store closures. The few studies that examine store closure focus on the aggregate assessment of the impact of store closures and not on the causal effect of the closure of a particular store. Moreover, many retailers have mobile apps that customers use to shop. An important related question for retailers with mobile app is: How does the closure of a store affect the neighborhood shoppers' mobile app usage and purchases online and offline? We address these questions using shopper data from a large retailer with a branded mobile app. The retailer closed 180 stores over a 25 month period. We estimate the causal effects of store closure through the difference-in-differences approach by creating propensity score matched control stores and controlling for selection. We analyze the effects at both the district and the shopper levels. Some of our findings are intriguing. Although the average sales in the district with the closed store drops initially relative to control districts, it bounces back over time. However, store closure has a negative effect on customer retention. Surprisingly, store closure affects mobile app users less than other shoppers. Overall, store closure does not influence shopping basket size but shoppers who shopped in the closed store buy less often than other shoppers. Nevertheless, the online shopping frequency of all shoppers increase after store closure, revealing that store closures shift shoppers' purchases to online channels. These results offer fresh insights on the effect of store closures and contribute to the sparse literature on store closures and the growing research on omnichannel and mobile marketing.

3 - Empirical Analysis of Consumer Channel Choice Across Direct And Indirect Online Channels in Competition

Peipei Cai, INSEAD, Fontainebleau, France, Eunkyu Lee

Despite the increasing dominance of online marketing channels in today's economy, previous studies have focused on either the competition between online and offline channels or the online-offline channel coordination for one multichannel retailer, providing little knowledge of the nature of competition among direct and indirect online channels. For example, competing airlines such as American, Delta, Southwest, and United, all operate their own direct channels and, with the exception of Southwest, also utilize indirect distribution through online travel agencies (OTA) such as Expedia, Travelocity, and Orbitz, for broader customer reach. By analyzing the browsing and online transaction panel data of ComScore, we investigate customer e-multichannel usage in a competitive market to understand the relationship between consumers' online channel usage in two distinct stages -- search and purchase. We model customer channel usage as a dynamic process and examine (1) how search patterns across direct and indirect e-channels serve as an indicator of the subsequent choice of transaction channel; (2) how a customer's choice of transaction channel affects her pre-purchase search across information channels for the next purchase occasion; (3) how such a dynamic process leads to an evolving pattern of channel choice behavior over time; and (4) what are the key factors underlying consumer channel choices that explain the dynamic linkage between the search and transaction stages. By answering these questions, we seek to provide insights into the nature of channel competition in online marketing and to provide guidelines for effective segmentation and targeting, optimal channel structure design, and multichannel coordination.

4 - Preemptive Management of Customer Cancellations on Online Booking Platforms

Marco Kotschedoff, KU Leuven, Antwerp, Belgium

The emergence of online booking platforms has changed the way how consumers search and book hotel stays. They are also essential for hotel operators to acquire and manage new customers. Cancellation rates are, however, significantly higher for reservations made through booking platforms than for reservations made through direct sales channels. High cancellation rates threaten the profitability in the hospitality industry. Strategic overbooking is a conventional approach to reduce the negative impact of cancellations on profits. In contrast, we propose to preemptively manage customer cancellations by targeting customers at different stages of the booking journey. First, we apply machine learning methods to predict customer cancellation risk scores from past booking requests. Second, we show how the predictive performance of our model improves as we move further along the booking journey. Third, we suggest to tailor marketing-mix variables such as price components, offerings and hotel visibility to our cancellation risk scores during the booking journey. Our managerial implications explicitly address the unique features of booking platforms and can be implemented into their design for customer targeting.

■ TC06

Virtual Room 06

Electronic Commerce

Contributed Session

Chair: Federica Rossetti, University of Texas at San Antonio, San Antonio, TX, 78249, United States

1 - Last-mile Delivery Cost is Bleeding E-commerce Firms

Umang Varshney, Indian Institute of Management, Indore, India

Internet-Based businesses, like Amazon and Flipkart, which are in retail markets, suffer most from exorbitant Last-mile delivery cost. Both offer free deliveries when the cart's value is above the threshold, pre-decided by them. But due to operation complexities, customers often get their products delivered by different delivery persons. This study has analyses reasons for operational inefficiency and customers last-mile delivery experiences. Then insights from semi-structured interviews of customers have been then modelled to determine the optimum delivery charge in horizontally differentiated products. This study assists Top-management in not only pricing decisions but also broads the understanding of last-mile delivery operations.

2 - Comparing Information Searches in Online Browsing and Product Evaluation for Different Products: An Elaboration Likelihood Model Perspective

Tengfei Guo, Tianjin University, Tianjin, China, Shiquan Zhong, Xuelian Wang, Geng Li

Information searching is a fundamental aspect of purchase decision making. In this research, we compare information search behaviors in online browsing and single product evaluating for hedonic and utilitarian products. Adopting the elaboration likelihood model, we include information richness as the central route factor, and information type as either the central or the peripheral route factor. We use a combination of field experiments and online scenario-based studies to test our hypotheses, the field experiments are conducted through a marketing tool supplied by Alibaba, and the online studies are conducted through participants randomly hired from a consumer group with more than 200,000 members via WeChat. We find the conversion of major routes in processing of information when exposed to varied products. For hedonic products, while consumers process information through the central route in browsing, they shift to the peripheral route in single product evaluating process; whereas for utilitarian products, consumers exhibit opposite behaviors, they are sensitive to the peripheral route factor in browsing but convert to the central route factor in single product evaluating process. We are the very first study to demonstrate consumer behavior's changing across purchase stages from the perspective of online information searching and processing.

3 - Partial Identification of Spillovers in E-marketplaces Utilizing Consumer Clickstream Data

Xueli Zhang, Nanyang Technological University, Singapore, Singapore, Sadat Reza

Two opposite spillovers simultaneously exist among firms in marketplaces. One is the positive spillover effect, which is captured by demand-side externalities, making firms tend to cluster together. The other one is the negative business-stealing effect because of the presence of competitors, hindering firms from co-locating in the same marketplace. Separate identification of these two effects empirically using observational data requires complete footprints of an individual's shopping journey. In the brick-and-mortar space, such footprints are not easily traceable. Hence, the extant literature primarily focuses on the net effect of these two effects. This paper develops an empirical framework to separately identify these two effects using consumer clickstream data under the context of a cashback website. Specifically, we argue that the positive spillover effect is pointed identified, while the negative business-stealing effect is partially identified, or its bounds are identified. Then we non-parametrically estimate these two effects and explore their heterogeneities in different types of merchants. The results show that the positive spillover effect (negative business-stealing effect) is significantly larger (smaller) on the merchants in the "General Marketplace" category than those in other categories. Besides, we examine how cashback rates will impact them separately. We find that cashback rates are positively related to the spillover effect and negatively related to the business-stealing effect. The effects of cashback rates are heterogenous in different merchant categories.

4 - Brands of the Future? How Marketing, Finance and Technology Impact the Growth of Digitally Native Brands

Federica Rossetti, University of Texas at San Antonio, San Antonio, TX, United States, Deepa Chandrasekaran, Raji Srinivasan

In this research, we focus on the growth of digitally native vertical brands, variously termed as direct-to-consumer brands, and web-only brands (henceforth, digitally-native startup brands). Digitally-native startup brands, at least initially, interact and transact with consumers entirely through the web, and promise an enhanced and transparent user experience. Despite the growing importance of digitally-native startup brands and the potential disruption to both traditional brick and mortar retail industry and established brands, there is scant research in marketing focusing on their growth and success. This gap raises compelling questions: What are the characteristics of digital brands and how do they differ from traditional brands? What factors influence their growth and success? In this paper, we examine the characteristics of these brands, and empirically investigate factors affecting their growth and success measured by both VC funding and consumer interest. Specifically, we examine whether, given their unique positioning as brands created online, is it marketing or technological capabilities that contribute to their growth, or both, and what is the role of founding conditions and prior funding success in enabling growth? We assemble a longitudinal dataset of 194 online startups, along with their founding and funding history and other characteristics and examine both their probability of securing successful late-round funding and securing consumer interest through Google Search. We find that prior funding rounds, marketing background of founders and social media engagement have a predominant role in the success of these brands. We provide theoretical and managerial implications.

■ TC07

Virtual Room 07

Location Big Data and Consumer Location Intelligence (Session B)

General Session

Chair: Natasha Foutz, VA, United States

Co-Chair: Baohong Sun, PhD, Cheung Kong Graduate School of Business (New York), New York, NY, 10022, United States

1 - Heterogeneous Graph Transformer Integrating Consumer Online Reviews and Offline Trajectories

Jiaxin Du, University of Texas, A&M, College Station, TX, United States, Natasha Z. Foutz, Baohong Sun, Xinyue Ye

Consumer offline trajectories embed rich information about consumer lifestyle and brand patronage while lacking consumer opinions prevalent in consumer online reviews. This research thus integrates both via Heterogeneous Graph Transformer (HGT) to delineate a more comprehensive consumer-business network, quantify the reasons for patronage (such as those attributable business features, consumer lifestyles, preference heterogeneities, geo-locations), and advise business strategies such as competitive targeting and entry/exit.

2 - The Impact of COVID-19 on Consumer Mobility Patterns

Ning Zhong, Pennsylvania State University, University Park, PA, United States, Kyeongbin Kim, David A. Schweidel

While many businesses were shut down by the COVID-19 pandemic, research has yet to investigate the impact of the pandemic on consumers' decisions to resume the prior behaviors. In this research, we make use of device-level location data collected throughout 2020 to examine the effect of the onset of the pandemic and stay-at-home orders on consumers. Data was collected for devices that are located in the state of Georgia, which was one of the last states to implement a stay-at-home order and one of the first states to lift the order. Looking at behavior before, during, and after the time at at which the statewide stay-at home order was issued, we investigate the extent to which consumers have resumed their previous location visitation patterns. In addition to examining differences that may exist across types of businesses, we also investigate if there are regional differences related to the speed with which consumers resume their prior visitation patterns.

3 - The Impacts of Didi Carpool on Income and Spending: Evidence From South America

Jinan Lin, PhD Candidate in MIS, Paul Merage School of Business, UC Irvine, Irvine, CA, United States, Tingting Nian, Bo Tan, Cheng Gong

In this paper, we study the impacts of Didi Carpool on drivers' income improvement and passenger consumption pattern. We are among the first studies to evaluate the launch of Didi Carpool in Brazil, a leading economy in South America, based on a finer-grained journey-level dataset from May 2018 to May 2019. Our observation period covers over two million passenger-monthly and over 270,000 driver-monthly observations. We aggregate daily total order values received by individual drivers into driver-monthly data, and employ multiple identification strategies including a DID estimator and a RDD based on a geofencing regional launch of Carpool service. First of all, our DiD estimator leverages extensive information including rating stars, accumulated completed orders, and even the distance between drivers and pickup locations. By our estimation, Didi Carpool can increase the average weekly income of each driver by R$194 to R$220, or about R$880 a month. 1 Based on an average annual salary of R$100, 000 in targeted regions in 2019, the income impacts from adopting Didi Carpool translate to an increase of 9% - 10% in annual salary. Second, our study also leveraged the geofencing regional launch of Didi Carpool from October 2018 to December 2018, and estimated local average treatment effects of picking up Carpool orders, by using RDD. In terms of consumers' monthly spending and usage, passengers who adopt Didi Carpool generate an increase of 1.13 usage times on the Didi platform, which breaks down to a 1.78 usage times increase on Didi Carpool and a -0.65 usage times decrease on Didi Express (Solo Ride). After adopting Didi Carpool, passengers' monthly spending on Didi platform increases by R$7.41 per week per passenger, which includes a R$15.84 increase from Carpool spending, and a R$8.42 decrease on Express spending. However, the gains of launching Didi Carpool outweigh the loss from Didi Express in both monthly usage and spending. We also examine the interaction between the demand cannibalization between Didi Express and Didi Carpool products.

4 - Resilience of the U.S. Gig Economy During the Covid-19 Pandemic: Insights From Location Big Data

Naveen Basavaraj, Carnegie Mellon University, Pittsburgh, PA, United States, Natasha Zhang Foutz, Beibei Li

We study the impact of the COVID-19 pandemic and its mitigation policies, emergency declaration and re-opening, on the gig economy. Leveraging the novel, population-scale, longitudinal, and high-frequency smartphone location data, we show that the gig economy is more resilient to job losses than the non-gig sector during this unprecedented crisis, particularly benefiting the vulnerable neighborhoods with higher proportions of the Black populations. We also find that non-gig workers transitioned to gig work upon the emergency declaration and remained in the gig workforce even after the re-opening.

■ TC08

Virtual Room 08

Digitization 3: Targeting and Recommendations

General Session

Chair: Yufeng Huang, University of Rochester, Rochester, NY, 14627-0001, United States

Co-Chair: Kosuke Uetake, Yale School of Management, New Haven, CT, 06511-8978, United States

1 - The Long Tail Effect of Personalized Rankings

Ilya Morozov, Northwestern University, Evanston, IL, 94305, United States, Robert Donnelly, Ayush Kanodia

We study to what extent personalization in online retail reduces the concentration of sales and contributes to the long tail effect. Using data from a large-scale randomized experiment conducted by Wayfair, a large online retailer of furniture, we show that personalized product rankings induce users to search and purchase a larger variety of items relative to non-personalized bestseller-based rankings. To study whether users benefit from this shift in demand, we propose a novel empirical framework that estimates heterogeneous users' tastes from both click histories and displayed personalized rankings. The framework combines a standard consideration set model with a latent factorization approach from the computer science literature, modeling user tastes as functions of latent attributes observed by users but not by the researcher. This approach makes our strategy robust to having limited data on item attributes and explicitly recognizes that user click and purchase histories are confounded by the prominence of displayed items. Having estimated the model, we show that personalized rankings increase consumer surplus of the average user by 30%. This effect arises primarily because personalization makes users with niche tastes more likely to discover relevant niche items. We also argue that absent personalization, Wayfair would only be willing to offer 25% of its current product assortment because most niche items would never find their audience.

2 - When to Target Customers? Retention Management using Dynamic Off-Policy Policy Evaluation

Kosuke Uetake, Yale School of Management, New Haven, CT, 06511-8978, United States

We develop and estimate a dynamic targeting strategy for managing customer retention using the dynamic treatment regime (DTR) method. Working with a Japanese online platform, we first implement a large-scale randomized experiment, in which emails are randomly sent to first-time buyers at different timings. The experimental data allows us to estimate the personalized dynamic targeting policy using the off-policy policy evaluation methods. We extend the existing DTR method by explicitly considering constraints such as budget constraints.

3 - Estimating Price Elasticity of Consumer Review Ratings

Takeaki Sunada, University of Rochester, Rochester, NY, 14620, United States

Despite the booming literature on consumer reviews, little is explored about the impact of firms' marketing activities on consumer reviews. Using a novel data set of hotel reviews from a Japanese online travel agency, I estimate how product prices affect consumers' online review ratings of the product. The unique data structure makes it possible to estimate the causal effect while controlling for confounding factors such as unobserved heterogeneity in the quality of stay. I also decompose the identified effect into an intensive margin in which the price affects the rating of a review left by a given reviewer, and an extensive margin in which the price affects the pool of potential reviewers. Finally, I conduct several tests between possible underlying mechanisms of why prices affect ratings of a given reviewer. I find lower price increases review rating and most of the effect is driven by the intensive margin. I also find the data favors the hypotheses of consumers' reciprocation and the price serving as a quality signal, over the hypothesis that consumers are reporting their surplus in the reviews.

4 - Humans in the Data Loop: Valuing Consumer Data for Digital Advertising

Tesary Lin, Boston University, Boston, MA, United States, Harikesh Nair, Carlos Carrion, Xiliang Lin

How do restrictions on consumer data affect big and small advertisers on a platform? Existing literature predicts that smaller firms benefit more from better data (Campbell et al. 2015, Aguiar and Waldfogel, 2018). However, these findings ignore the moderation from "humans in the loop", namely, how heterogeneous strategic abilities of firms moderate the heterogeneous impacts. To understand the impact of data restriction policies, we run a large-scale experiment on a demand-side platform (DSP). The experiment exogenously varies data available to the platform when it buys ads programmatically on a third-party ad exchange. We randomize impressions that the DSP bids on into three treatments, each representing a particular data restriction in existing regulations. Across treatments, we change the data that feed into the DSP's predictive model used for bidding, thereby changing how the platform matches advertisers and consumers.Our preliminary results show that advertisers are highly heterogeneous in their bidding strategies, in a way correlated with their match values to consumers. For example, advertisers with higher predicted click-through rates (pCTRs) are more likely to adopt automated bidding and submit more ad plans. These bidding strategies moderate the values from better data: Automated bidding allows advertisers to avoid low pCTR matches, thus amplifying the impact of better prediction. On the other hand, the number of ad plans moderates the marginal value of data per advertiser. This impact is substantially affected by the extent to which consumers consent to data collection, highlighting the importance of considering "human in the data-loop" for such evaluations. Based on these findings, we discuss how privacy regulations may have disparate impacts on firms and market concentration.

■ TC09

Virtual Room 09

Loyalty & Rewards Programs

Contributed Session

Chair: Reza Roshangarzadeh, University of Texas at Dallas, Richardson, TX, United States

1 - Sequential Targeting for Mobile App Retention With Multitask Deep Reinforcement Learning

Fanglin Chen, New York University, New York, NY, United States, Xiao Liu, Bo Tang

We propose a multitask deep reinforcement learning (RL) framework for the sequential targeting policy of a mobile app. In this context, the firm aims to boost customer retention by sending cash bonuses to customers and control the costs of such cash bonuses during each time period. To achieve the multitask goal, we first find out the target policy and the associated Q-values using a deep reinforcement learning model. A linear programming (LP) model is then added to satisfy the constraints of promotion costs. We solve the LP problem by maximizing the Q-values of actions learned from the RL model given the budget constraints. During deployment, we combine the trained offline RL model with the LP model to generate a robust policy under the budget constraints. Using both online and offline experiments, we demonstrate the efficacy of our approach by showing that our method achieves a higher long-term customer retention rate and a lower cost than various baselines. Taking advantage of the near real-time cost control method, the proposed framework can easily adapt to data with a noisy behavioral policy and/or flexible budget constraints.

2 - Shipping Subscriptions in B2B: A Multichannel Perspective on Customer Purchases

Baris Kocaman, Eindhoven University of Technology, Eindhoven, Netherlands, Sarah Gelper, Fred Langerak, Tom Van Woensel

Inspired by the success of shipping subscription programs in B2C online channels, B2B sellers are following suit. Yet, channel management in B2B is typically more complex than in B2C, owing to the salient salesperson channel. This paper investigates the demand implications of shipping subscription programs in B2B multichannel environments. Using data from a global B2B high-tech tools manufacturer, we demonstrate that the subscription program does not affect all channels equally. After controlling for self-selection, subscribers purchase more (higher total spending and purchase frequency, larger baskets, and increased product variety), yet the purchase lift is especially high in the salesperson channel. In the online channel, we find similar effects but less pronounced. In the store channel, we do not observe any significant changes. We show that these asymmetric channel effects are explained by a signal-and-push mechanism whereby the salesperson interprets the subscription as a signal of sales potential and, in turn, increases their marketing effort for subscribers. The study's results offer guidance for B2B sellers on managing subscription programs in multichannel environments. Specifically, since the personal channel is also the costliest, it is recommended that sellers manage salesperson response proactively.

3 - Prepaid Coupon Promotion and Membership Programs: Evidence From a Mobile Laundry Service

Harim Shin, Syracuse University, Syracuse, NY, United States, Eunkyu Lee, Liangbin Yang

In today's competitive environment, marketers often acquire and retain customers using multiple marketing campaigns and programs. This paper examines the relationship between two widely used marketing tools, prepaid coupon promotion and membership programs, and their impact on consumers' short-term and long-term behavior. We focus on a novel type of prepaid promotion (Prepaid Coupon for Consumer-Created Bundle, PCCCB) that allows customers to pre-purchase the coupon and apply it to the self-created bundles, and study its interaction with the membership programs. Using a mobile laundry data set, we model the relationship between the PCCCB promotion and the membership programs, and how they affect heterogeneous consumers' short-term and long-term behaviors in complementary or substitutional ways. We also provide a rationale explaining why some consumers behave sub-optimally when multiple marketing campaigns and promotional programs are running simultaneously, and discuss how marketers could better design their prepaid coupon promotion and membership programs to maximize their joint effectiveness in an integrated marketing promotion strategy.

4 - Who Should be Rewarded More? Evaluating the Effect of Reward Allocation

Reza Roshangarzadeh, University of Texas at Dallas, Richardson, TX, United States, Mohsen Foroughifar, Shervin Shahrokhi Tehrani

Reward programs have seen a sharp growth in recent years in retail industry and there are now considered as a main marketing tool for firms to shape consumer purchase behavior. In this regard, the allocation of rewards in a multi-reward program can play a significant role in terms of inducing motivation for different segments of consumers. An allocation scheme that incentivizes an early consumer purchase mindset can lead to a totally different outcome for the firm compared to an allocation scheme that is largely based on a cost-saving mindset by pushing the valuable rewards towards later purchase incidences. Based on this, using reward program data from a firm in the tea product category, we investigated the impact of allocating rewards between different purchases on the firm's performance. We found that a design where a greater portion of rewards are allocated for the earlier purchase incidences compared to the implemented version is the firm's optimal design. Extending to a targeted marketing effort by the firm, we found that a customized reward allocation for different segments has a significant potential to increase the firm's profit.

■ TC10

Virtual Room 10

Advertising 4

Contributed Session

Chair: Yi Zhu, University of Minnesota, Minneapolis, MN, United States

1 - Estimating the Dynamic Effects of Turning off TV Advertising on Search Interests: A Generalized Synthetic Control Method Under Interference

Jia Liu, Hong Kong University of Science and Technology, Hong Kong, Shawndra Hill

This paper aims to measure the dynamic effects of major TV advertisers' temporary discontinuation of TV advertising on consumer online search interest, by leveraging a field experiment in the U.S. wireless industry in which our focal brand stopped its TV advertising for one randomly chosen week. The research challenge lies in the fact that TV advertising of competing brands exhibit significant spillover effects across brands, which violates the fundamental assumption required for existing causal inference methods. Therefore, we cannot assume that the outcomes of the non-focal units represent the outcomes of the focal units had they not been subjected to the intervention, as the observed intervention effect is a function of the direct as well as indirect effects due to interference. To address this research challenge, we develop a generalized synthetic control method which can debiase interfering ``treated'' and ``control'' units when conducting counterfactual analysis. We show, through a simulation study, that under interference, our proposed method can significantly reduce bias in estimating the true intervention effect compared with existing methods. Applying in our empirical context, we find that this intervention resulted in a significant 5\% reduction of the focal brand's daily search volume. This effect initially occurred after two days, but once regular TV advertising was resumed, 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, while search traffic was more likely to be reduced (up to 40\% per day) for searches that are relevant to the content of TV ads, this effect wore off quickly. Lastly, we find a positive spillover effect of the intervention on the focal brand's competitors, which, however, is usually very short-lived.

2 - Video Ads Content Analysis Using Significant Features (SF) Lasso

Eunkyung Park, PhD Student, School of Computer Science & Engineering, University of New South Wales, Sydney, Australia, Raymond Wong, Jun Bum Kwon, Victor W. Chu, Oliver J. Rutz

Digital and Mobile Marketing has brought a richness revolution to advertising. Instead of static ads containing a few images and a limited amount of text, richer video ads are becoming increasingly popular. A key question for digital marketers is to understand what makes a video ad successful. The evaluation of video ads is challenging as (1) the number of video ads a given firm has is typically very small, (2) the number of textual and visual features per video ad is very large, and (3) these content features are often not shared across multiple video ads. (1) and (2) results in a “small n, large p” problem, however in a much more extreme form. (3) is highly problematic for most existing models as there is very little, if any, data available to cross-validate a model. Given these three characteristics of video ads, standard methods fail to identify many, if not most, content features as significant - leaving the marketer with no insight why one video ad was successful and another one was not. To address these issues a new model is proposed - the Significant Feature (SF) Lasso. This model addresses the three characteristics in video ad features by searching for the optimum penalized value in the regularization path of Lasso that maximizes the number of significant features. The model is implemented on the World Vision U.S. and Canada YouTube video ads. The SF Lasso model ably identifies a set of features driving the number of likes compared to competitive models, which only identify a very limited set of features. In an external validity test, the SF Lasso model identifies important features that human coders utilize when evaluating video ads in an experimental setting. In addition, simulation studies detail the model’s ability to identify significant features even in extreme data conditions when competitive models fail to do so.

3 - Display Ad Measurement Using Observational Data: A Reinforcement Learning Approach

Srinivas Tunuguntla, University of Wisconsin-Madison, Madison, WI, United States

This paper introduces an observational framework for measuring the effects of display advertising. Causal measurement of display ad effects using observational data presents a significant challenge because of small effect sizes and the selection biases induced by targeting. The proposed framework, derived from Markov Decision Processes, accounts for the different sources of endogeneity by explicitly modeling the users' browsing behavior and the advertiser's decision making. Using the proposed framework, we develop a novel Reinforcement Learning method that recovers the incremental impact on outcomes attributable to (1) a display advertising campaign and (2) the individual impressions served. We validate the estimate provided by the proposed method using data obtained from a randomized controlled trial.

4 - Consumer Reactions Toward it Infrastructure Upgrade: Evidence From a Nation-wide Mobile Network Upgrade

Yi Zhu, University of Minnesota, Minneapolis, MN, United States, Jason Chan, Xuan Bi, Jun Wu

IT infrastructures provide the critical backend necessary to deliver many IT products and services, but they are usually an afterthought for consumers. Compared with consumer-facing non-infrastructure technologies (e.g., software applications or operating systems), IT infrastructures are easier to be neglected by consumers, as consumers are less familiar with IT infrastructures and rarely interact with them directly. Such unfamiliarities may elicit distinct consumer reactions when IT infrastructures are upgraded. This paper offers one of the first investigations on the impact of large-scale IT infrastructure upgrades on consumer reactions. Specifically, exploiting a natural experiment setup, we empirically estimate the impact of the generational mobile network upgrade from 3G to 4G on consumers' sentiments. We evaluate the content of service call conversations between consumers and service center agents in an Asian metropolitan city and discover that consumers' sentiments in these conversations turned more negative after the upgrade. In particular, the negative shift is observed in the service call conversations related to mobile network signal, speed, and cost, but not in the ones related to text messages and phone calls. Additionally, our heterogeneous analyses suggest that unexpected costs generated by data overuse, consumers' education levels, and local socioeconomic conditions are the primary drivers of consumers' sentiments. These insights into consumer reactions can inform relevant stakeholders of optimal messaging around future mobile network upgrades (e.g., the 5G upgrade), which may influence consumers' pre-upgrade expectations and help yield better consumer reactions. Implications of these findings for general IT infrastructure management are discussed.

■ TC11

Virtual Room 11

Policy, Regulation and Marketing - I

General Session

Chair: Anita Rao, Chicago Booth, Chicago, IL, 60637, United States

1 - Platform Policies and the Spread of (Mis)information on Twitter

Unnati Narang, University of Illinois at Urbana-Champaign, Champaign, IL, 77840, United States, Abdullatif Al Zaidan, Aravinda Garimella

Social media companies are increasingly playing a critical role in determining the content readers consume and share. This has concomitantly created a new ecosystem for the spread of misinformation. It is no surprise then that most social media platforms, such as Facebook and Twitter have employed policies aimed at reducing the spread of misleading information and fakes news via their platforms. However, it is unknown whether these policies are effective in practice. A common source of misinformation on these platforms is traditional media companies (e.g., CNN, Fox News) who may generate content suffering from media bias. Our research examines the following questions: (a) What is the effect of social media platform labeling policies on the subsequent creation and spread of (mis)information by media companies? (b) Do the characteristics of the media source (e.g., political leaning) influence the extent of this effect? Specifically, we examine Twitter’s policy to label manipulated media content in 2020 on the creation and spread of misinformation on the platform. We extract data on 16 million tweets by over 1,200 media sources. Our preliminary results show that labeling policies lead to a reduction in the number of tweets by the media source with manipulated content but no such decrease in retweets. We also examine the patterns in fake news media content and conduct textual analysis to examine the underlying mechanisms. Our research contributes to the emerging literature on media bias, media’s influence on politics, and social media’s role in the spread of misinformation.

2 - Who Runs Spotify? Measuring the Power of Content Producers on Digital Music Streaming Platforms

Max J. Pachali, Tilburg University, Tilburg, Netherlands, Hannes Datta

Digital platforms connect consumers with content producers, mostly on paid subscriptions. Today, platforms have replaced traditional revenue streams of content producers across many industries. Policy-makers are increasingly concerned about the growing power of digital platforms and the negative consequences for consumer choice and competition. We empirically study the power of Spotify in the digital music streaming market and compare it with the power of content producers (i.e., major record labels). We estimate a demand model of consumer playlist choice using data on more than 1.2m playlists collected from Chartmetric.com and compare how Spotify and the major labels can harm each other’s revenue generation by executing power through promotions, recommendations, and content availability on the platform.

3 - Too Sweet? The Case of the "No High Fructose Corn Syrup" Label

Anita Rao, Chicago Booth, Chicago, IL, 60637, United States

Brands often engage in selective marketing highlighting the positive attributes of their products. Such selective marketing can be informative or misleading. This paper examines High Fructose Corn Syrup (HFCS), a sweetener that received negative publicity due to the purported correlation between the use of HFCS and rising obesity, causing firms to begin using the "no HFCS" label. Examining the nutritional content of brands across various product categories where the use of the "no HFCS" label is predominant, I find that products with the "no HFCS" label are less healthy, containing more sugars, than others.

4 - Legalizing Arbitrage: A "Textbook" Case

Sarah Moshary, University of Chicago, Chicago, IL, United States, James Dana, Bradley Larsen

We provide a description of the economic impact of the landmark 2013 US Supreme Court case, Supap Kirtsaeng v. John Wiley & Sons, Inc., which ruled that third parties could legally arbitrage the textbook market by purchasing copyrighted textbooks (and other books) manufactured and sold abroad, and then reselling them in the US. We show that prices for books sold by publishers in the US dropped significantly following the Kirtsaeng decision, and fell more when the book had an international edition available abroad. We also develop an empirical and theoretically framework that allows us to estimate the social welfare effects of relaxing arbitrage costs in the college textbook market, and to formally test theoretical predictions about the impact of the court-imposed reduction in arbitrage costs on the prices, sales, product availability, and product quality of college textbooks.

■ TC12

Virtual Room 12

Privacy II

Contributed Session

Chair: Z. Jessie Liu, Johns Hopkins, United States

1 - Tradeoffs in Automated Political Advertising Regulation: Evidence From the Covid-19 Pandemic

Clara Jean, Epitech & Université Paris-Saclay, Sceaux, France, Grazia Cecere, Vincent Lefrere, Catherine Tucker

Digital platforms have experienced pressure to restrict and regulate political ad content as a matter of national urgency. Digital ad venues therefore need to identify ads as having political content in order to police whether or not they have appropriate disclosures. However, an algorithmic approach to the categorization may hit difficulties in times of rapid change and if there is not a consensus on what a political ad actually is. We collect data on European and American ads published in the Facebook Ad Library and show that algorithmic determination of what constitutes an issue of national importance resulted in COVID-19-related ads to be disqualified because they do not have an appropriate disclaimer. Our results show that ads run by governmental organizations to inform the population about COVID-19 are more likely to be banned by Facebook's algorithm than ads run by non-governmental organizations. We suggest that this implies that governmental organizations failed to recognize that COVID-19 was a matter of national significance and that ads referring to COVID-19 required a disclaimer. We show that this primarily affects European governmental organizations' ads. It seems that Facebook's policy related to "{Social Issues, Elections or Politics}'' ads is based on US political broadcasting and political advertising rules which are less familiar to European organizations. Our results suggest that in general, most parties, falling within the political ad space have difficulty determining what might be governed by political ad policy, especially in the context of national emergencies.

2 - Privacy-preserving Generative Adversarial Networks to Share Data and Derive Marketing Insights

Gilian Ponte, University of Groningen, Groningen, Netherlands, Jaap Wieringa

Privacy is a fundamental human right. Over the years, we have observed an increase in privacy concerns due to the growing collection and use of consumer data in commercials settings. In response to this development, public policymakers have enacted privacy legislation that limit the ability to derive marketing insights and share data. Simultaneously, public policy views data sharing vital to future economic development. To consider both, marketers need to make a utility-privacy trade-off, where the aim is to balance data utility and privacy preservation. In this paper, we address a Marketing Science Institute (2020) research priority to resolve this trade-off and show that it is possible to pursue both using generative adversarial networks (GANs).We develop GANs to approximate any data-generating process. GANs have the unique ability to generate data from complex joint distributions of arbitrary dimensionality that characterize marketing data sets. During training, a generator indirectly maximizes the likelihood of observing the real data through another player, which allows the artificial data never to be identical to the real data, except for its distribution. To possibly increase data utility, we can use a GAN's capacity for feature extraction. Consequently, GANs make a unique case to address the trade-off by maintaining data utility while preserving consumers' privacy. In a simulation study, we investigate artificial parameter estimates' bias, potential performance measures to monitor during training, and large sample properties of GANs. For three marketing applications, we derive the same marketing insights from artificial data and find that these estimations occasionally outperform real data estimations in terms of predictive validity. We contribute to the literature by showing that GANs enable any entity to generate privacy-friendly artificial data that permit data sharing, even under privacy regulations, while allowing to derive meaningful marketing insights.

3 - Consumers' Adoption of Artificial Intelligence-enabled Applications: Inhibitory and Faciliatory Factors and the Role of Ambivalence and Brand Trust.

George Dagliyan, Pepperdine University, Los Angeles, CA, United States, Christel Rossell

From autonomous vehicles to smart home assistants and telemedicine, artificial Intelligence enabled (AI-enabled) technologies are increasingly available in the market. Consumers are saddled between the benefits and the risks of these new technologies. On the one hand, AI-enabled technologies provide tangible benefits in the form of convenience, customization, and efficiency. On the other hand, the risks of privacy invasion, decision-related uncertainties, and loss of control merit attention as well. This research explores the coexistence of inhibitory and faciliatory factors and how they affect consumers' intention to use AI-enabled technology. It also examines how subjective ambivalence and brand trust affect those relationships. We developed and tested the conceptual model with a cross-sectional survey of a national sample of U.S. consumers across three distinct categories of AI: autonomous vehicles for robotic AI, smart home assistants for virtual AI, and telemedicine for embedded AI. Using structural equations modeling, preliminary findings based on N=600 reveal that the effect of brand trust, an antecedent of both facilitators (positively) and inhibitors (negatively), is moderated by subjective ambivalence: trust does not lower inhibitors when consumers feel ambivalent. The results thus signal that brand trust serves as a protective layer against perceived inhibitors of AI-enabled technology when subjective ambivalence is low but not when subjective ambivalence is high. Theoretical and practical implications are discussed in terms of the diffusion of innovation and the psychological processes that underlie consumer adoption of new technologies often laden in ambivalence.

4 - Impact of Market Structure on Regulatory Compliance: Evidence From Online Censorship in China

Z. Jessie Liu, Johns Hopkins, Baltimore, DC, United States

This paper studies the role of market structure in regulatory compliance through a unique empirical example: censorship via content removal by three major live-streaming platforms in China. Adopting an event study approach, this paper exploits the unexpected occurrence of 30 salient events over two years and shows that platforms of different sizes censor a different number of keywords with notably different delays. This paper then develops and estimates a structural model where the platform's profit depends on its own censorship action as well as that of its competitors, induced by the switching behavior of users with heterogeneous preferences for censorship. By complying with the government's censorship request, platforms may lose users who prefer to evade censorship by switching out. By not complying, platforms incur a cost imposed by the government that is positively correlated with their sizes, but it also allows them to attract new users from their competitors that obey the government's censorship requests. My counterfactual analysis predicts that centralizing market power via merging or shutting down small platforms could backfire and lead to an unintended consequence where the overall censorship in the marketplace turns out to be lower.

■ TC13

Virtual Room 13

Loyalty & Customer Satisfaction

Contributed Session

Chair: Sanghee Kim, University of Iowa, Iowa City, IA, 52246, United States

1 - When Are Expectations Met? Measuring Customer Satisfaction with Uncertain Reference Points

Camila Back, Ludwig Maximilian University of Munich (LMU) - Faculty of Business Administration (Munich School of Management), Munich, Germany, Martin Spann

The importance of a comparative standard to understand customers' satisfaction judgements is well established in both research and practice. Dominant among these conceptualizations is the disconfirmation paradigm, whereby satisfaction results from the comparing the outcome to expectations. This paper examines the role of uncertain expectations in shaping disconfirmation and subsequent satisfaction evaluations. We propose an analytical model for satisfaction measurement whereby satisfaction is the sum of two components: outcome-based satisfaction and reference-dependent satisfaction. We account for probabilistic beliefs about outcomes and compare our model to the established point-estimate approach. Given this conceptualization, we propose a new method for eliciting the outcome that yields zero reference-dependent satisfaction (Z-REFSAT), from which we can infer the inherent uncertainty level. We test the validity of our method via a simulation study (accounting for loss aversion and diminishing sensitivity) as well as an experimental study (in the context of delivery times from an online retailer). We discuss the implications of these results for the role of marketing communications in shaping beliefs about outcomes and their subsequent impact on satisfaction judgements as well as future research directions.

2 - SQ-EXQUAL: A Hybrid Scale for Measuring Customer Satisfaction and Loyalty

Suvendu Kumar Pratihari, Research Associate, Indian Institute of Management Ahmedabad, Ahmedabad, India, Anand Kumar Jaiswal

The study aims to develop a hybrid and holistic measure of experience quality termed 'SQ-EXQUAL' that constitutes both the cognitive and affective dimensions. Further, the study examines and compares the effect of different higher-order factors of SQ-EXQUAL on satisfaction and loyalty. The study adopts an empirical investigation and uses a self-administered questionnaire to collect 500 samples (431 usable) across ten years period from 2010 to 2020. Liquid coffee retail service experience is the context of the investigation. With the exploratory factor analysis, the study found a total of nine factors. The measurement model of nine factors constituting 23 items shows a model fit above the threshold level. These factors include tangibility, reliability, empathy, and responsiveness, which belong to the satisfaction (SQ) dimension; aesthetic, social image, playfulness, entertainment, and time distortion belong to the Experience Quality (EXQual) dimension. The internal consistency, convergent, and discriminant validity are significant at $p \leq .05$. The SEM results show that SQ and EXQUAL complement each other while determining satisfaction and loyalty. For instance, SQ and EXQual's effect determines satisfaction by 32% and loyalty by 60%. Contrary, SQ-EXQUAL, as the single dimension of 3rd order, determines satisfaction by 37% and loyalty by 60% at $p \leq .05$. However, considering satisfaction as a mediator, the coefficient of determination on loyalty varies more in the second-order model than the higher one. Theoretically, the study bridges the gap of measuring the experience quality holistically and adds value with a new hybrid scale that constitutes both service and experience quality attributes. The study emphasizes the theatre theory and extends its significance to measure experience quality holistically. Further, the relationships between SQ-EXQUAL dimensions on satisfaction and loyalty adds knowledge to the existing literature. Practically, the SQ-EXQUAL scale can be useful to practitioners, especially in the context of liquid coffee retail service and related sectors.

3 - What Drives Satisfaction: Expectations, Ideals or Absolutes? A Multi-Year Study of Industry and Firm Factors

Sanghee Kim, University of Iowa Tippie College of Business, Iowa City, IA, United States, Thomas S. Gruca

Customer satisfaction (CS) is a widely used marketing metric. Prior research shows its impact on desirable consumer behaviors, e.g., increased loyalty, as well as its positive influence on the value of the firm. Various authors have proposed different standards by which consumers determine their overall level of satisfaction. Some suggest that it is an absolute measure of perceived quality over cumulative experience while others support the expectancy-confirmation theory (ECT). Still, others argue that customers judge their satisfaction with a given goods or service relative to an ideal version of given goods or services. Since it is unknown which model is operant for any situation, the ACSI (American Customer Satisfaction Index) includes all three elements, absolutes, expectations, and ideals, as manifest variables for the latent construct of CS. The reported score for each firm in the ACSI is a weighted sum of these three measures with the weights adding up to one. While a great deal of research has examined the consequences of the composite ACSI score, little is known about the relationship between the composite ACSI and its three manifest variables. In this exploratory study, we examine how the relative influence of three satisfaction models on the formation of CS varies across time, industry characteristics, and firm-level measures. Given our findings, customers form their satisfaction differently depending on the characteristics of firms. For services, customers rely more on relative measures, such as ECT or ideal point. In a monopoly market, despite the absence of an alternative supplier, customers put more weight on comparison to expectations or the ideal experience. It contradicts what Oliver (2004) and Anderson (1994) suggest that the role of expectations is lower in the CS evaluation process of monopoly providers. The findings of our study can contribute to a better understanding of how consumers form their CS judgments in different consumption situations and to deeper insights into more effective ways to manage CS that are appropriate for the context of the firm.

Thursday, 12:45PM - 1:45PM

■ TD01

Virtual Room 01

Retailing

Contributed Session

Chair: Raghunath S. Rao, University of Texas-Austin, B6700 1 University Station, Austin, TX, 78712, United States

1 - Store-within-showrooming: The Role of Acceptance and Matching

Ziying Zhang, Zhejiang University, Hangzhou, China, Yi Yang, Lin Liu

This paper explores a strategic retailer monetarizes its showrooming service by allowing competing third-party brands to open a store within its store. Specifically, we focus on the two key roles of showrooming in increasing consumers' shopping acceptance level (i.e., improving shopping experience) and matching level (i.e., finding a better fitting product). Intuitively, the brand with a lower acceptance level, or that with a higher matching probability, has a greater incentive to invest in using the showrooming service by opening a store within the retailer, because of the higher net benefit. However, our results show that the brand with a higher acceptance level may use showrooming, and that with a lower matching probability always enters the showroom. In addition, showrooming may reduce consumer surplus and may also create an "all win" situation in which all parties (the retailer, third-party brands, consumers, and social planner) benefit. However, such an "all win" situation only emerges under acceptance improvement because showrooming always reduces consumer surplus under matching improvement. Our finding also shows that there is an interior "bitter spot" at which the retailer's profit is minimized under acceptance improvement, and such a "bitter spot", however, does not emerge under matching improvement. Our extensions explore showrooming with competing brands that are vertically differentiated and with retailer's first party business, and the results are discussed.

2 - Offline Retailers as Return Drop-offs for Online Retailers: Can Competitors Become Partners?

Abhinav Uppal, Indian School of Business, Mohali, India, Ahmed Timoumi

Online retailers lack an offline retailer's ability to resolve consumer uncertainty for products that require touch and feel to determine fit at the purchase stage. To mitigate this shortcoming, online retailers usually allow for product returns. However, returning products can have high hassle costs for certain consumers, dissuading them from buying products in the first place. Hence, retailers such as Amazon have been seeking ways to reduce this hassle cost, including partnerships with offline competitors such as Kohl's, where the latter would serve as a drop-off point for Amazon returns. In this paper, we investigate this interesting phenomenon by specifically examining the theoretical rationale for this non-trivial partnership to take place. To this end, we model consumers' purchase and return decisions for "touch and feel" products between the two retailers, where consumers are heterogeneous in terms of their retailer preference and their hassle cost for product returns. We characterize the conditions under which the two retailers would enter into a partnership together. We find that the partnership favors the online retailer in most of the parameter space. However, both the online and offline retailers can also be better off under the partnership, depending upon the level of differentiation between the two retailers.

3 - Buy Online and Return Offline: A Strategic Analysis of Consumer Returns and Product Assortment

Raghunath S. Rao, University of Texas-Austin, Austin, TX, United States, Yue Li, Paola Mallucci

Product returns are expensive to retailers and consumers, and online retailers are especially vulnerable to return costs due to higher return rates. In this study, we build a novel multi-product model of online-offline competition with assortment decisions affected by return rates that consequently affect consumers' search decisions. Our analysis suggests that online retailer stocks products with an ex-ante higher probability of fit and lower value relative to the brick and mortar store's assortment decisions. We also find that there is considerable overlap in the assortment across the two retailers. We then use the model to study the recent rise of a new return format wherein purchases made at an online retailer are returnable at a competing brick-and-mortar store. We find that this "buy online and return offline (BOROF)" policy significantly impacts consumer behavior and assortment decisions. Specifically, under BOROF, the two retailers fully differentiate, and the equilibrium product variety increases. Our analysis shows that, under certain conditions, brick-and-mortar stores might be willing to accept the online returns without any compensation while needing to be compensated under other conditions. Overall, consumers are better off under BOROF.

■ TD02

Virtual Room 02

Durables, Bundling, and Demand Estimation

Contributed Session

Chair: Soheil Ghili, Yale University, New Haven, CT, United States

1 - How Do Changes to Manufacturer Warranties Impact the Demand for Extended Warranties?

Hyeong-Tak Lee, University of Iowa, Iowa City, IA, United States, Sriram Venkataraman

Durable goods often come bundled with free limited-time manufacturer warranties (MWs). Yet, each year durable-goods buyers spend about $38 billion on optional extended warranties (EWs) to insure themselves against repairs after the MWs expire. Surprisingly, scant empirical research exists on how consumers trade-off MWs with EWs and therefore many managerially relevant questions remain unexplored: Do consumers treat these two warranties as substitutes or complements? How does changing the terms of the MWs impact the demand for EWs? We answer these questions using a structural econometric model. Our model builds upon the framework of expected utility theory and estimates consumers' risk preferences from data on their EW choices and post-purchase repair claims. Our model also accounts for adverse selection by modeling unobserved heterogeneity in both risk (repairs claim rate) and risk aversion. We find that risk-averse buyers endogenously select vehicles with greater MWs, hence, more likely to purchase EWs. Therefore, in our empirical setting, risk-averse consumers treat MWs and EWs as complements rather than substitutes. Using the model estimates, we quantify the impact of changes to coverage terms of the MWs on demand for EWs through counterfactual analysis. We also find that heterogeneity in risk preferences is rather large and skewed, which has direct implications for pricing EW contracts. Specifically, we assess how repricing select EW menu items impacts the total demand for EWs, as well as the individual demand for EW menu items. Substantively, our findings offer rich new insights for automakers and EW underwriters in the automobile industry, which is a key pillar of the U.S. economy.

2 - Are Coarse Ratings Fine? Application to Crashworthiness Ratings' Format

Bhoomija Ranjan, Lecturer, Monash Univesity, Caulfield, Australia, Benjamin Shiller, Siqi Liu

Many rating organizations intentionally coarsen ratings before public presentation, for example by using a discrete badge rather than a continuous rating. We investigate the impact of coarsening empirically in the context of automobile crashworthiness ratings. Specifically, we construct a univariate continuous crashworthiness rating from crash test measurements and observed fatality rates. We then estimate a random coefficient model of vehicle demand under status quo coarse ratings and simulate outcomes under counterfactual continuous ratings. We find that consumers alter vehicle choices, thereby reducing fatalities by 7.4%, which implies 1,850 fewer U.S. fatalities annually. Finally, we explore whether incentives to produce crashworthy vehicles are reduced enough to offset benefits of finer information. We conclude that a continuous rating format would reduce fatalities.

3 - Hedonic Price Modeling of Classic Car Model Value Formation

George Baltas, Professor, AUEB, Athens, Greece, Christina Giakoumaki

In recent years, the classic car market has been attracting considerable media and public attention but failed to receive any attention in the empirical marketing literature. The purpose of this paper is to address the factors that determine the values of classic car models and explain the remarkable price differences among them. Toward that end, the paper develops and tests a set of research hypotheses about the effects of model characteristics on market values in the context of a generalized hedonic price model that also accounts for heterogeneity among classic automobile brands. It is demonstrated that classic car model values reside at several levels and are determined by observable characteristics pertaining to aesthetics, rarity, engineering and performance. In addition, we show that classic car marques play a critical role in the determination of model values and account for considerable variation in prices, even after controlling for observable model attributes. This is the first paper in the empirical marketing literature to address classic automobile price formation. The findings reveal how measurable, observable factors determine classic car values and augment our broader understanding of vintage and collectible goods markets.

4 - Optimal Bundling: Characterization, Interpretation, and Implications for Empirical Work

Soheil Ghili, Yale University, New Haven, CT, United States

This paper studies pure bundling. Specifically, I show that, under some conditions, a firm optimally chooses to sell only the full bundle of a given set of products if and only if the optimal sales volume of the full bundle is weakly larger than the optimal sales volume for any smaller bundle. I argue that this characterization can be interpreted as follows: pure bundling is sub-optimal when there is considerable variation across consumers in how complementary they find disjoint sub-bundles, and/or when this variation correlates negatively with their price sensitivity. I then demonstrate--using simulated data and a random-coefficient discrete choice demand model--that capturing these two variations is indeed crucial for model selection in the empirical analysis of bundling decisions.

■ TD03

Virtual Room 03

Influencer Marketing (IV)

General Session

Chair: Jochen Hartmann, University Hamburg, Hamburg, 20148, Germany

Co-Chair: Andreas Lanz, HEC Paris, HEC Paris, Jouy-en-Josas, France

1 - Video Influencers: Unboxing the Mystique

Prashant Rajaram, Ross School of Business, University of Michigan, Ann Arbor, MI, 48104, United States, Puneet Manchanda

Influencer marketing is being used increasingly as a tool to reach customers because of the growing popularity of social media stars who primarily reach their audience(s) via custom videos. Despite the rapid growth in influencer marketing, there has been little research on the design and effectiveness of influencer videos. Using publicly available data on YouTube influencer videos, we implement novel interpretable deep learning architectures, supported by transfer learning, to identify significant relationships between advertising content in videos (across text, audio, and images) and video views, interaction rates and sentiment. By avoiding ex-ante feature engineering and instead using ex-post interpretation, our approach avoids making a trade-off between interpretability and predictive ability. We filter out relationships that are affected by confounding factors unassociated with an increase in attention to video elements, thus facilitating the generation of plausible causal relationships between video elements and marketing outcomes which can be tested in the field. A key finding is that brand mentions in the first 30 seconds of a video are on average associated with a significant increase in attention to the brand but a significant decrease in sentiment expressed towards the video. We illustrate the learnings from our approach for both influencers and brands.

2 - Mining Iconic Brand Assets: A Unified Multi-Modal Deep Learning Framework

Amos Schikowsky, University of Hamburg, Hamburg, Germany, Jochen Hartmann, Mark Heitmann, Michael Haenlein

Visual brand appearances can provide important indications about brand usage and perception. For example, on social media images spontaneous brand usage (e.g., selfie image with a Starbucks cup), endorsed usage (e.g., viral and influencer marketing), but also undesirable brand-related content (e.g., brand firestorms) appear. Beyond social media, optimizing activities such as product placement or sponsorship necessitate information on actual brand visibility. At the same time, the various fragmented media channels make manual image tracking infeasible. Automated solutions are required to keep track of where and how iconic brand assets such as brand logos, product shapes, design elements, or advertising figures appear. This paper proposes a unified framework geared towards mining iconic brand assets that blends state-of-the-art multi-modal deep learning techniques. We illustrate this framework and train 20 Interbrand 100 logos. An above 88% average F1 score for detecting and localizing logos suggests efficient and effective tracking is feasible. Three exemplary applications on social media brand presence, negative consumer feedback, and sports sponsorship illustrate the relevance of mining visual brand appearance.

3 - Conferring Minds to Machines: A Deep Learning Approach to Mind Perception, Smart Object Relationships, and Task Delegation

Jochen Hartmann, University Hamburg, Moorweidenstraße 18, Hamburg, 20148, Germany, Anouk Bergner, Christian Hildebrand

Smart objects (such as digital voice assistants) are dramatically changing how consumers communicate with and relate to technology. The current research provides a novel approach to understanding anthropomorphism attributions in the form of a "mind" to smart objects and its implications on consumer behavior. Specifically, we develop a state-of-the-art deep learning model using transfer learning to unobtrusively classify mind perception from unsolicited, unstructured text and provide a rich set of interpretable linguistic features using manifold methods, demonstrating that the extent of mind perception provides novel insights into the consumer-smart object relationships and successfully predicts differences in consumers' willingness to delegate a broad set of tasks to it.

■ TD04

Virtual Room 04

Reviews/UGC 4

Contributed Session

Chair: Samuel Staebler, Tilburg University, Tilburg, Netherlands

1 - Incentivizing User-generated Content Using Crowdsourcing Contests – A Double-edged Sword: Evidence from a Field Dataset and a Controlled Experiment

Debjit Gupta, Assistant Professor, Binghamton University (SUNY), Vestal, NY, United States, Juncai Jiang, Ying Xie, Dipankar Chakravarti

Given its public goods nature, sustaining quality user-generated content (UGC) is often difficult for online platforms. Hence, some platforms emulate traditional crowdsourcing contests, using monetary rewards to stimulate UGC. However, UGC contests with monetary incentives may be a double-edged sword. Although some contributors seek extrinsic monetary incentives, others value non-monetary rewards (e.g., peer "likes" or "upvotes" reflecting image and social approval) or are intrinsically motivated. Using a unique field dataset collated from a question and answer website, we examine how monetary incentives in crowdsourcing contests impact UGC contributions and approval from peer users. We find that while monetary incentives increase both the quantity and quality of UGC contributions, these effects do not vary by incentive size (prize amount). Also, peer upvote count is an inverted-U function of incentive size: lower for a small incentive, highest for a mid-range incentive (but no higher than in uncompensated cases), and lower again for a large incentive. A controlled experiment manipulating both incentive size and contribution quality corroborates that monetary incentives have an inverted-U effect on peer upvotes. These findings suggest that sustaining UGC contributions by monetary incentives (particularly winners-take-all contests) may be difficult and platform managers must strike a better balance between monetary and non-monetary rewards.

2 - The Bandwagon Effect: Can a Trophy Tame Internet Troll?

Xinlong Li, Nanyang Technological University, Singapore, Singapore, Xinying Hao

This paper estimates the award-winning effect on brand image. Using a data set consists of the National Basketball Association (NBA) players' game performance, popularity and fans online comments, we show that being selected as an All-Star player, which is an important honor for NBA players and key in defining a player's career legacy, can help a player to build a more positive brand image. This positive effect helps All-Star players receive comments with a significantly higher sentiment. In particular, Internet trolls, who keep posting negative, defamatory, or abusive comments, become significantly more supportive toward All-Star players. But kind Internet users and more experienced Internet users are not prone to this positive effect.

3 - How Multi-Attribute Rating Systems Affect Ratings? A Salience Explanation

Ali Cakal, Koc University, Istanbul, Turkey

Product ratings are influenced by many factors, including the rating systems they are generated in. We investigate the impact of adopting a multi-attribute rating system on product ratings, using mobile phone category data from an e-commerce website that switched to a multi-attribute rating system. We find that, on average, products get lower overall ratings under the multi-attribute system. The decrease is primarily due to the users who opt to provide attribute-specific ratings. These users are also more likely to mention these attributes in their reviews, suggesting a salience effect from the provision of evaluating attributes. We find no change in mean attribute ratings over time, in contrast to previous studies that suggest multi-attribute systems may increase rating informativeness.

4 - How Do Media Report About Academic Research? An Empirical Study of Marketing Articles

Samuel Staebler, Assistant Professor of Marketing, Tilburg University, Tilburg, Netherlands, Michael Haenlein

Many articles in the marketing research discipline claim to contribute to practice and ultimately to improve managerial decision-making. It seems reasonable to assume that the degree to which (marketing) research impacts business and society depends on the extent to which such research is reported in newspapers and social media. Anecdotal evidence suggests that media coverage of academic research varies substantially. While some research articles receive considerable attention in the popular press, the vast majority of academic papers (≈ 90%) remain entirely unnoticed. In this study, we investigate under which conditions marketing research receives news and social media attention. We analyze drivers of citations that may be specific to the journal (e.g., prestige), the article (e.g., readability), and the authors (e.g., gender). We compile a dataset of 300,000 observations by combining information from two external databases (i.e., Altmetrics and Dimensions) with extensive manual data collection. Based on this data, we investigate how news media (e.g., New York times), social media platforms (e.g., Facebook and Twitter), and academic journals report on more than 10,000 marketing articles published in the top marketing journals over the last decade. Our study helps researchers to identify factors that allow drawing attention to their work beyond the academic community. Specifically, we give guidance on how organizational matters (e.g., number of co-authors) and content-specific decisions (e.g., sub-domain of research) influence newspapers and social media's editorial decision to cover academic content.

■ TD05

Virtual Room 05

Omnichannel

Contributed Session

Chair: Abhishek Roy, Temple University, Fox School of Business, Philadelphia, PA, 19122-6105, United States

1 - Product Returns in Omnichannel Retailing: Impact of Access to a Physical Store

Gonca Soysal, University of Arkansas, Fayetteville, AR, United States

Product returns are costly for manufacturers and retailers and the general belief among practitioners is that return rates are increasing rapidly as result of the growth of online retailing. In this study, using customer and transaction level panel data from a leading US specialty apparel retailer from a period during which the retailer opened many physical stores, we investigate consumer purchase and return behavior across the online and offline channels. Specifically, we are interested in understanding how having convenient access to a physical store of an omnichannel retailer impacts consumers' purchase and return behavior in the online and offline channels. Opening of a physical store close to consumer's residence will reduce the consumer's transportation costs related to visiting the retailer's nearest physical store. The impact of this reduction on product returns however is not immediately clear, especially in categories where products have important non-digital attributes (e.g., apparel, fresh produce) and thus require physical examination before purchase. On one hand, consumers' costs associated with visiting a store to physically examine the products before making a purchase will decrease, which might result in a decrease in product returns. On the other hand, consumers' costs associated with making a return to a physical store will also decrease, which might result in an increase in product returns since consumers might be willing to take more risks in purchasing or to make returns when they are not perfectly satisfied. Moreover, the impact of having convenient access to a physical store on consumer return behavior does not have to be symmetric across purchases through the online and offline channels and does not have to be homogenous across customers.

2 - The Impact of Online Versus Offline Shopping Channel on Intertemporal Preferences

Jiaqi Zhong, Doctoral Student, Renmin University of China, Beijing, China, Ying Ding

Due to the outbreak of COVID-19, consumption has accelerated its transformation from offline to online. However, little is known about how people mentally represent and process future time in different shopping channels (online vs. offline shopping). The current research aims to investigate the influence of shopping channel on time perception and its consequence in intertemporal preference, a trade-off between small-sooner and larger-later options. Building on the extant literature, we propose that consumers immerse themselves more when shopping online (vs. offline) and feel time passing faster, which in turn shortens perceived time duration. Consequently, online (vs. offline) consumers will be more patient in intertemporal preferences and exhibit greater preference for delayed larger gains. Across three empirical experiments, we find that consumers are more inclined to choose the larger-later coupon over smaller-sooner coupon in an online shopping context compared with offline shopping context (Study 1, N = 185). Study 2 (N = 214) explores the underlying process and the results show that online shopping makes consumers feel time passing faster, thus leads to more preference for larger-later coupon. Study 3 (N = 105) employs 2 (online vs. offline shopping) x 2 (crowded vs. uncrowded) between-subjects design and demonstrates that the effect of shopping channel in intertemporal preference would be attenuated when consumers feel crowded. Our findings advance the existing research by introducing shopping channel as a key predictor of intertemporal preferences. We also shed new light on the importance of subjective judgment of future time in intertemporal preferences. From a managerial perspective, marketers could consider adopting different coupon strategies across different shopping channels.

3 - Manufacturer's Multichannel Sales Strategies in the Presence of Consumer Showrooming and Webrooming

Prasenjit Mandal, Indian Institute of Management Calcutta, Kolkata, India, Preetam Basu, Samir Biswas

Consumers often involve in hybrid shopping behaviours, such as showrooming and webrooming, in which they use one channel to gather product information and explore products but complete the product purchase in a different channel. This paper studies the impact of such free-riding consumer behaviours on the multichannel sales operations of a supply chain consisting of an upstream manufacturer and a downstream brick-and-mortar (BM) retailer. The manufacturer has the option of selling its products to end consumers not only through the BM retailer but also through its online channel. We find that under certain market conditions, both the manufacturer and the retailer benefits from the former's multichannel sales strategy. Although existing literature on multichannel retailing has also studied showrooming or webrooming behaviour individually, our work complements them by studying the impact of both consumer behaviours on the manufacturer's sales strategy in a distribution channel. The common wisdom is that a BM retailer suffers from consumer showrooming. Contrary to that notion, our findings reveal that both consumer showrooming and webrooming may benefit the BM retailer and the manufacturer, thereby leading to a win-win outcome.

4 - Ripple Effects: The Impact of Strategic Consumer Behavior on Shipping and Return Policies of Omnichannel Retailers

Abhishek Roy, Temple University, Fox School of Business, Philadelphia, PA, United States

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.

■ TD06

Virtual Room 06

Game Theory

Contributed Session

Chair: Tommaso Bondi, Cornell Tech & Johnson School of Management, New York, NY, United States

1 - A Model of Sponsored Reviews

Zihao Zhou, University College-London, London, United Kingdom, University of California-Berkeley, Berkeley, CA, United States

This paper constructs a stylized model that analyses the incentives of a product reviewer that posts reviews of products with uncertain qualities to the reviewer's followers on an internet platform. The platform rewards the reviewer for reviews that grow the reviewer's followers and hence attract traffic, which is higher for more accurate reviews. On the other hand, the product manufacturer also pays the reviewer for selling the product to the reviewer's followers. The model analyses the reviewer's tradeoff between an honest review that tends to bring more traffic and a biased review that generates more sales. In short, the paper finds that the reviewer has an incentive to post an honest review for products whose prior beliefs about the quality are in the medium range. The paper also discusses comparative statics that affects the prior-belief range of product qualities in which the reviewer has an incentive for an honest review.

2 - Is Pay-to-win a Winning Monetization Strategy for Game Developers?

Mark Bender, Assistant Professor of Marketing, University of South Florida, Tampa, FL, United States

We explore a game developer's decision to sell pay-to-win (P2W) content as an add on to its game. P2W is a type of microtransaction, usually restricted to video games with a competitive component, in which the developer sells in-game content that increases a player's in-game abilities in exchange for real money. Its use is often derided by players who find it a way to generate unfair advantages within the game. We show that P2W may serve multiple purposes from the perspective of the firm even if it cheapens the experience from playing the game. First, it may level the playing field within the game which allows the firm to increase the price of the game being offered to players of all skill levels. Second, it can also serve a price discrimination role in which only select skill levels of players find it beneficial to purchase the P2W to increase their chance of winning the game, allowing the firm to better extract consumer surplus across player skill levels when setting prices. We characterize conditions under which a video game developer finds it optimal to offer P2W and those under which the developer would prefer not to offer P2W. When offering P2W, we examine two potential equilibria: one in which multiple player skill types purchase the P2W and one in which only one skill type purchases the P2W.

3 - Employee or Contractor: On the Employment Status of Drivers and Compensation Design by Ridesharing Platforms

Sreya Kolay, Assistant Professor, School of Business, University at Albany, SUNY, Albany, NY, United States, Xiaoyi (Sylvia) Gao

Ridesharing platforms like Uber and Lyft are under significant scrutiny from regulators and activists regarding the "contractor" (and not "employee") type status given to each driver on these platforms. Proponents of granting employee status to the drivers argue that it helps establish a safety net for the drivers. Opponents argue that the employee status takes away the flexibility in working hours that is of value to many drivers as well as the platform. To address the question of whether or under what circumstances, the platform, the drivers and consumers are better off under the "employee" status or under the "contractor" status, we derive the optimal compensation design for the ridesharing platform under each of these two status paradigms. We show how the profitability and welfare comparisons for the platform, drivers and consumers across the two statuses depend on key market characteristics, such as difference in demand between rush hour and non-rush hour periods and the degree of heterogeneity in the outside options of drivers. Our paper provides support for the concerns in the public arena by highlighting potential regions of conflict where the platform's preferred choice of the contractor status can leave drivers worse off. For example, when the drivers are relatively more homogeneous in their outside options and the demand difference between rush hour and non-rush hour is relatively small, the platform finds the contractor status more profitable whereas drivers are better off under an employee status. In such a situation, a regulatory intervention towards enforcing an employee status on the drivers will benefit them. At the same time, we show that there are scenarios where the drivers and the platform are aligned in their preference for the contractor status, and any regulatory intervention forcing a switch to an employee status may leave drivers worse off. In addition, we highlight areas where such intervention can improve drivers' welfare but hurt consumers in the process, as well as areas where the intervention can benefit both drivers and consumers.

4 - Amazon and the Future of Retail

Tommaso Bondi, Assistant Professor, Cornell Tech & Johnson School of Management, New York, NY, United States

Over the last two and a half decades, Amazon has represented a growing threat for independent retailers. How can these retailers react? Using the book market - and the recent resurgence in the number (and revenue) of independent bookstores in the US - as a case study, we develop a theoretical model describing how bookstores' optimal stocking and exit decisions evolve in response to Amazon's growth. We show that, as Amazon has grown larger, it has become optimal for an increasing share of bookstores to offer a specialized catalog (e.g., by only focusing on one, possibly niche, genre), rather than going for a "generalist" strategy (e.g., by stocking a variety of genres representative of the overall book market). This result is robust to different specifications of consumer preferences - e.g., eclectic or specialized. Our findings have several implications, both at the "micro" and the "macro" level. At the "micro" level, we show that offline retailers specialization leads to increased consumption segregation among consumers. At the "macro" level, we rationalize the phenomenon commonly known as the "vanishing middle", meaning a polarization in firm size distribution: this is because larger bookstores (e.g., Barnes & Noble) are more likely to be generalists, and thus more hurt by Amazon's growth. We also offer a new perspective on the relationship between the internet and preference minorities: as brick-and-mortar retailers specialize, we find that an increasing share of preference minorities will be relatively better served offline, in contrast with the existing literature. As a result, an offline long tail endogenously emerges. We confirm our findings using proprietary data obtained from a major US publisher, detailing their individual book sales to both offline and online retailers over the last five years.

■ TD07

Virtual Room 07

Location Big Data and Consumer Location Intelligence (Session C)

General Session

Chair: Natasha Foutz, University of Virginia, Charlottesville, VA, United States

Co-Chair: Baohong Sun, New York, NY, 10022, United States

1 - A Descriptive Look at the Effect of Remote Working on Retailing

Wanqing Zhang, University of London, London, 47906, United Kingdom, Qinghua Li, Pradeep Chintagunta, Frederico Rossi

Remote working has become the new normal during the COVID pandemic. Since consumers no longer need to move between their homes and physical working places daily, they may also change their shopping locations. In this study, we exploit those changes during COVID to study how remote working affects consumers' choice of retailers. Using data of store visits and consumer mobility before and after the pandemic, we describe the changes of their shopping locations and commuting patterns.

2 - Business Effective Sequential Route Recommender System for Taxi Drivers

Junming Liu, City University of Hong Kong, Hong Kong

We propose a dynamic route recommender system that provides real-time route searching for a sequence of vacant taxi cabs. The objective is to maximize the potential net profits by following the recommended routes conditioning on the dynamic demand-supply distributions. While existing recommender systems suffer from recommendation overload, our proposed method initializes with a GCN-LSTM for pick-up possibility distribution prediction, along with the dependence on taxi congestion and its corresponding taxi oversupply. The Graph Convolution Network (GCN) is designed to capture the characteristics of the road network while the Long-short-term-memory (LSTM) is designed to capture the temporal dynamics of the GCN. By embedding the road network into a deep sequence model, we can predict the pick-up probability of road segments with the consideration of potential taxi overload. The dynamic segment pick-up probability distribution is then fed into a maximum net profit route searching model to recommend searching routes for a sequence of vacant taxis. To address the computational challenge, we transform the road network structure into a recursion tree structure with a recursive searching algorithm, which significantly reduces the computational time and provides a real-time route searching solution for the sequential recommendation. Finally, we carry out extensive experiments on a real-world data set collected from Beijing City and the experimental results validate the effectiveness of the proposed recommender system.

3 - IoT, Sensor Data and Customer Relationship Management: Coverage Choice, Pricing and Information in Automobile Insurance

Miremad Soleymanian, Simon Fraser University, Vancouver, BC, Canada, Charles B Weinberg, Ting Zhu

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.

4 - Predicting Stages in the Consumer Path-Purchase Journey: An Omnichannel Deep-Learning Model

Chenshuo Sun, PhD Candidate, NYU Stern School of Business, New York, NY, United States, Panagiotis Adamopoulos, Anindya Ghose, Xueming Luo

The proliferation of omnichannel practices and emerging technologies opens up new opportunities for online companies to collect voluminous data across multiple channels. In this study, we examine whether leveraging omnichannel data can lead to better predictions about consumers' online path-to-purchase journey and create better monetization potential beyond leveraging single-channel data. Using an omnichannel dataset that captures consumers' online behavior in terms of their website browsing trajectories and their offline behavior in terms of physical location trajectories at the same time, we predict consumers' future path-to-purchase journey based on their historical omnichannel data. Using a state-of-the-art deep learning algorithm, we find that using omnichannel data can significantly improve the predictive power of our model. The lift curve analysis reveals that the omnichannel model outperforms the corresponding single-channel model by 7.38%. It benefits heterogeneous online retailers, regardless of their popularity or whether they have an offline presence or not. Using an illustrative example of targeted marketing, we quantify the economic value of the improved predictive power using a cost-revenue analysis, and demonstrate that a commerce platform like Amazon can save up to $102.5 million per year. Our paper contributes to the emerging literature on omnichannel marketing and consumers' online path-to-purchase journey, while also offering several managerial insights for firms in a variety of different domains such as ad and content targeting at different stages in the customer journey, which in turn can lead to improved decision-making in multichannel attribution and advertising budget allocation.

■ TD08

Virtual Room 08

Digitization 4: Consumption

General Session

Chair: Kosuke Uetake, Yale School of Management, New Haven, CT, 06511-8978, United States

Co-Chair: Yufeng Huang, University of Rochester, Rochester, NY, 14627-0001, United States

1 - Place-Making or Consumer-Making: The Role of the Neighborhood in Shaping Consumption Patterns

Tomomichi Amano, Columbia University Business School, Boston, MA, United States, Kristina Brecko

The past decade has seen renewed interest in neighborhoods' location-specific characteristics such as amenity levels and mix and spatial and social integration. In this paper, we study the underpinnings of a key policy goal of this effort: local economic development. We examine whether location-specific goods play a role in shaping individual consumption patterns and by which channel. We show evidence that location-specific characteristics play a role in facilitating adoption of regional consumption trends by the individual household. In particular, we find that an increase in local amenity levels increases adoption of regional consumption trends by households, while an increase social integration has the potential to facilitate or deter such adoption, depending on the product category. These effects are present when incorporating contemporaneous changes in supply conditions as well as when keeping them fixed, suggesting that changes in location-specific goods can induce consumers to change the way they shop and respond to marketing activity. We propose that the role of location-specific goods in brand choice is fruitful for future academic investigation. CPG brands are commonly not differentiated by more than the brand itself (Bronnenberg et al, 2015). Yet, a significant portion of variation in the brand choice across households are not accounted for by demographics such as income or age, or past experience with the brand (Bronnenberg et al, 2012). We expand this literature on understanding sources of brand share differences by highlighting location-specific drivers of consumer preference formation. Our findings also have practical implications for public policy makers and marketers.

2 - Consumer Time Budgets and Grocery Shopping Behavior

Bart J. Bronnenberg, Tilburg University, Tiburg, Netherlands, Tobias Klein, Yan Xu

We construct a novel household panel data set that combines purchase records with information on labor market status and other demographics to study the relationship between purchase behavior and the availability of time. Our main results revolve around the question whether the availability of time changes the types of products households buy. To answer this question we develop an approach to classify products according to the time it takes to turn them into consumption experiences and an empirical approach that builds on this classification. We find that the availability of additional time shifts a household's purchases towards more time-intensive market goods. Product- and retail-innovations aimed at reducing the time cost of household production are consequently important drivers of demand in consumer packaged goods (CPG) industries

3 - Donation and Consumption

Yewon Kim, Stanford GSB, Stanford, CA, United States

Are donation and consumption substitutes or complements? Using a long panel that tracks individuals' donation and concert ticket purchase history at a symphony center, this paper studies an endogenous relationship between donation and consumption at a single organization. The data show heterogeneous, within-consumer intertemporal substitution patterns between donation and consumption. Empirical findings shed light on what drives donation - giving back (responsive) and giving forward (mission-driven) - and how different motivations shape long-term support behavior. The paper also offers implications on how non-profit organizations can optimize targeted marketing efforts to increase their patrons' engagement.

4 - Get Rich on Twitch: Incentive-compatible Platform Design for Influencer Marketing

Yufeng Huang, University of Rochester, Rochester, NY, 14627-0001, United States, Ilya Morozov

Live streaming has become an instrumental marketing technology in online marketplaces. Yet, streamers, who are mostly compensated by streaming platforms, are not aligned with product developers in their incentives. This paper studies the dominant streaming platform and PC video game platforms, Twitch.tv and Steam. Using a wide range of alternative identification strategies, we first measure the extent of (positive) traffic spillover effects from streamers to game developers. We then present a model to characterize streamers' incentive to produce content, which then quantifies the impact of alternative incentive structures to internalize the spillover effects between platforms.

■ TD09

Virtual Room 09

Service Orientation

Contributed Session

Chair: Aidin Namin, Loyola Marymount University, Los Angeles, CA, 90045, United States

1 - Antecedents and Consequences of S-D Orientation – An Examination of CEOS' Leadership Styles and Firm Performance Outcomes

Kwabena Frimpong, KFUPM Business School, Dhahran, Saudi Arabia, Obaid Shuridah, Samuel Adomako, Omar Ahmed Altayi, Robert Opoku

Despite the high scholarly and practitioner interest in the role Service Dominant (S-D) Orientation plays in firms' competitiveness, very little is known in terms of the antecedents and market consequences of this business approach. Based on insights from the leadership and firm performance literature, this paper examined two potential antecedents (servant and transformational leadership styles) and outcomes of S-D orientation (perceived value and market performance). Using matched survey data collected from 212 employees/managers of medium-sized SMEs and 212 customers from an emerging economy (Ghana), the results indicate that CEOs' transformational and servant leadership styles are positively and significantly linked to the practice of S-D orientation philosophy in firms. Moreover, S-D orientation positively mediates the link between the two antecedent leadership styles and firms' performance outcomes relating to perceived value and market performance. However, even though the mediation effect of S-D orientation on perceived value is significant, its influence on quantitative market performance is not. These findings have important theoretical and managerial implications.

2 - Hedonic vs Utilitarian Servicescape Effects in Both Sides of the Service Encounter: A Bayesian Multilevel Bayesian Approach

Kostas Kaminakis, Lecturer, National and Kapodistrian University of Athens, Athens, Greece

The current empirical study extends current knowledge regarding the impact of servicescapes on both sides of the service encounter (customers and employees). The proposed multi-level framework outlines in detail the way the built environment guides individuals' emotions and their consequent behavioral outcomes, focusing on employee extra-role behaviors towards customers (OCB-C) and its consequent impact on interaction quality and customer overall satisfaction levels. This is the first study to present a multi-level framework capturing the way the servicescape impacts the interaction between employees and customers and at the same time examine how the effects differ across hedonic and utilitarian service contexts. This study adopts the novel multi-level, multi-group Bayesian SEM (B-SEM) analytical approach to overcome the major issue of the non-normal distributions of the data. The data are derived from 147 employees and 716 customers of restaurants, and 84 employees and 368 customers of garages / car maintenance workshops. The results suggest that the effects differ across the two opposite contexts (hedonic and utilitarian), indicating the moderating impact of the service context especially in the case of hedonic contexts. In addition to the expected academic contribution of the study, this study is also anticipated to have significant managerial relevance and provide service managers with several useful insights regarding how to manipulate the servicescape in order to enhance favorable outcomes for both customers and employees.

3 - Service Strategy's Effect on Firm Performance – A Meta-analysis of the Servitization Literature

Ashkan Faramarzi, Assistant Professor, ESDES-Lyon, Lyon, France, Stefan Worm, Wolfgang Ulaga

The present study conducts a meta-analytical review of the growing service transition literature. We study the effect of servitization on firm performance by conducting a meta-analysis of 344 effect sizes across 76 published and unpublished studies. On average, servitization exerts a positive effect on firm performance (measured differently across studies), but its impact differs across service types, businesses, regions, and markets. Using meta analytic regression analysis (MARA), we show that the strength and directionality of this effect are contingent on different contextual and methodological characteristics. For example, the effect is higher for services in support of the client's actions (SSCs) than for services in support of the product (SSPs), for emerging markets than for Europe, and for high-tech industries than for low-tech industries. In addition, studies' methodological choices such as measures of servitization, operationalization of firm performance, presence of a mediator, and research designs controlling for endogeneity, moderate the relationship. For instance, measurement of firm performance in the form of sales, general performance, and non-financial performance yields significantly higher effects than measures of profit.

4 - Social Media: A Double-edged Sword for Promoting Online Donation Campaigns?

Aidin Namin, Assistant Professor of Marketing: Analytics, Loyola Marymount University, Los Angeles, CA, United States, Yashar Dehdashti, Brian T. Ratchford, Lawrence Chonko

Online donation solicitation through crowdfunding has become increasing popular in recent years, with multiple websites specializing in various causes. These online donation campaigns need to raise awareness about their existence and need for help. In the Internet era, social media are the perfect vehicle to inform people about the need for help and raise awareness because they can reach a large audience in a short time. However, the social media could also be a double-edged sword in that users might merely like and/or share these campaigns without actually making a meaningful contribution (e.g., giving money to a donation seeking campaign); a phenomenon known as slacktivism. We investigate the slacktivism phenomenon in online donation campaigns and the underlying mechanism through which liking and sharing the information about these campaigns on the social media affect their success. Our data come from a major crowdfunding website and include variables about the amount of donation requested and collected, likes, shares, and duration over a significant period of time. We show that the overall effect of using social media for online donations is negative and that liking and sharing exert varying degrees of detriment on the total amount of donations. Our research has important managerial implications in that using social media should be done more creatively and not be limited to using the share and like buttons.

■ TD10

Virtual Room 10

Advertising 5

Contributed Session

Chair: Liangbin Yang, Syracuse University, Syracuse, NY, 13244-4418, United States

1 - Understand Advertising Effectiveness Using Quantile Regression

Shohei Hasegawa, Hosei University, Chiyoda-Ku, Japan

Quantile regression estimates conditional quantiles and provides better understandings about the relationship between dependent and independent variables than ordinary regression. This method was developed in econometrics and has been applied mainly to inequality research. For example, even with the same years of education, it is assumed that high- and low-income earners have different returns to education. Quantile regression can compare the returns between high- and low-income earners by estimating quantiles of the income distribution conditioned on the years of education. The similar situations can be considered in marketing. Even with the same views of a television advertisement for a product, it is assumed that advertising effectiveness differs between consumers whose purchase volume of the product increases significantly and consumers whose purchase volume increases little. The authors apply the Bayesian quantile regression to single-source data and analyze advertising effectiveness. The result shows that an advertisement evaluated as ineffective by ordinary regression analysis is actually effective to customers in higher quantiles of the purchase volume distribution. This indicates that the advertiser may miss to acquire profitable customers if it decides to stop advertising based on the result of ordinary regression analysis.

2 - The Neglected Effects of Online Advertising: Targeting Organic Visitors and Non-visitors

Lin Boldt, University of Central Florida, Orlando, FL, United States, Xueming Luo, Qing Liu, Xiaoyi Wang

Firms tend to target induced visitors who would immediately visit the website (or take a desired action in the purchase funnel) only if ads are served. However, ads might increase the spending of the organic visitors who would visit the site regardless of ads and could have a delayed effect for non-visitors who would not immediately visit the site regardless of ads. We propose a flexible targeting framework that does not restrict the effects of ads to merely the induced visitors. The difficulty of modeling the effect of advertising for organic visitors, non-visitors and induced visitors include: the identification of these three segments given that it is impossible to observe the behavior of a consumer being exposed to ads and not being exposed to ads simultaneously, and the endogeneity caused by the self-selected site visit. Our Bayesian model "imputes" the unobserved "counterfactual" conditions and provides a statistical solution to identify the effects of ads for each segment. We address the endogeneity in the self-selected site visit behavior by specifying the correlations between the unobserved errors of the segment type and those of the outcome variable. We apply our method to a field experiment data on a digital book-reading platform. Our results suggest that advertising increases consumers' purchase for both organic visitors and non-visitors, the two often neglected segments, and that advertising works differently for these two segments compared to induced visitors in terms of timing and mechanism. Our method enables marketers to optimize ad spending and targeting.

3 - Search Engine's Decision for the Order of Advertisers in Paid Search Listing: Click Volume First or Profit Volume First?

Zuguo Cai, Southwest Jiaotong University Scool of Economics and Management, Chengdu, China, Lili Fan

Search engine's profit from ad position auction is directly influenced by consumer click-through rate and advertiser's bid. Since consumer does not know advertiser's bid when clicking its website in paid search listing, his clicking behavior is not directly influenced by its bid. Accordingly, there might be an inconsistency between these two factors resulting in an inconsistency between consumer click-through rate and search engine's profit. This paper does two aspects of work to contribute this research issue. First, we examine the impact of advertisers' order in paid search listing on consumer click through rate using consumer-level data. Second, we also explore the impact of advertisers' order on search engine's profit using the same data by two types of estimation methodologies. Empirical results from multi-level Bayesian estimation show that advertisers' order in paid search listing optimally attracts consumer to click advertisers' websites. It is suggested that advertisers' order also significantly increase search engine's profit in biased estimation results. However, the unbiased estimation results show that the advertisers from the same advertisers' order do heterogenous contributions to search engine's profit. Only the advertiser placed on the highest ad position could do positive and significant contribution to search engine's profit. The advertisers placed on the remained ad positions do negative and significant contributions. Furthermore, these findings reveal that there is indeed an inconsistency between advertiser's attractiveness and advertiser's bid, which is different from the argument of previous literature.

4 - The Impact of Co-viewing on TV Ad Attention

Liangbin Yang, Syracuse University, Syracuse, NY, United States

As the starting point of effective advertising, it is crucial for marketers to ensure that consumers pay attention to the messages they deliver. This is challenging since ad attention measurement was once unavailable until advanced motion capture technology is used recently to track when and how much attention each individual pays to the ads. Although people often watch TV with others, there are relatively few studies examining the effects of co-viewing on viewer attention. Using a novel "eyes-on-screen" dataset that captures the second-by-second individual-level TV viewing and attention behavior, we take a closer look into when and how viewers pay attention to the TV ads during co-viewing. Specifically, we develop large-scale hierarchical models to account for the heterogeneity of TV Ad attention among individuals across time. Furthermore, we examine how co-viewing and interaction among co-viewers affect their attention to the TV Ads. In the counterfactual analysis, we show that the proposed models could significantly help marketers gain more TV Ad attention than the cutting-edge benchmarks. As discussed in this study, we provide meaningful managerial insights and implications for TV ad practices.

■ TD11

Virtual Room 11

Policy, Regulation and Marketing – II

General Session

Chair: Anita Rao, Chicago Booth, Chicago, IL, 60637, United States

1 - Debunking Misinformation in Advertising

Jessica Fong, University of Michigan, Ann Arbor, MI, United States, Tong Guo, Anita Rao

Many brands differentiate themselves by highlighting the absence of certain ingredients (e.g. no GMO) with some going as far as to deceptively claim those ingredients are toxic. Because such claims can spread misinformation among consumers, various interested parties - regulators, the media and competitor brands - aim to debunk such misinformation. However little is known whether a) such misinformation in advertisements alters consumers' willingness to buy a product and b) if so, whether debunking can effectively revert effect of misinformation. This paper aims to empirically understand the impact of misinformation and that of debunking in the context of three ingredients in product categories in which misinformation is prevalent: aluminum in deodorants, fluoride in toothpastes, and GMOs in food. We find that an additional exposure to misinformation can further alter consumers' willingness-to-pay, and debunking from a trustworthy source plays an important role in correcting consumers' misbeliefs. Additionally, debunking is also effective for those with the strongest ex-ante aversion to the ingredient.

2 - The Market for Fake Reviews

Brett Hollenbeck, University of California-Los Angeles Los Angeles, CA, 90025, United States, Sherry He, Davide Proserpio

We study the market for fake product reviews on Amazon.com. These reviews are purchased in large private internet groups on Facebook and other sites. We hand-collect data on these markets to characterize the types of products that buy fake reviews and then collect large amounts of data on the ratings and reviews posted on Amazon for these products, as well as their sales rank, advertising, and pricing behavior. We use this data to assess the costs and benefits of fake reviews to sellers and evaluate the degree to which they harm consumers. The theoretical literature on review fraud shows that there exist conditions when they harm consumers and other conditions where they function as simply another type of advertising. Using detailed data on product outcomes before and after they buy fake reviews we can directly determine if these are low-quality products using fake reviews to deceive and harm consumers or if they are possibly high-quality products who solicit reviews to establish reputations. We find that a wide array of products purchase fake reviews including products with many reviews and high average ratings. Soliciting fake reviews on Facebook leads to a significant increase in average rating and sales rank, but the effect disappears after roughly one month. After firms stop buying fake reviews their average ratings fall significantly and the share of one-star reviews increases significantly, indicating fake reviews are mostly used by low quality products and are deceiving and harming consumers. We also observe that Amazon deletes large numbers of reviews and we document their deletion policy.

3 - Marijuana Legalization and Opioid Prescription

Tong Guo, Duke University, Durham, NC, 27708, United States, Hayoung Cheon, S. Sriram, Puneet Manchanda

Since the late 1990s, the opioid prescription for pain treatment has increased significantly in the U.S. with aggressive marketing from pharmaceutical companies, resulting in more than 450,000 opioid overdose deaths in the U.S. since the late 1990s. Around the same time, several U.S. states have legalized medical marijuana which has potential benefits as a pain treatment. A case can be made for marijuana legalization to lower opioid prescriptions because doctors and/or their patients view marijuana as an alternative to opioids in relieving pain. On the other hand, marijuana use can lead to increased substance abuse and thus have a positive effect on opioid prescriptions. Given that there is limited scientific research on the long-term impact of medical marijuana, physicians may be reluctant to prescribe it. Other factors such as non-standard dosage and prescribing guidelines for marijuana, concerns about patients' insurance coverage and the potential stigma around prescribing a previously illegal drug may also hinder substitution away from opioids. Therefore, there is a third possibility that MML did not affect opioid prescriptions in any meaningful way. With claims data from a large health insurance company in the U.S. between 2006 and 2016, we study the effect of medical marijuana legalization on opioid prescriptions, leveraging the temporal variation in state-wise legalization. On average, opioid prescriptions decreased after medical marijuana legalization for all three outcome metrics that we consider (number of prescriptions, total days of supply, and total dosage in MME). We find that the role of physicians in reducing opioid prescriptions after legalization is more prominent than their corresponding role in increasing opioid prescriptions.

■ TD12

Virtual Room 12

Social Impact - Covid

Contributed Session

Chair: Francisco Cisternas Vera, The Chinese University of Hong Kong, Hong Kong

1 - Measuring Corporate Response to Covid-19 Using NLP on Press Releases

Meheli Basu, Assistant Professor, Syracuse University, Syracuse, NY, United States, Aniruddha Dutta, Purvi Shah

This study examines corporate social and governance efforts related to COVID-19 pandemic and their impact of on corporate sustainability ratings. Firms are classified according to their market capitalization (MC) value and industry sector to examine differences in organizational responses. A set of 185 publicly traded corporate organizations are selected in various sectors such as technology, consumer cyclical, consumer defensive, financial services, communication services, energy, utilities, industrials and real estate, with the exception of the healthcare companies. The healthcare sector is excluded from the study since many companies in this sector are involved in the production and distribution of medical and hygiene products and services, which directly or indirectly tie in with their revenues, and hence are not truly reflective of altruistic organizational initiatives. The classification of organizations on the basis of MC is as follows: high market cap (> $100B), medium market cap ($50-100B) and low market cap ($25-50B). Press releases on COVID-19 pandemic response, including employee safety and benefits, as well as contributions toward communities, have been collected from the websites of individual firms for the period of March 2020 to July 2020, to study corporate measures in the early period of the pandemic. Sustainability ratings, in the form of Environmental Social and Governance (ESG) risk scores given by Sustainalytics (a premiere ESG rating agency), of all organizations are obtained from Yahoo! Finance in April 2020 (for the quarter January to March 2020) and July 2020 (for the quarter April to June 2020). Text data from the press releases is analyzed using Natural Language Processing to analyze topics and themes appearing in the corporate press release, followed by examining if the organizational reporting of initiatives represents the real extent of activities carried out by an organization, reflected in the individual sustainability score.

2 - Can Upward Brand Extensions be an Opportunity for Marketing Managers During the Covid-19 Pandemic and Beyond?

Tsunwai Wesley Yuen, University of Lincoln, Lincoln, United Kingdom, Tsunwai Wesley Yuen, The University of Manchester, Manchester, United Kingdom, Peter Mount, Thi Tran

Early COVID-19 research has guided current managerial practice by introducing more products across different product categories as consumers tried to avoid perceived health risks from food shortages, i.e. horizontal brand extensions. For example, Leon, a fast-food restaurant in the UK, introduced a new range of ready meal products. However, when the food supply stabilised, availability may no longer be a concern for consumers. Instead, job losses could be a driver of higher perceived financial risks. Meanwhile, it remains unknown whether the perceived health or financial risks play a more significant role on consumers' consumptions. Our preliminary survey shows perceived health risks outperform perceived financial risks to positively influence purchase intention during COVID-19. We suggest such a result indicates an opportunity for marketers to consider introducing premium priced products, i.e. upward brand extensions. The risk-as-feelings and signalling theories were used to explain consumer choice under risk may adopt affective heuristic processing, using minimal cognitive efforts to evaluate products. Based on this, consumers are likely to be affected by the salient high-quality and reliable product cue of upward extension signalled by its premium price level, which may attract consumers to purchase when they have high perceived health risks associated with COVID-19. Addressing this, a series of experimental studies confirm that upward brand extensions (versus normal new product introductions) can positively moderate the positive effect between perceived health risks associated with COVID-19 and purchase intention. Such an effect can be mediated by affective heuristic information processing. The results contribute to emergent COVID-19 literature and managerial practice during the pandemic but could also inform post-pandemic thinking around vertical brand extensions.

3 - Vaccine Adoption – Role of Emphasis Framing in Health Communication

Arslan Javed, ESSEC Business School, Cergy, France, Reetika Gupta

Vaccine adoption decisions have received unprecedented attention due to their significant consumer welfare and public policy implications during the COVID-19 pandemic. Past research on health behaviors has investigated the role of valence framing in the evaluation of health messages (e.g., Guenther et al., 2020) and focused on the elicitation of fear by showing serious consequences associated with a disease (e.g., Ruiter et al., 2001). Our research extends this body of work by employing emphasis framing to examine 1) the competing role of two attributes: susceptibility (probability of contracting a disease) and severity (consequences associated with a disease) in the framing of health messages and its effects on vaccine adoption decisions and 2) the mediational role of anxiety. Specifically, based on the literature (e.g., So, 2013), we posit that consumers facing health messages which emphasize a high (vs. low) susceptibility of contracting a disease will prefer vaccine adoption, and this effect will be mediated by their level of anxiety because vaccine adoption will alleviate the uncertainty related to contracting the disease. Further, we expect that this effect will be moderated by disease severity. The results from an online experiment (Susceptibility: high, low X Severity: high, low) (254 participants) confirmed the main effect of susceptibility ($M_{Sus.H} = 5.38$; $M_{Sus.L} = 4.80$; $p < .006$) and mediational role of anxiety, but we failed to find the moderating effect of severity. Next, we plan to investigate the 1) effect of severity and 2) the role of the efficacy of recommended action in influencing these effects. Theoretically, our research contributes to the literature on health communication and decision-making. For policymakers and health communication managers, our research recommends that health messages should focus on the probability of contracting a disease to promote vaccine adoption.

4 - Inequality During Covid-19 Pandemic – Evidence From Mobile App Consumptions in Korea

Francisco Cisternas Vera, Assistant Professor, Chinese University of Hong Kong, Shatin, Hong Kong, Ivy Dang, Hwang Kim, Shi Jia

Covid-19 is the first human pandemic in the 21st century. It has brought changes to nearly every aspect of our lives. Leveraging on a proprietary dataset, which records the weekly app usage behaviors of a sample of consumers in Korea from January to August 2020, we study the impact of covid-19 on digital behaviors. We compare app consumptions at different phases of covid-19 (i.e., pre-pandemic, during 1st wave, recovery from 1st wave and post-1st wave), and find significant behavioral changes. We find some of them revert to normal quickly while others not. We then zoom in on how such behavioral responses to covid-19 differ across different app categories and demographic groups. We aim to explore how income, gender, education and digital literacy play a role during the pandemic. These findings can inform policy recommendations such as government subsidy strategies under natural disasters, as well as managers interested in increasing digital adoption of mobile apps

■ TD13

Virtual Room 13

NLP and Consumer Behavior

Contributed Session

Chair: Begum Sener, KOC University, Istanbul, Turkey

1 - Crowdfunding Success: A Story of Construal Level in Text and Images

Amrita Dey, University of Utah, Salt Lake City, UT, United States, Yu Zhu, Tianyu Gu, Stephen J Carson

The online profiles of crowdfunding projects consist of text, visual and meta-data. This research examines how construal level in all these aspects are associated with the success of project funding. Empirically, we employ text mining techniques and state-of-the-art machine learning methods, including Large Vocabulary Segment Instance Segmentation (LVIS), to analyze the textual and imagery information in project profiles and further test whether the construal sensitized use of textual and imagery information can signal credibility with backers and thereby enhance the funding success. Based on the CLT theory, we hypothesize that a low (high) construal level of textual (Chandy et al., 2001, Tangari et al., 2010) and imagery (McQuarrie &#38 Mick, 1999) in the text and imagery of the project profile will increase (decrease) the probability of success of the project. We propose a novel long-tailed object detection approach (Gupta et al., 2019) to determine the image concreteness, which, along with text concreteness are further embedded in construal level theory (CLT) to predict the funding success of a project on a dataset (Cheng et al., 2019) from Kickstarter. As predicted, our results show that investors pay a high amount when the textual information in the project profile is more concrete and when the imagery information given includes more instances (but not more kinds of instance).

2 - Direct Gaze, Story Narration, and Online Medical Crowdfunding Outcomes

Yuanyuan Liu, Rensselaer Polytechnic Institute, Troy, NY, United States, Shan Yu, T. Ravichandran

Online medical crowdfunding is increasingly used to finance personal healthcare-related expenses. One in five Americans have contributed to a medical crowdfunding campaign, and 35% of them extended their generosity to strangers (2020 Health Survey from NORC at the University of Chicago). Extant literature has documented that online medical crowdfunding is impacting socio-economic inequities and influencing health disparities. Disadvantaged groups are likely to face greater difficulties crafting persuasive communications in multimodalities (across text and image) via digital media, converting social participants into their potential donors and advocates. Despite the ubiquity of online medical crowdfunding as a social phenomenon, there has been little research on the impact of social cue and specifically the interplay of visual social cue and text narration on crowdfunding outcomes. We synthesize spatial attention, objective self-awareness theory, narrativity communication into decision-making process to develop a research model that explores the direct and interactive effects of visual cues (gaze direction) and textual cues (characteristics of story narration) on the success of crowdfunding campaigns. We compile a unique dataset with 60k medical crowdfunding campaigns in the U.S. during 2017-2019. Using computer vision image processing and natural language processing techniques we extract embedded interpretable direct gaze cues from image and story narration information from text. The preliminary results provide broad support to our hypothesized relationships. Our findings shed light on the nuanced interactions between visual and textual cues in influencing user behaviors in a medical crowdfunding context.

3 - What is Happiness? Word Embeddings Quantify Concept of Happiness Across 30 Years in China

Zhiqiang Li, Postgraduate Student, Zhongnan University of Economics and Law, Wuhan, China, Yaxuan Ran, Joey Liu

Researchers have long been interested in culture and cultural change, but measurement has proved challenging. This paper suggests that an emerging computerized text analysis technique, word embeddings, can capture cultural and concept change. In this paper, we utilize this technique to quantify temporal dynamics of the concept of happiness between 1979~2010 in China. We first construct five dimensions that generally represent Chinese people's conception of happiness, including physical need, social support, self-actualization, environment harmony, and patriotism. We then demonstrate how the concept of happiness changes in these five dimensions. In particular, natural language processing of30 y of People's Daily text and other text types (e.g., song lyrics) provides an empirical test of whether the concept of happiness is related with these five dimensions and how these relations have changed over time. Results show that the correlation between happiness and physical need declines over time while its correlations with natural harmony and patriotism go upward obviously. By comparing diachronic changes among five dimensions, this research captures the social economic shifts---e.g., the Reform and Opening-up in the end of 1970s and new millennium of 2000. Our method further proves to be valid by showing that changes in the embedding track closely with objective indexes (e.g., Gross Domestic Product, GDP). Our research for temporal analysis demonstrates the powerful utility of Word Embeddings and facilitates intersection between machine learning and quantitative consumer research.

4 - Short Live Hate, Hello Happiness: Understanding the Transient Zeitgeist

Begum Sener, Koc University, Istanbul, Turkey, M. Berk Ataman, Ezgi Akpinar

Understanding consumers' feelings and catching up with the spirit of the time are marketers' new challenges. Yet little is known about the transient properties of the zeitgeist. Consumers feel and express a mix of emotions that change over time. Some emotions last longer, whereas some get quickly replaced by others. Extant research has examined the temporal effects of select emotions, mostly in isolation, on consumer judgments, evaluations, and behavior but left unexplored questions such as how long each emotional state is likely to last, which subsequent emotions are likely to arise, and why. Using daily data on 24 distinct emotional states, extracted by an automated text analysis of 7 million tweets over two years, the authors explore the duration and the transformation of zeitgeist along three key dimensions of emotions: (i) unstrained auspiciousness which includes valence, time, motivation, attention and effort, (ii) arousal, and (iii) conscious authority which includes dominance, certainty, and agency. Results from a multivariate time series analysis show that, when an emotion washes over the consumers, the zeitgeist is more likely to shift towards emotional states with distant levels of unstrained auspiciousness, lower levels of arousal or distant levels of conscious authority. For instance, happiness is likely to arise after hate, based on the three underlying dimensions. Having a better understanding of how emotions evolve equips marketers with the ability to adapt to the consumer zeitgeist and enjoy a superior performance by tailoring their marketing efforts.

Friday, 9:00AM - 10:00AM

■ FA01

Virtual Room 01

Selling Strategy

Contributed Session

Chair: Krista J. Li, Indiana University, Bloomington, IN, 47405, United States

1 - Mergers and Product Repositioning

Xin Wang, The Hong Kong University of Science and Technology, Kowloon, Hong Kong, Zijun (June) Shi, Soo-Haeng Cho, Yushu Zeng

Mergers often induce firms to modify both product quality and product variety. To date, the impact of such change has received scant attention in the literature. We focus on how product quality and variety alterations in a merger directly affect the consumer by analyzing a merger in a vertically differentiated market. In contrast to existing literature that uses price as the main determinant of consumer welfare, we find that a merger may decrease customer welfare even if it induces the merged firm to reduce prices, because quality could also be affected. Furthermore, although conventional wisdom dictates that cost reduction from a merger usually reduces prices and benefits consumers, we find this is not always accurate nor precise. Cost reduction can increase price by inducing a merged firm to raise quality and thus charge a higher price. Cost reduction can also result in a reduction in the number of products offered by the merged firm, which adversely affects consumers. Consistent with our main theoretical findings, we find empirical evidence from analyzing observational data in the airline industry.

2 - The Mnemonomics of Contractual Screening

Liang Guo, Professor, Chinese University of Hong Kong, Hong Kong, China

In many markets, buyers sign advance contracts before actual decisions on transactions or consumptions are made. Therefore, a buyer may have partial private information on expected payoff at the contracting stage and, as time moves on, new information may arrive. However, prior information can be lost or forgotten. In this paper we investigate how limited memory may influence the optimal design of contracts for sequential screening. Despite memory loss, the buyer can make ex post inference about her initially informed type from the chosen contract. As ex ante screening facilitates subsequent retrospection, the chosen contract can serve as a self-reminding instrument. This would yield an endogenous demand for separation in ex ante contract choice. In response, distortions in the optimal contract design can be either mitigated or intensified, leading to improved or undermined social welfare, respectively. As a result, the equilibrium buyer surplus can be higher than that under perfect memory. We also show that the buyer can exhibit the so-called flat-rate bias, even though her preference is time consistent and perfectly predicted. In addition, as memory can be perfectly recovered from the equilibrium contract choice, investing on any other memory-improving instrument is redundant. Moreover, the buyer's demand for screening can induce her to choose dominated refund contract. Nevertheless, when dominance must be obeyed, the seller may offer a menu of refund contracts with two-way distortions.

3 - Channel Coordination of Storable Goods

Krista J Li, Indiana University, Bloomington, IN, United States, Xi Li, Yan Xiong

Retailers and consumers often forward buy and stockpile storable goods at low prices for future sales or consumption. Manufacturers can restrict retailers from stockpiling with contractual tactics such as scan-backs. In this paper, we investigate how a manufacturer of storable goods coordinates its channel by restricting retailer stockpiling and adjusting wholesale prices. Our analysis reveals different effects of retailer stockpiling and consumer stockpiling on the manufacturer and the retailer, which lead to three key recommendations: First, with dynamic wholesale prices, the manufacturer should restrict retailer stockpiling when the storage cost is low; however, with two-part tariffs, the manufacturer should restrict retailer stockpiling when the storage cost is high. Such restriction can also benefit the retailer, resulting in a win-win outcome. Second, with dynamic wholesale prices, when restricting retailer stockpiling, the manufacturer should reduce first-period wholesale price to induce consumer stockpiling; when permitting retailer stockpiling, the manufacturer should raise first-period wholesale price to exploit retailer's stockpiling incentives. Third, although a centralized firm would not benefit from consumer stockpiling, both consumer stockpiling and retailer stockpiling can benefit the manufacturer and the retailer in a decentralized channel.

■ FA02

Virtual Room 02

Pricing 1

Contributed Session

Chair: Xi Li, City University of Hong Kong, Hong Kong, China

1 - Consumers' Preferences for Double-flat-rate Pricing Plans

Emanuel Schuster, Ludwig-Maximilians-University, München, Germany, Martin Spann

Double-flat-rate tariffs are pricing plans used in subscription-based services across different industries such as telecommunication and media services as well as utilities. Double-flat-rate pricing plans consist of two distinct components: a nonrecurring flat-rate and a recurring flat-rate. To gain access to a service, customers have to pay an initial, nonrecurring fee (i.e., the nonrecurring flat-rate), which involves the set-up of the service. The second component is a (usually monthly) recurring subscription fee, which entitles customers to the usage-independent access to the service (recurring flat-rate). While previous research has extensively studied single flat-rate pricing plans, consumers' preferences for double flat-rate pricing plans have not been studied yet. In this research, we conduct two distinct discrete choice experiments in different industries (electric mobility and telecommunication) and find substantial preference heterogeneity for the two pricing plan components. The nonrecurring flat-rate fees have a greater influence on customers' choices than the recurring flat-rate. As a consequence, customers prefer to compensate lower nonrecurring fees with higher recurring fees even if that results in higher bill amounts over the total contract duration. We discuss the theoretical implications for behavioral pricing and consumers' tariff choice decisions as well as the managerial implications for service providers.

2 - Gaussian Process Bandits Informed by Economic Theory: An Application to Dynamic Pricing

Ian Weaver, Yale School of Management, New Haven, CT, United States, Vineet Kumar

Pricing new products is a difficult challenge faced by many firms, especially when there are no good comparable benchmarks. The only method available to accurately learn the product's demand and profit maximizing price is to run experiments. Multi-armed Bandits (MAB) use a non-parametric approach that improve upon balanced field experiments by obtaining the optimal price with much less experimentation. MABs focus on learning in areas where the optimal price is more likely to be found rather than learning equally across all prices. However, MAB algorithms place no restrictions on the shape of the underlying demand curve. We propose a novel method for non-parametric bandit algorithms that is guaranteed to obtain a weakly decreasing demand curve, consistent with economic theory. We demonstrate that the proposed method is able to perform significantly better than traditional MABs and obtains close to optimal pricing. It is especially useful in settings with high experimentation costs.

3 - Competition Networks and Price Dispersion: The Supply-side Implications of Heterogeneous Consumer Consideration

Richard Grice, PhD Candidate, INSEAD, Fontainebleau, France

In many retail settings, consumers limit their consideration to a subset of the many differentiated alternatives offered by firms. This shapes the structure of competition between firms, since consumers will not switch to an unconsidered alternative. I explore the supply-side implications of heterogeneous consideration by studying an oligopoly model of price competition in which consumers vary in the set of firms they consider prior to purchase. I represent the pattern of consumers' consideration using a bipartite graph, and show it induces a network structure to the local competition between firms. I then use tools from the literature studying games on networks to prove existence of a unique equilibrium for any given pattern of consideration. The main result establishes a novel connection between prices and the pattern of consideration in a market. In particular, it reveals markups are inversely related to firms' Bonacich centrality in the network of local competition - more central firms are considered in combination with more alternatives, face greater competition locally, and thus set lower prices. The model therefore explains persistent cross-sectional price dispersion in retail markets and rationalises the asymmetric cross-price elasticities found in empirical studies of market structure. Finally, the proposed modelling framework can be used to study the effect of marketing actions that affect consumers' consideration, such as advertising, assess the profitability of market expansion strategies, or guide antitrust analysis of retail markets.

4 - Algorithmic Price Discrimination Under Consumer Inspection

Xi Li, City University of Hong Kong, Hong Kong, China, Zibin Xu

With recent advancements in big data analytics and artificial intelligence algorithms, firms can obtain superior preference knowledge from their consumers and offer them personalized prices. Consumers, on the otherhand, often need to inspect product attributes to find out their intrinsic match values, which takes both time and effort. In this paper, we investigate the strategic interactions between a price discriminating firm with superior knowledge of consumer preferences and its consumers who can take actions to inspect and valuate the firm's product. We find that consumer inspection prevents the firm from fully utilizing its information advantage to exploit consumers. In equilibrium, the firm cannot help but to opportunistically trick low preference consumers into overpaying for its product or service. Since the firm's opportunistic behavior raises consumers' suspicions and induces them to inspect the product, a deadweight loss arises, hurting both the firm and consumers alike. As such, public policies that prevent firms from using algorithms to price discriminate against consumers can ultimately benefit the firm, consumers, and the welfare of society as a whole.

■ FA03

Virtual Room 03

Influencer Marketing (V)

General Session

Chair: Daniel Shapira, Guilford Glazer School of Business & Management, Beer Sheva, 84105, Israel

Co-Chair: Andreas Lanz, HEC Paris, HEC Paris, Jouy-en-Josas, France

1 - Know Your Friends: Scalable Community Detection in Social Networks

Bas Donkers, Erasmus University Rotterdam, Marketing, Rotterdam, Netherlands, Arash Yazdiha, Dennis Fok

The structure of social networks plays a large role in the diffusion of new products and the success of social media campaigns. Earlier works have suggested ways to characterize influential members using their connection count. However, identical treatment of each connection is problematic as some connections may be important for one type of behavior but irrelevant for another. Diffusion literature suggests that considering multiple underlying networks aids in making conclusions about the relevance of specific connections. Such underlying networks can be thought of as different communities of people. However, direct observation of communities, or connections over multiple networks, is often not possible. We explicitly model the structure of an observed network to identify latent overlapping communities. We propose a scalable stochastic variational inference methodology to uncover the model parameters. Probabilistic community memberships can then be used to characterize the connections between members. We apply our community membership model to a US social network that involves product adoption. By labeling each connection based on to the inferred communities of the connecting members, we find that the inferred latent communities are indeed predictive about the adoption patterns of new products.

2 - Who is Good at Discovering Hits? Mechanisms Behind Predictive users in Online Communities

Manuel Sebastian Mariani, University of Zurich, Zurich, 8050, Switzerland, René Algesheimer

Management and network scientists have long sought to understand the link between the adoptions by specific groups of individuals and the future success of a product. Long-standing approaches have focused on highly-connected individuals - typically referred to as social hubs - detected from social network data. Yet, recent works have challenged the idea that social-network data are indispensable to detect predictive individuals: for example, Mariani et al. (2020) showed that one can use adoption data alone to detect "discoverer" customers who repeatedly early purchase top-performing products or in top-performing stores. While the detected discoverers can be monitored to predict top-performing products, the mechanisms behind their emergence and ability to discover top-performing products are largely unexplored. Here, we analyze a unique dataset from large-scale online communities where users adopt user-generated content (recipes) and, at the same time, interact via private messages. By combining the adoption and social activity data, we find that the discoverers do not exert a high influence on their social contacts. At the same time, their preferences are highly representative of the average user's preferences. Leveraging this property, we can accurately predict whether a user will behave as a discoverer from her earliest actions in the platform, and predict the future success of a recipe from the representativeness of its earliest adopters. These findings enrich our understanding of the factors that link a product's success with its early adopters' properties, and they have managerial implications for the prediction of user behavior and popularity trends in online communities.

3 - Future Endorsements of Prospective Influencers as an Alternative Approach to Influencer Seeding in User-Generated Content Networks

Daniel Shapira, Guilford Glazer School of Business & Management, Ben-Gurion University, Beer Sheva, 84105, Israel, Andreas Lanz, Jacob Goldenberg, Florian Stahl

Given the ubiquity of user-generated content networks such as Instagram, Youtube, and SoundCloud, endorsements by influencers have become an integral part of online communications. The soaring interest in influencer marketing triggered a cost explosion such that the monetary compensation of endorsements may now exceed most companies' means: Kylie Jenner, for example, charges $1 million to share exclusive branded content with her giant community of more than 200 million followers. Another major development is that such influencers are not willing or capable of accepting every endorsement request due to conflicts such as contractual agreements with similar firms. These limitations pose a new high barrier or may even render it infeasible for many firms (especially small- and medium-sized businesses) to engage in influencer seeding. We suggest a different approach: A manager can target prospective influencers and sign them to endorse the firm in the future - while these prospective influencers are still unknown users with a small follower base. This approach has a potential to significantly reduce the costs; however, because of the inherent extreme uncertainty as only a very few users ultimately become influential, a corresponding prediction framework should be developed that allows for financial risk considerations. For this reason, we propose a new framework that evaluates prediction models on a risk-return spectrum, enabling the manager to make an efficient model choice according to her preferred level of risk. We empirically test this framework on the SoundCloud platform using data-based simulations in which we apply various prediction models (such as deep learning or rare-event models by Firth (1993) as well as King and Zeng (2001a, 2001b)).

■ FA04

Virtual Room 04

Different Facets of Online Reviews

General Session

Chair: Andreas Bayerl, University of Mannheim, Mannheim, 68161, Germany

Co-Chair: Verena Schoenmueller, Bocconi University, Milan, 20136, Italy

1 - The "Oracles" of Online Reviews

Yael Karlinsky-Shichor, Northeastern University, Boston, MA, United States, Verena Schoenmueller

In a crowd of reviewers, we identify "oracle reviewers" whose opinions have a higher than average predictive ability for product success. We find that the mere appearance of a review as well as a favorable opinion by an oracle reviewer are predictive of product success. While previous research focused mostly on predicting success based on individual or aggregate characteristics of a product's reviews, we use heterogeneity in reviewers' behavior to identify the sources of wisdom in the crowd, allowing companies to better assess the potential product success in the market.

2 - Discrimination vs. Experience: The Interactive Relationship Between Online Rating Variance and Volume

Maximilian Gaerth, University of Mannheim, Mannheim, Germany, Neeru Paharia, Florian Kraus

A growing number of customer review sites (e.g., TripAdvisor, IMDb, Yelp) display multiple online WOM metrics associated with reviewer expertise. Specifically, the authors examine the interactive effect of two of them on persuasion: rating variance and rating volume. While online reviewing experts (vs. novices) tend to show lower variance across their ratings (Nguyen, Wang, Li, and Cotte, 2020), readers of online WOM incorrectly infer greater reviewer expertise from high (vs. low) rating variance. As a result, consumers are more likely to purchase a product previously purchased or recommended by reviewers with lower expertise. Interestingly, the perceived diagnosticity of rating variance (i.e., discrimination) as a signal of reviewer expertise is as strong as the diagnosticity of rating volume (i.e., experience). Hence, displaying the rating distributions underlying low and high volume reviewers can significantly increase consumers' preferences for products endorsed by reviewers with lower rating volume but higher rating variance. In addition, the authors examine the circumstances under which rating variance becomes even more diagnostic as a signal of reviewer expertise than rating volume. Lastly, the authors test a common debiasing manipulation and show that reviewers are not aware that high (vs. low) rating variance signals greater reviewer expertise, since people who are motivated to convey expertise neglect to exhibit higher variance across their ratings.

3 - The Temporal Slippery Slope: Decrease in Sequential Ratings in Online Reviews

Chen Pundak, Tel Aviv University, Israel, Tel Aviv, 6997801, Israel, Lev Muchnik, Yael Steinhart, Jacob Goldenberg

Our research reveals that a single reviewer tends to provide more than one rating during a short "consumption episode." This "batching" phenomenon relates to existing research on varying human activities that may come in bursts, such as work patterns and web browsing. Specifically, we present evidence of the batching phenomenon in five popular review websites (Yelp, IMDB, Rotten Tomatoes, TripAdvisor, and Goodreads), noting that it is quite common for users to provide multiple ratings for different items within a single day.Importantly, we introduce a new sequential effect within these batches of ratings given by the same reviewer, showing that each subsequent rating within a batch gets a lower score. The drop of the score is a function of the time elapsed. To explain this effect, we postulate that the time that passes between two sequential ratings reflects the degree of doubt about each rating. We predict that the reviewer's doubt increases for later ratings in the sequence, leading to a drop in rating. We examined two different review platforms: (a) Movies (110.49M ratings) and (b) books (11.3M ratings), both in a time resolution of seconds. We found a consistent effect of sequential rating dropping as a function of time. Specifically, in a short time frame, the reviewer's rating is negatively affected by the time passed since the reviewer's previous rating. We replicated and extended this effect in two experimental studies by ask participants to make two sequential ratings. We first show that the delay in the subsequent rating is associated with higher doubt regarding the rating, and the doubt relates to the lower rating. In the second study, we control the level of doubt. While we replicate the drop in ratings in the control condition and witness an increase in the drop in the high-doubt condition, the drop is attenuated when participants are asked to rate a second movie for which they are certain about its rating score.

4 - The Interplay between Wages and Online Reviews on the Labor Market

Andreas Bayerl, University of Mannheim, Mannheim, 68161, Germany, Jacob Goldenberg, Daniel Shapira, Florian Stahl

We spend one third of our lives at work. The decision about our workplace is therefore an important part of our well-being and our general life satisfaction. Given this importance, it is likely that job seekers will hope to find information about potential employers online, just as they might look for hotel reviews before their next vacation. To this end, various platforms have set out to collect relevant insights for such job seekers. The platforms collect what we call Employee-Generated Content (EGC), i.e. online reviews of verified employees. Against this background, we investigate first the producers (senders) and then the consumers (receivers) of online employer reviews. In the context of reviewing your employer and anonymously stating what your job satisfaction is, income is something to look at. In this paper, we assess this relationship by focusing on the association between the likelihood to recommend an employer in an online review and the reviewer's salary. Using around 4 Mio verified online employer reviews together with 500,000 verified salary data points from the European market leader for collecting EGC, we document that in certain salary ranges more money can lead to a decreased likelihood to recommend the employer. We are able to explain our finding through a bootstrapped mediation analysis. What we find is, that it is not all about the money, but also about other work-related factors at the company. Second, we focus on the consumers or receivers of online employer reviews. Using data from an applicant tracking system, we bring together information about more than 3 Mio application for 90,000 job openings at around 2,000 firms and the accumulated electronic word-of-mouth (eWOM) of the respective job-offering company. We find a positive association between EGC of a company and the demand for that company on the job market.

■ FA05

Virtual Room 05

Retailing/Demand

Contributed Session

Chair: Fatima Madani, Monash University, Melbourne, Australia

1 - Robotics, IoT and Point of Sales Data to Measure the Impact of Shelf Position on Sales

Andres I. Musalem, Ind. Eng. University of Chile, Santiago, Chile, Sofia Pontigo

This study examines the effects of shelf position on sales using a novel dataset about product position collected using a combination of robotics, internet of things and machine learning technologies. The data considers product position data for two stores of a major supermarket chain in Latin America and sales data provided by one of the retailer's vendors covering five product categories. Using these data, we first perform a descriptive analysis to explore possible (non-causal) associations between variables. This analysis suggests that products located at the edges of an aisle sell between 37.0-69.6% more than those located near the center, while products located closer to the checkout counters sell between 24.3-48% more than those located farther away. The results also suggest that products located at the medium heights sell 2.7 to 5.6% more than those placed on the bottom shelf. We then propose a quasi-experimental approach to draw causal inferences about the impact of shelf position on sales. This requires us to rely on a semiautomatic method to detect changes in shelf position and hence identify suitable changes for a quasi-experimental approach, which we implement with a difference-in-differences analysis. In contrast with the results from the descriptive analysis, the quasi-experimental analysis finds no significant impact of the horizontal position of a product on its sales. However and consistent with the descriptive analysis, this analysis also suggests that by getting closer to the vertical center of a shelf, a product could increase its sales by 15.2-23.4%, while increasing the height of a product can decrease its sales by 26.6%.

2 - Impact of Uber Acquisition of Postmates on Consumer Welfare

Pallavi Pal, Stevens Institute of Technology, New Jersey, NJ, United States

This paper investigates the effect of acquisition in markets with network effects. Using a novel dataset that has information available on Uber and Postmates websites before and after the merger, I look at the impact of Uber's acquisition of Postmates on the quality and price of service provided to the consumers. The analysis shows that the acquisition had a statistically significant effect on the delivery fee and the delivery time for consumers on the two platforms. The difference between product's quality (the food delivery in this case) across the two platforms was also affected by the acquisition.

3 - Inference of Unobserved Vertical Relationships: The Case of Category Captaincy

Xinrong Zhu, University of Wisconsin, Madison, WI, United States

This paper studies category captaincy, a vertical arrangement whereby the retailer delegates pricing and assortment decisions of an entire category to one of the manufacturers within the category. The confidential nature of the arrangement complicates empirical work. I introduce empirical strategies to detect the existence of category captaincy arrangement, infer which brand is the captain, and estimate the impacts of captaincy. In an empirical setting using yogurt retail transactions data, I first document disproportionate asymmetry in market shares and product assortments between two leading brands across retailers, a phenomenon that I refer to as ``brand advantage" that potentially stems from category captaincy arrangements. I then estimate a BLP demand model, which allows me to separate underlying retailer-specific brand advantage from consumer preferences. Using the estimated brand advantage measure, I employ Bayesian inference methods to classify retailers into alternative captaincy models. Finally, I specify a supply model that describes captaincy competition and pricing strategies. Based on predictions from the supply model and the classification results, I apply conduct tests to infer that the captains eliminate double-marginalization from their own products when making pricing decisions. The results from counterfactual experiments show that category captaincy arrangements boost market shares of the leading brand by about 50%, and can reduce competition and consumer welfare.

4 - Does The Birth of a Child Increase Alcohol Consumption? Evidence from Scanner Data

Fatima Madani, Monash University, Melbourne, Australia, Satheesh Seenivasan, Felix Mavondo

Birth of a child causes emotional upheaval for households at least for a while. During times of upheaval, consumers commonly employ various coping strategies such as impulsive shopping and stress-induced consumption to manage the difficult situation and get their mind off the stress. In this study, we examine the effect of the birth of a child (first child and subsequent child) on the consumption of impulsive and stress-relieving products such as alcohol, soda and candy. Drawing from theories on emotion-focused coping strategies, we argue that households who experience the birth of a child increase their consumption of stress-relieving products to restore balance in their lives and combat their frustration and stress. We use Nielsen panel data on household purchases across all US grocery retailers. We apply a change point detection method to estimate the time of childbirth (i.e., the three-month period in which a household experiences the childbirth), based on households' spending on particular categories (e.g., diapers, formula etc). Then, we apply an event study approach to estimate the effect of childbirth on households' consumption of stress-relieving products. We find that the households' expenditure share on alcohol increases by approximately 50 percent following the birth of a child. Further, the effect of the birth of the first child is more pronounced than that of subsequent children. Our findings have important implications for retailers and public health professionals.

■ FA06

Virtual Room 06

Marketing, Games, and Gamification I

Contributed Session

Chair: Jens Paschmann, University of Cologne, Cologne, Germany

1 - Self-report Measure of Dispositional Flow Experience in the Video Game Context: Conceptualisation and Scale Development

Xiaowei Cai, Public University of Navarre, Pamplona, Spain, Javier Cebollada, Mónica Cortiñas

The flow theory has been widely applied to explain video game players' gaming and purchasing behaviour. However, due to the conceptual and empirical flaws of the current measurement instruments, researchers can hardly apply them to measure the dispositional flow experience of adult video game players. In this research, we conceptualised flow experience and developed its measurement instrument in the video game context. To achieve these objectives, we conducted five studies with different participants in each of them: conceptualisation of the constructs and item generation (n = 13), expert judging (n = 5), pre-test (n = 96), initial development and validation (n = 289), and advanced development and validation (n = 593). We applied both qualitative and quantitative analysis to conceptualise and measure the flow experience of video game players, including grounded theory and several statistical tools of latent variable modelling. We obtained a scale of 28-items that performs well in the first-order model. Moreover, we tested three hierarchical structure of flow experience: unidimensional model, independent antecedents model, and hierarchical antecedent model. Results show that the hierarchical antecedent model is the best structure to represent flow experience. We named our scale Video Game Dispositional Flow Scale (VGDFS). This research benefits future researchers and industrial practitioners who are interested in measuring flow experience and explore its psychometric correlates with extraneous factors.

2 - Fickle Affiliations: The Impact of Social Network Change on Player Behavior in Online Games

Vlada Pleshcheva, The European School of Management and Technology (ESMT), Berlin, Germany, Catalina Stefanescu-Cuntze, Francis E. De Vericourt

Does affiliation with online social entities impact players' behavior in online games in a freemium model? Many online games offer in-game social structures in the form of "guilds" or "clubs" to foster game engagement and ultimately convert the players to premium features. In this paper, we study how the characteristics (such as intensity, duration, and frequency) of players' affiliation with in-game social structures impact the player's behavior, particularly their propensity to purchase premium game features. We analyze a large-scale dataset on user behavior in a multiplayer online game, where players may join in-game communities, and their community experience mediates their engagement with the game. We investigate the determinants of a player's decision to join in-game communities and those that make them churn and switch to other communities (such as novelty or status-seeking). We then quantify how community membership and relative status performance of communities affect players' purchase intensity. We estimate structural models where the users' willingness to pay for the game's premium features is a function of engagement with the game and players' loyalty to the in-game social structures. We find that "switchers" (players who sequentially change in-game club memberships rather than staying loyal to one club) have higher purchase likelihood and greater engagement with advanced game features. We provide insights on the role of in-game social structures in the game's monetization and discuss our results' managerial implications.

3 - Software Multihoming to Proximal and Distal Markets

Alexander Bleier, Frankfurt School of Finance & Management, Frankfurt Am Main, Germany, Nico Wiegand, Yuri Peers

A steady supply of software is a crucial driver of platform sales. While platform manufacturers often seek software to be released for their own platform only, publishers benefit from releasing titles across multiple platforms. In the video gaming industry, research has examined the effects of such software multihoming to directly competing other consoles of the same technology generation (i.e., the proximal market). Today, however, multihoming increasingly involves also releases to less direct competition such as mobile devices, handheld devices, and consoles from the previous generation (i.e., distal markets). Against this backdrop, this study investigates whether and how software multihoming to platforms in proximal and distal markets affects focal console sales. Drawing on U.S. game console data from the seventh and eighth generation, the results show that, in contrast to previous findings and widely-held industry beliefs, singlehomed game releases in the proximal market are only advantageous for high-quality games. Moreover, multihoming to the distal mobile device market creates positive spillovers for focal console sales while multihoming to the distal previous-generation console market exerts negative effects. These relationships further hinge on the focal platform's life cycle stage. For platform managers, the results indicate that expected returns to singlehoming deals with complement publishers are often inflated and how a more nuanced view of multihoming can help improve managing platform competition.

4 - Driving Mobile App Customer Engagement Through Gamified App Features

Jens Paschmann, University of Cologne, Cologne, Germany, Franziska Völckner, Hernan Bruno, Kristina Klein, Harald van Heerde

Most app providers offer their mobile apps for free and monetize ongoing customer engagement (e.g., through in-app advertising), which makes ongoing app usage key to creating value for them. With more than two million apps available, competition for users and attention is intense, and managers must not only manage churn rates, but also actively prevent usage decline over time. One popular strategy to this end is mobile app gamification - the implementation of game mechanics in mobile apps. We have access to individual-level milliseconds-based usage observations in a popular consumer opinion app for the first 52 weeks since its launch. We model customer engagement (based on app access and usage duration) using a hidden Markov hurdle model. We estimate the influence of certain game elements on customer engagement on a sample of more than 500 users. The results show, amongst other things, that interacting with gamified app features can also lead to unintended declines in customer engagement, strongly affecting engagement-based business models and value creation through these apps. We discuss implications for stimulating customer engagement and mobile app value through gamified app designs.

■ FA07

Virtual Room 07

AI

Contributed Session

Chair: Kannan Srinivasan, Carnegie Mellon University, Tepper School of Bus., Pittsburgh, PA, 15213-3815, United States

1 - Impact of AI on Marketing Jobs and Skills

Sundar G. Bharadwaj, Professor of Marketing, University of Georgia, Athens, GA, United States, Adithya Athreya

Artificial intelligence and machine learning algorithms have recently achieved superhuman performance across a wide range of economically valuable tasks. New technologies have affected demands for jobs in the labour market. In this study, we use a machine learning approach to measure the "exposure" of marketing and sales jobs to AI technology. Employing text mining to collect and pre-process job description data from tens of thousands of postings from online job search portals, we use a clustering and a syntactic dependency, parsing algorithm to segment and then extract information about the tasks people do in these respective marketing jobs. We then use the text of AI related patents to predict the skills associated with jobs to "exposed" to AI using deep neural networks. Our research has implications for firms regarding the nature of marketing jobs that are prone to be complemented or substituted with AI, policymakers to design appropriate education and skills policies, and individuals making decisions regarding what marketing careers to pursue.

2 - How do AI-powered Virtual Influencers Disrupt the Job Market of Human Influencers?

Kannan Srinivasan, Carnegie Mellon University, Pittsburgh, PA, United States, Serim Hwang, Xiao Liu

In 2018, Time magazine announced the 25 most influential people on the internet. Surprisingly, the group, which contains Rihanna and former President Trump, includes an AI-powered virtual influencer: Lil Miquela. Lil Miquela has over 3 million followers on Instagram and has been a brand ambassador for luxury brands such as Porsche. Brands are increasingly choosing AI influencers for marketing because these virtual influencers are more reasonably priced, and exempt from human mistakes (i.e., moral issues, feuds, scandals). However, despite the rapid growth of virtual influencers in the market, they are significantly understudied in literature. More importantly, little is known about the disruption of virtual influencers on the existing influencer marketing industry and how this disruption may harm humans influencers' job security. In this paper, we study how the rise of virtual influencers affects the sponsorship deals of human influencers. A major modeling challenge to solving this problem is that virtual influencers' sponsorship can be missing not at random (MNAR) because their sponsorship does not need to be disclosed due to a lack of the federal Trade Commissions (FTC) guidelines, which leads their sponsorship being partially observable. We construct doubly robust (DR) estimators that provide consistent estimators. We find that the number of human influencers' sponsorship deals has decreased since the introduction of virtual influencers, particularly human influencers who have been sponsored by brands that have started to sponsor virtual influencers. The results are robust to different model specifications. We discuss managerial implications for three stakeholders: the Federal Trade Commission (FTC), human influencers, and the developers of virtual influencers.

■ FA08

Virtual Room 08

Improving Customer Recommendations

General Session

Co-Chair: Eric Schwartz, University of Michigan, Ann Arbor, MI, 48109-1234, United States

Chair: Carl F. Mela, Duke University, Durham, NC, 27708-0120, United States

1 - Design and Evaluation of Personalized Free Trials

Hema Yoganarasimhan, University of Washington, Foster School of Business, Univer, Seattle, WA, 98195, United States, Ebrahim Barzegary, Abhishek Pani

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 examine how trial length affects users' responsiveness, and seek to quantify the gains from personalizing the length of the free trial promotions. Our data come 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. First, we show that the 7-day trial to all consumers is the best uniform policy, with a 5.59% increase in subscriptions. Next, we develop a three-pronged framework for personalized policy design and evaluation. Using our framework, 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 policy with its ability to personalize the treatment sufficiently without over-fitting (i.e., capture spurious heterogeneity). Next, we segment consumers based on their optimal trial length and derive some substantive insights on the drivers of user behavior in this context. Finally, we show that policies designed to maximize short-run conversions also perform well on long-run outcomes such as consumer loyalty and profitability.

2 - Recommendations Systems: Beyond Matching Products to Buyers

Pedro Gardete, Nova School of Business and Economics, Lisbon, 94305-7216, Portugal, Carlos Santos

The digital revolution has allowed sellers to make large assortments of products available to consumers. Recommendation systems have played a central role in this dynamic. At the core of these systems is the use of data and sophisticated algorithms to predict match values between products and buyers. By analyzing consumer search data and product recommendations of an online used car seller, we find that there is scope for value creation by recommendation systems beyond their primary matching role. More specifically, our analysis leverages search consumption: The fact that consumers enjoy inspecting at least some of the products on sale. We identify an engagement effect such that recommending some products with high hedonic value induces additional customer engagement while keeping baseline conversion rates unchanged. The engagement effect is economically significant in our data: It explains 55% of the potential value available to recommendation systems, the remaining 45% made up by the traditional product matching mechanism.

3 - Sequential Allocations for Customer Acquisition to Optimize Customer-Base Value

Eric Schwartz, University of Michigan, Ross School of Business, Ann Arbor, MI, 48109-1234, United States, Peter Fader, Liangbin Yang

Firms acquire customers as assets, which have uncertain value and costs that differ based on where those customers came from. The source of acquisition (e.g., channel, medium, segment) is a critical lever firms can pull to affect the mix of low value to high-value customers. But firms do not know exactly where their most valuable customers come from (or where they could come from). It's natural to test this by spreading a budget across different sources of acquisition, but spending too much on acquiring customers who prove to be less valuable makes that experiment costly. We propose an approach for a marketing manager to take a fixed per-period budget, and sequentially reallocate it across a range of sources of acquisitions, each period, to optimize the return on investment in customer lifetime value per dollar spent on customer acquisition cost. And as new customers arrive and existing customers age, the manager can update their model of customer lifetime value and optimize their budget allocation, acquiring the mix of customers to maximize the return on investment in new customer assets. This research introduces the theoretical work in machine learning on delayed partial feedback and censoring in the multi-armed bandit problem to characterize the marketer's decision under uncertainty: while gaining information gradually as customers reveal their value over time, they decide the next budget allocation to acquire the next cohort. We develop the model and algorithm for a contractual setting, where sources of customer acquisition differ in their distributions of churn propensities, and where the delayed and censored feedback is also tied to the reward. Extensions for the non-contractual setting are discussed.

4 - Collaborative Filtering Bandits for Online Recommendations

Carl F. Mela, Duke University, Fuqua School of Bus., Durham, NC, 27708-0120, United States, Boya Xu, Yiting Deng

Recommendation systems have a long history of success in marketing and are widely deployed in applications as diverse as news and retail. We build on this literature in several ways. First, we consider contexts where new content and new users are common. In such cases, there is little information on which to make initial recommendations, a problem commonly called the cold start problem. Second, we consider contexts with large numbers of tags to describe content and users which can be challenging to scale in practice. Third, we consider the recommendation of menus of items as opposed to single items, as is common in e-tail landing pages. Finally, we tradeoff learning about user preferences for items with the sale of those items, often called the explore-exploit tradeoff. To achieve this aim, we integrate a reduced space attribute-level collaborative filtering approach with a multi-arm bandit. Using the MovieLens data set, we show better recommendations lead to a several percentage point increase in ratings over other algorithms. A field test is being conducted at JD.com and will be reported in this Marketing Science session.

■ FA09

Virtual Room 09

Brand Equity

Contributed Session

Chair: Leonard Rackowitz, University of Hamburg, Hamburg, 20148, Germany

1 - From Marketing to HR - How Customer-Based Brand Equity Drives Employer Brand Equity

William Shibuya, University of Houston, Houston, TX, United States, Rex Yuxing Du

There is increasing pressure to see marketing taking a bigger role in supporting HR to fight the war for talent. This study combines the marketing and the HR perspectives, investigating how customer-based brand equity drives employer brand equity. The authors investigate the impact of several dimensions of customer-based brand equity, as well as the influence of different types of brand communication, including positive and negative factors. Employer attractiveness and employer unattractiveness are the outcomes of interest. Findings from the panel vector autoregression (PVAR) modeling of 1,031 brands in the U.S. suggest that quality and unpaid media are the most impactful factors in driving employer brand equity. But there are differences in how the positive and negative dimensions of employer brand equity develop: unpaid media are much more critical than quality for employer unattractiveness, but not for employer attractiveness. Perceptions of value and paid media also drive employer brand equity. The results should assist marketers and HR professionals, enhancing the comprehension and management of the connections between marketing efforts and talent acquisition.

2 - Which Branding Strategy Should Brand Managers Follow, Corporate-brand Versus Individual-brand Based Branding?

Akihiro Inoue, Professor, Keio University, Yokohama-City, Japan, Yuki Dempo

Marketing managers often run across the decision-making regarding which branding strategy to take, either corporate-brand or individual-brand based strategies. Many Japanese companies weigh more on corporate brands, such as Toyota, Panasonic, and have being taking an umbrella-brand strategy, that is, placing corporate-brand first and individual brand second, such as Toyota Camry, Panasonic DIGA. In this research, we attempted to suggest which branding-strategy marketing managers to follow, based upon the hierarchical modeling.Brand can be seen as knowledge system (e.g., Keller 1993; 2003). The first two dimensions of brand knowledge, shown by Keller (1993), are brand awareness and brand image, following recall, recognition, associations, attributes, benefits, attitude, and so on. On this ground, we conjecture that awareness works as a key driver for brand knowledge systems and that consumers would perceive a higher brand value of which knowledge system is closer to their awareness. We develop the two types of hierarchical models in terms of willingness-to-pay. We specify one model, corporate-brand-based (CBB) model, where the WTP is the function of the images of corporate brand and their parameters are the function of individual-brand images as the hyper model. We specify the other model, individual-brand-based (IBB) model, where the WTP is the function of the images of individual brand and their parameters are the function of corporate-brand images as the hyper model. We develop the hypothesis that, regarding the consumers who aware corporate-brand first, CBB model fits better, and, regarding those who aware individual-brand first, IBB model fits better. We applied the models to a traditional Japanese food company and found the hypothesis partially supported.

3 - Why do Firms Patent? Product Market Value, Customer Perception, and Financial Market Outcomes

Qianqian Yu, Assistant Professor, Lehigh University, Bethlehem, PA, United States, Mine Ertugrul, Karthik Krishnan, Bo Xu

We study whether patent protection creates product and financial market values. Linking consumer-based brand value data with detailed patent application information, we find that firms that have more and higher quality patents are associated with higher perceived levels of product innovativeness as well as quality among consumers. To establish that the effect of patent protection on product market perception is causal, we exploit the exogenous variation in the random assignment of patent examiners who review patent applications. Specifically, we conduct an instrumental variable analysis using the average examiner leniency as an instrument for firms' patent grants. Our mediation analysis documents a positive and significant impact of a firm's patenting activities on various dimensions of firm performance through enhanced product market perception, including market valuation, profitability, revenue, gross profit margin, and market share of sales relative to industry peers. We propose and find supporting evidence for three channels through which patenting may affect product market perception. First, patenting is related to increased commercialization of inventions, thereby leading to a greater extent of new product introductions. Second, patenting helps to firm to retain talent (inventors, in particular), who can help firms to launch innovative and high quality products. Third, patenting can be used by firms as an effective differentiation strategy to market their products and signal their uniqueness. Our paper contributes to the marketing and finance literature by offering the first study unveiling how patenting activities affect product market outcomes, which in turn create financial market value.

4 - Why Tastes Lose Popularity and How to Prevent it

Leonard Rackowitz, University of Hamburg, Hamburg, Germany, Besarta Veseli, Michel Clement

Fashion brands and styles rise and fall in popularity. While marketing scholars have intensely studied adoption, there is little understanding of why such identity-relevant cultural tastes are abandoned. This study is based on previous research on popularity dynamics of non-commercial tastes, finding that faster increases before peaks of popularity accelerate abandonment. We contribute a theoretical explanation rooted in identity signaling theories. To understand why growth rate and decline rate around popularity peaks of tastes may be associated with each other, the goal of this study is to investigate the role of three moderators of this potential relationship: (1) Conspicuousness of taste (i.e., the extent to which a taste is recognizable by others), (2) level of popularity, (3) price level. We empirically analyze trajectories of fashion apparel brands using Google search data. Using the Wayback Machine (web.archive.org), we captured the evolution of a latent construct variable measuring brand prominence and the price level. We generalize results of previous studies finding that growth rate and decline rate are negatively correlated. Newly, we demonstrate that this relationship is intensified by increasing levels of brand prominence and attenuated by increasing levels of popularity. Brands at low levels of brand prominence can disintegrate the negative relationship by lowering brand prominence before the peak but brands at higher levels cannot. This study is valuable for a broad range of brands of conspicuously consumed products in identity-relevant domains. We demonstrate how brand prominence can be used to steer popularity dynamics and give recommendations to brands in regard to distribution and communication to prevent abandonment.

■ FA10

Virtual Room 10

Advertising 3

Contributed Session

Chair: Tsung Yiou Hsieh, University of Houston, Houston, TX, 77054, United States

1 - Assessing Long-Term Brand Performance

Anthony Koschmann, Eastern Michigan University, Ypsilanti, MI, United States, Douglas Bowman

While brand managers are interested in both the short- and long-term effects of marketing, less well understood is the effect of marketing efforts between strong and weak brands. An examination of 2,661 consumer packaged goods brands over a 21-year period using panel vector autoregressive (PVAR) modeling, shows that prices and promotion response have varying short- and long-term effects for weak name brands, strong name brands, and private labels. Additionally, a Granger causality test finds that prices lead to private label share, but this is not the case for name brands (strong or weak). Promotion response causes share in weak brands, but the reverse for strong brands: share affects promotion response. The findings add to the research on long-term brand performance drivers, with managerial implications for marketing mix tactics based on the brand's current performance.

2 - Towards a Full Effects Marketing Mix Model: Dual Contribution of Advertising on Long-term Brand Equity and Sales

Christina Antonie Reh, WHU - Otto Beisheim School of Management, Vallendar, Germany, Christian Schlereth

Marketing mix models (MMMs) synthesize historical data into patterns and trends that can be used to evaluate ad-channel performance. In times of increasing data regulation pressure, they become more attractive, because they offer a non-personalized perspective on advertising effectiveness. In this research, we develop a dynamic linear model that aims to account for the dual contribution of advertising on short-term sales and long-term brand equity, as measured by third-party providers. Thereby, we account for that sales can happen through two underlying processes: the advertisement (1) leads to direct conversions, i.e., that it is effective in increasing the number of purchases, or it (2) serves for brand building purpose, i.e., that the brand becomes familiar and known, which might result into sales later. We demonstrate in the context of an e-retailer that this decompositional approach implemented through a novel state-space model offers important advantages compared to a benchmark model that considers sales data alone. It improves goodness-of-fit and it improves diagnosticity by distinguishing advertising effectiveness in brand building from short-term conversion. We also detail the managerial insights provided by such a model, especially the effectiveness of traditional TV advertisement vs. online advertisement.

3 - Offensive Ads and Long Term Approach Toward the Advertised Brand by Those Who Are Discriminated Against: Disidentification Tendency in Action

Enav Friedmann, Lecturer, Ben Gurion University, Beer Sheva, Israel, Eliran Solodoha

Despite growing consumer awareness stressing the negative consequences of offensive ads, companies increasingly use them as a marketing tactic. Current literature stresses the discriminated consumer's short-term negative response (purchase intentions, brand choice), while responses mimicking real purchase situations are mostly long term. Our research explores the long-term effects of offensive ads on individuals being discriminated against. Following construal level theory, we suggest that exposure to offensive ads narrows the psychological distance between discriminated groups and the individual. Exposure to offensive ads elicits immediate self-threat that triggers intense instinctive responses, such as fight, flight or freeze reactions. We expect after a time delay, the self-threat becomes cognitively more concrete, leading to disidentification tendency of individuals from discriminated groups. Approaching the offending brand in the long term becomes a distancing mechanism for individuals of discriminated groups, acting as disidentification tendency. Two longitudinal studies (race offensive experiment, n= 347; gender offensive experiment n= 221) showed consistent results: feelings of group discrimination served as a moderator between group identification and consumer response in the long term. We suggest stricter market regulations to monitor and mitigate the effect of these ads on the groups they intend to offend.

4 - Assessing the Potential of Addressable Linear TV Advertising

Tsung Yiou Hsieh, University of Houston, Houston, TX, United States, Rex Du

Compared to traditional program-based linear TV advertising, this paper evaluates the potential lift in conversion that can be achieved through addressable, audience-based TV advertising where individual households watching the same linear programming can be targeted with different ad insertions. To do so, we calibrate a household-level TV advertising response model by merging, for a panel of 731,393 households over a period of 15 months, second-by-second linear TV viewing data with conversion data from a focal brand. Our proposed modeling framework provides estimates for (1) the same-day and carryover effects of the focal brand's TV ads, and (2) two dimensions of heterogeneity that can moderate those effects, i.e., the likelihood of a household being in the market for the advertised product, and conditional on being in the market, a household's responsiveness to the focal brand's TV ads. Based on the calibrated response model, we conduct what-if analyses to compare the incremental impact of the focal brand's TV advertising under different targeting strategies. We find that audience-based targeting enabled by addressable TV can lift conversion by 130% over program-based targeting employed by the focal brand.

■ FA11

Virtual Room 11

Marketing and Finance I

Contributed Session

Chair: Sudhir Voleti, Indian School of Business, Hyderabad A.P., 500032, India

1 - Target Firm Customer Portfolio Concentration and the Value of Customer Portfolios Acquired Through Mergers and Acquisitions: Do Acquirer Characteristics Matter?

Cem Bahadir, University of North Carolina at Greensboro, Greensboro, NC, United States, Sundar G. Bharadwaj

While the value of customer portfolios within firms has seen significant research, little research has examined the value of customer portfolios during M&A deals where a transfer of ownership of customer relationships between firms takes place. This study presents a contigency model investigating the moderating role of acquirer firm's M&A strategy, customer-centric organizational structure, and incumbent customer portfolio concentration on the relationship between the target firm's customer portfolio concentration and the value of acquired customer portfolio assets. Analysis of a database of M&A transactions reveals that acquirers place higher value on acquired customer portfolios that are concentrated (relative to fragmented) when acquirers (1) pursue a consolidation- versus diversification-based M&A strategy, (2) utilize a customer-centric organization structure relative to a product or geograpic organizational structure, and (3) have concentrated customer portfolios compared to the acquirers with fragmented customer portfolios. Collectively, the results provide support for the contingency model that acquirer's strategy, structure, and resource characteristics result in the dominance of scale-related efficiencies over dependence-related diseconomies in the relationship between target firm customer portfolio concentration and the value of the acquired customer portfolio in the M&As.

2 - An Examination of the Effects of Venture Branding Efforts on Ventures' First-round Financing Performance

Yuewu Li, Texas Tech University, Lubbock, TX, United States, Xinchun Wang, Alejandra Marin, Mayukh Dass

Over the life span, startup ventures receive one or more rounds of financing from venture capital investors that are used for operation and growth purposes. Acquiring the first-round investment (i.e., the first formal outside investment) is especially challenging because the information asymmetry is the strongest between the venture and investors at that time. Therefore, to attract first-round funding, ventures need to make extra efforts to demonstrate or signal their latent potential to the venture capital market. In this paper, we focus on the role of marketing in venture fundraising and draw on the signaling theory to examine whether ventures' branding efforts have any relationship with their first-round financing performance. Using multi-source data from the Crunchbase database, Pitchbook database, Investment announcements, and Compustat on 139 startup ventures and their first investors, we test related hypotheses and found significant positive effects of ventures' branding efforts on their first-round financing performance. We also found that this positive relationship is amplified by the level of market orientation of the deal, venture age, and industry capital intensity. Based on the findings, we provide several important implications for both new ventures and investors seeking financing/investment opportunities.

3 - An Empirical Investigation of Capital Market Responses to Forward-looking Marketing Activities

Sudhir Voleti, Associate Professor, ISB, Indian School of Business, Hyderabad A.P., India

We examine the marginal impact on firm value of Marketing Intent inferred from forward looking firm vocabulary. Management's (natural language) responses to questions about past and future firm strategy and performance are public and available on-record. A linguistic analysis of such responses (contained in quarterly analyst call transcripts) could yield information about firm worldview, intent and plans for what has not yet come to pass. Market reactions to management's forward-looking intent affects firm value (specifically, we consider three-factor cumulative abnormal returns or CARs), a key outcome quantity. We apply linguistic techniques to the analysis of natural language at scale to a large corpus (80000 observations) of call transcripts of firms covering a sizeable swathe of the US economy (S&P 1500) over a reasonable period (15 years). We find empirical support for strong and statistically significant differential CAR effects for particular thematic structures (tokens, sentences, latent topic proportions) in forward-looking vocabulary, even after controlling for standard financial controls (such as Unexpected Earnings Surprise, RoA and financial ratios), lexical controls (linguistic features, sentiment, readability scores), as well as statistical controls (such as firm and time fixed effects). We employ a variety of econometric and (shallow) machine learning tools and techniques to infer the contribution of the Marketing function and marketing intent to capital market responses.

■ FA12

Virtual Room 12

Sustainability 3

Contributed Session

Chair: Youngtak M. Kim, University of Georgia, Athens, GA, United States

1 - Dynamic Organizational Commitment and Giving

Ana Minguez, University of Zaragoza, Zaragoza, Spain, F. Javier Sese

The growing number of existing problems in society offers new challenges for nonprofits, having an increasing responsibility in social interventions. The marketing efforts of fundraisers are mainly focused on increasing the donations as well as the pool of supporters who donate regularly. However, the organizational commitment of regular donors varies over time, having different consequences on the funds collected. The present study aims to demonstrate how monetary donations can vary according to the evolution of two organizational commitment dimensions, affective and normative, which will be largely determined by the relationship length (years in the organization). This study also seeks to analyze donation periodicity as a moderating factor that can explain the psychological states that donors manifest when they donate with different periodicities and that may influence organizational commitment and consequently contributions. Using a database of 6137 regular donors, a longitudinal study is conducted over an eight-year period (2013 - 2020). Results suggest that organizational commitment on donations has a U-shape effect, derived from the confluence of the dynamic evolution of a decrease in affective commitment and, simultaneously, an increase in normative commitment, effects that occur over time as the donor remains in the organization. Results also show that the decrease in affective commitment is less pronounced when donors contribute with frequent periodicities (e.g., monthly) compared to a yearly frequency. This study broadens the existing literature by providing a more realistic picture of the behavioral heterogeneity of donors experiencing organizational commitment and also helps nonprofits identify when donors are becoming less profitable.

2 - Encouraging Customers to Engage in Climate Change Amelioration: Does it Help a Firm's Relationship with its Customers?

Jake An, Lecturer, University of Sydney, Newtown, Australia, Jihwan Moon, John Roberts

We study a financial services firm's climate change initiative, a carbon emission offset program (COP), where the firm co-opts its customers to address the challenge. Program participants pay monthly fees based on their carbon footprint. We investigate the COP's effect on the firm's financial performance while accounting for self-section using a matching method and a treatment effects model. We find that membership of the COP has positive effects on customer retention and investment balance in both the short-term (10 months) and the long-term (two years). To probe the consumer evaluation by which this occurs we analyze the role of customer attitudinal variables obtained from two survey waves (particularly those of customer-based brand equity and perceived environmental empowerment variables). Combining the survey data with our longitudinal behavioral data, we find that the positive effects of COP membership on customers' investment balance growth are both direct and indirectly through changes in attitude. Interestingly, the indirect effect occurs through an improvement in customer environmental empowerment (i.e., confidence in preventing climate change) not improved customer brand equity. This finding leads us to conduct a field experiment in which we examine different communication strategies to promote the COP. We find that COP participation increases when the firm sends messages to customers saying that they can help the environment with the firm and its entire community (i.e., other customers), rather than stressing the societal contribution of the firm to climate change amelioration.

3 - The Relative Importance, Barriers and Opportunities of Persuasion Techniques to Engage Consumers in More Sustainable Fashion Behavior; A Case Study

Annuska Toebast-Wensink, MA MSc, University of Applied Sciences Utrecht, Utrecht, Netherlands

Clothing consumption decisions involve competing interests such as self-identity, the need to fit in, and the desire to be fashionable and trendy (Niinimäki, 2010; Harris et al., 2016). Sustainability is a low priority concern when it comes to consumers' purchase criteria (Harris et al., 2016) and impulse buying behavior prevents consumers from investing in better quality and sustainability (Chaturvedi, 2020; Diddi et al, 2019, Niinimäki, 2010). Research shows that the branding and marketing strategies of fashion companies are currently not set up to achieve sustainable consumer behavior (Coleman and D'Souza, 2013). Fashion marketing and brand managers have a challenging task finding interest for consumers for a sustainable way of life and to make it easily accessible and attractive for them (Grubor et al, 2017). We researched the marketing opportunities that fashion companies have for persuading consumers to choose more sustainable fashion. As a theoretical framework for persuasion tools and techniques we use the SHIFT framework (White et al, 2019). The SHIFT framework sorts several proven persuasion theories and typologies of psychological factors to predict sustainable consumption: social influence, individual self, feelings and cognition, and tangibility. As brands themselves are powerful instruments of change (Chu et al, 2019), we added the concept of 'brand values' as a sixth factor in the research. Desk research and interviews are employed to understand the current endeavors of a large fashion company in persuading consumers to engage in more sustainable fashion behavior. The study brings forward novel viewpoints on influencing consumer behavior in sustainability transitions.

4 - Performance Implications of Sustainable Innovations in the Consumer Packaged Goods Market

Youngtak M. Kim, University of Georgia, Athens, GA, United States, Sundar G. Bharadwaj

Consumer demands for sustainable products are growing and serving as key drivers of growth. As a result, companies have embraced sustainable innovations into their offerings in efforts to serve the needs of commercial stakeholders (customers, investors, suppliers). However, the corporate sustainability (CS) literature has neglected product-related CS and its implications at the product/brand level with limited information on the financial and product market performance implications of sustainable products. Therefore, this study seeks to determine whether and when sustainable innovations - product modifications or new to market introductions with attributes that provide functional utility to consumers as well as environmental and societal benefits - affect brand performance (i.e., sales). Using consumer panel and retail data across 91 categories for over eight years, we observe both the consumer demand and supply-side mechanisms that influence purchase behaviors of sustainable innovations. Also, we observe how product and category-level factors moderate this relationship. This presents brand/product managers with a nuanced insight on the sustainable innovation-performance link as well as implications for commercial and societal stakeholders (NGOs, communities, public policymakers).

■ FA13

Virtual Room 13

Recovering Preferences

General Session

Chair: Doug J. Chung, Harvard Business School, Boston, MA, 02163, United States

1 - Machine Learning Inference for Heterogeneous Effects of Product Attributes

Lingling Zhang, University of Maryland, College Park, MD, United States, Fan Feng, Vithala R. Rao

Consumers find it non-trivial to evaluate products on platforms, particularly when they make infrequent purchases such as renting or buying a house. In this research, we utilize a large-scale dataset from the online home rental market to examine how consumers respond to landlords' communication of dwelling characteristics. We employ a machine learning inference approach to estimate the heterogeneous effects of dwelling attributes, while addressing the endogeneity concern that landlords' communication could be strategic. Our results show that different types of attributes have varying effects at different stages of consumers' decision making. Search attributes that are described in objective language are not effective for initial interest, but they can help speed up conversion. In contrast, attributes that are described in a more subjective tone have a positive effect on initial interest but may hurt conversion. We also find that when the content of the attributes is hard to verify, consumers engage in correlational inference and respond more positively to premium dwellings. Our research has implications for sellers to plan strategic communication and for digital platforms to design information disclosure policies to improve seller-buyer matching.

2 - Goal Reminders: Do They Work? For Whom, How and Where?

Doug J. Chung, Harvard Business School, Boston, MA, 02163-1317, United States

This study examines the role of goal reminders on employees' performance. First it presents a theory of an agent's behavior regarding goal reminders. The model takes into account reference-dependent preferences and information acquisition through goal-progress monitoring by different types of people. To validate the theoretical claims, the study's authors, in collaboration with a major Nordic retail firm, conducted a field experiment with 561 fulltime retail-sales employees to examine the effectiveness and the mechanism of goal reminders. Monitoring goal progress has a positive effect on an agent's performance. However, goal reminders suppress goal-progress-monitoring behavior—the Ostrich effect, especially for low-type agents. Thus, there exist a negative effect of goal reminders on employees' performance. Yet, reminders have a net positive effect on performance through an increase in motivational salience, but its effect is weaker with high-type agents.

3 - Can Willingness to Pay be Identified Without Price Variation? What Usage Tracking Can Tell Us

Vineet Kumar, Yale School of Management, New Haven, CT, 06511, United States, Cheng Chou

We study how to obtain the distribution of willingness to pay (WTP) for subscription products, where consumers pay a fixed price each period. In the absence of price variation, we demonstrate how variation in usage and subscription choice together can identify the WTP distribution and elasticities, which are primitives of interest in demand estimation. We then propose a novel estimation strategy to recover the WTP distribution when price does not vary in data. Our approach does not assume specific distributions for the unobservables. In addition, we show how price variation, if exists, can help identify the functional form by which usage impacts WTP. We illustrate our method with an application to a music streaming service.

4 - Temporal Normalization During Valuation Creates Preference Reversals

Ursa Bernardic, University of Geneva, Geneva, Switzerland

Preference reversal refers to a systematic disparity between people’s valuation of options and chooses between these. Attempts to account and model such preference reversals draw attention across multiple fields (psychology, marketing and neuroeconomics) for more than four decades. Here, we investigate how the distribution of items faced during valuation affects sequential valuation and, ultimately, choice efficiency. To this end, we experimentally manipulated the sequence of options being presented in a valuation task and evaluated how the elicited values could predict subsequent binary choices. We carried out an experiment in which subjects (n=41, age: 19-25 y.o., 20 females) performed 1) a value rating task, and 2) a binary decision-making task. In the value-rating phase, participants indicated on a scale from 0 to 10 CHF how much they would be willing to pay for a presented item belonging to one of two categories: food items or trinkets. Importantly, unbeknown to participants, the order in which these two categories were presented was split into two blocks, separating high and low-value items of this category, based on the actual price of items. In the manipulated category participants evaluated items from low (or high) and afterward from the high (or low) block, while for the non-manipulated category, items were drawn randomly from either low or high block. In the end, participants also rated how familiar they were with the presented items. Choice data was analyzed with a generalized linear mixed-effects regression. More precisely, binary preference decisions were fitted with a logistic function and the value rating for the preferred and non-preferred options as dependent variables. Our preliminary results revealed that manipulating the distribution of object values impacts valuation and causes preference reversals. As such, the value difference of the options predict binary choices for the manipulated, but much worse for the non-manipulated category. Further analyses suggest that temporal normalization in valuation is domain-specific and not generic.

Friday, 10:15AM - 11:15AM

■ FB01

Virtual Room 01

Targeting and Recommendation

Contributed Session

Chair: Tianxin Zou, University of Florida, Gainesville, FL, United States

1 - Predictive Accuracy, Search Impatience, and Product Recommendation

Zirou Chen, University of Toronto, Toronto, ON, Canada, Mengze Shi

Advances in predictive technologies such as artificial intelligence have enabled the firms to provide product recommendations more accurately matching with individual consumer needs. Accurate recommendations, while enabling consumers to more efficiently find the right match, can diminish the expected value of the other products that are not recommended, resulting in search impatience. We build a monopoly model to capture these two contrasting effects of personalized product recommendations and study the overall effect on a firm's profit. We find that the firm should provide personalized recommendation if and only if backed by sufficiently high predictive accuracy. Moreover, when the firm has stronger brand quality, the required predictive accuracy for making personalized recommendation is even higher. For such a firm, due to the substantial loss in profit caused by search impatience, a firm can be worse off when its predictive accuracy increases within an intermediate range. We also consider consumer's misperception of the firm's predictive accuracy. While over perception leads to insufficient amount of search and under perception results in excessive search, the overall effect of market-level misperception makes the product recommendations more profitable. Our results underscore the importance of properly understanding the impact of consumer perception when firms make decisions on predictive technologies and customer recommendations.

2 - A Theory of Irrelevant Advertising: An Agency-induced Targeting Inefficiency

Woochoel Shin, University of Florida, Gainesville, FL, United States, Jiwoong Shin

The ad targeting technology has enabled a highly personalized delivery of online ads. Behind this development is the belief that better targeting will lead to more relevant ads. This paper challenges this lay belief by showing that irrelevant advertising is an inescapable reality arising not necessarily from the technological imperfection but also from the incentive problem embedded in the advertising industry's institutional arrangement. We show that an ad agency serving multiple advertisers may strategically allocate an ad impression to a lesser-matched, sometimes totally irrelevant, niche advertiser because its future impressions will be likely to match better with the mainstream advertiser. Without a contractual obligation, the agency may still distort the impression allocation. In this case, however, there is no case of an impression being delivered to a completely irrelevant advertiser. Instead, there exists a case where the agency chooses not to deliver the impression to any of the potentially relevant advertisers to save them for a conceivably better-matched future impression. Finally, we endogenize the advertiser's decision of whether or not to hire an ad agency. We identify the conditions under which the advertiser is better off hiring an ad agency against bidding by itself despite these inefficiencies.

3 - Targeted Advertising as an Implicit Recommendation and Personal Data Opt-out

Z. Eddie Ning, CKGSB, Beijing, China, Jiwoong Shin, Jungju Yu

Advances in artificial intelligence and data collection enable advertisers to better target individual consumers by predicting each consumer's preferences using their online and offline behaviors. In this paper, we show that when consumers have uncertainties about their preferences for unknown products, an ad that is targeted to a consumer can carry an implicit message: the advertiser's algorithm predicts that the product fits her preferences. This implicit recommendation influences the consumer's purchase decision, but also introduces misaligned incentives that are worsened as prediction technology improves. As the accuracy improves, consumer inference from targeted ads becomes stronger, but the advertiser's incentive to exploit this recommendation role of ads to affect the consumer's decision also increases. We show that when individual-level prediction becomes more accurate, the advertiser may use a less targeted advertising strategy due to stronger recommendations. Even under perfect accuracy, consumers can still receive ads for "bad products" and make incorrect purchase decisions. In equilibrium, a better prediction technology can lead to higher prices and lower consumer welfare, which gives consumers stronger incentives to opt out of data collection. Implications for personalized pricing and information provision are also discussed.

4 - Competing for Recommendations: The Strategic Impact of Personalized Product Recommendations in Online Marketplaces

Tianxin Zou, Assistant Professor of Marketing, University of Florida, Gainesville, FL, United States, Bo Zhou

Many online marketplaces (e.g., Amazon) use recommendation systems to personalize product recommendations for each customer. In practice, many recommendation systems are “profit-based,” recommending the product that maximizes the marketplaces’ expected profit from each consumer. We study how a marketplace’s profit-based recommendation system and its consumer profiling accuracy influence different participants in the marketplace. Under the profit-based system, sellers strategically adjust their prices to gain the marketplace’s recommendations to more consumers. We find that when the consumer profiling accuracy increases, the equilibrium price first decreases and then increases. Interestingly, a higher consumer profiling accuracy can decrease the sellers’ and the marketplace’s profits but increase consumer surplus. These results are driven by the interaction of three incentives of each seller when setting its price: to induce more recommendations from the marketplace, to extract more surplus from high-fit consumers, and to compete for consumers who do not rely on the marketplace’s recommendations to find the products. Counterintuitively, we show that incorporating the products’ pricing information into its recommendation system to maximize each recommendation’s expected profit can backfire on the marketplace. This result highlights the importance for the marketplace to consider the sellers’ strategic pricing response when designing its recommendation system.

■ FB02

Virtual Room 02

Pricing 2

Contributed Session

Chair: Giovanni Compiani, University of Chicago, Chicago, IL, United States

1 - Customer Reactions to Price Transparency and Dripped Surcharges

P.J. (Prabhanjan) Didwania, PhD Student, University of California, San Diego, San Diego, CA, United States, Karsten Hansen, Kanishka Misra

We run a series of field experiments to investigate the effect of price transparency and added dripped surcharges. We find that customers in certain groups (based on temporal distance and product value) react differently to various types of surcharges and amount changes to those surcharges. The studies run in this analysis are conducted by a multi-sided platform that focuses on entertainment options in a singular popular tourist destination. Clickstream data helps us show that consumers in fact spend more when price obfuscation takes place. Additionally, customers value upfront salience during the purchase process.

2 - Algorithmic Pricing

Madhav Kumar, MIT, Cambrige, MA, United States, Diego Aparicio, Dean Eckles

Algorithmic pricing can be broadly defined as a formula to set prices by a computer, and it is typically associated with a lower menu cost and a greater frequency of price changes. While traditionally observed in ride-sharing, lodging, and airplane tickets, there has been recent evidence of its implementation in pharmaceutical drugs, gasoline, and online retail. And little is known about how consumers respond to encountering frequently changing prices for goods. We use detailed clickstream data from an online grocery retailer that varied pricing methods, to examine how exposure to the frequently-changing prices characteristic of algorithmic pricing affects purchase behaviors. Both within-product and between-consumer variation in exposure to algorithmic pricing is exploited to estimate its effects on purchases, finding evidence that this exposure does modify shopping behavior. Additional analyses using laboratory experiments and eye-tracking field data are used to complement the main empirical findings of algorithmic pricing.

3 - Pricing for Delivery: The Cases of Ecommerce and Consumer Goods

Phillip J. Lederer, University of Rochester, Rochester, NY, United States

The use of "uniform delivered" pricing has not been fully explained. By uniform delivered pricing we mean quoted prices including transportation cost independent of the geographical location of the buyer. In eCommerce and branded consumer goods such as P&G, Colgate, etc this pricing method is commonly used. Indeed the fact that consumer goods manufacturers have taken it as standard practice has not been generally recognized beyond suggestion of middlemen arbitrage opportunities. In contrast although many firms like Amazon use uniform delivered prices, many web and mail order firms do not. This talk explores explanatory factors little considered in the literature to explain these practices, such as: correlation of transport cost with price elasticity, competition with local retailers, geographical location of shipping sites and choices of pricing points. Several analytical models are used to examine the issues. Empirical data and case studies are presented supporting the results.

4 - Boundaries of Differentiated Product Markets and Retailer Pricing

Giovanni Compiani, University of Chicago, Chicago, IL, United States

In this paper, we study the effects of misspecified boundaries of competition on optimal retail pricing using store-level supermarket scanner data. We focus on two sources of misspecification. The first is a demand-side misspecification, which can arise from either defining the product market to be too narrow or specifying an overly restrictive model of demand. This is especially relevant in widely differentiated product markets such as salty snacks or juices, where goods are broadly related but in ways that may not be immediately obvious a priori. The second is a supply-side misspecification, which can arise from the retailer separately optimizing prices within each category but failing to account for (and thus internalize) cross-category effects. Quantifying the costs associated with either form of misspecification is challenging because it requires a flexible yet valid demand system. To this end, we take a nonparametric approach to estimating a multi-category demand system that imposes minimal restrictions on the sign/magnitude of cross-price effects and also satisfies key properties required by economic theory. We then estimate the model and compute optimal prices for a variety of product groups to demonstrate the relative impact of misspecified demand and supply-side boundaries of competition.

■ FB03

Virtual Room 03

Influencer Marketing 6

Contributed Session

Chair: Zijun (June) Shi, HKUST, Marketing Department, LSK Business Building, HKUST, Hong Kong, NA, Hong Kong

1 - Influencer Generated Organic Product Review and Firm Strategies

Shiwen Gao, National University of Singapore, Singapore, Wei Shi Lim

In recent years, influencer generated product reviews have gained fast growing popularity among consumers. As consumers generally value influencers' authentic content, a large proportion of the popular product reviews seen online are organic. By viewing these organic reviews, consumers could infer their product fit through the information provided although their product tastes/horizontal preferences might differ from that of these influencers. Furthermore, influencer reviews generally offer vastly different levels of information. In this paper, we investigate the strategic interaction between an influencer's organic review and the firm's information disclosure strategies. Specifically, we focus on the informational role of the influencer to examine whether and how the review informativeness is affected by her follower size, product complexity, and consumer search. We find that given a sufficiently small consumer search cost, an influencer's organic review either hurts the firm's profit or makes no impact. Furthermore, regardless of the level of product complexity, a less influential influencer (i.e., having a smaller number of followers) is potentially more harmful to the firm than a more influential one. We also discuss the impact of the additional information provided by the influencer on consumer surplus.

2 - What is the Role of Mega-influencers in Live Streaming E-commerce? – A Natural Experiment

Shaohui Wu, University of Science and Technology of China, Hefei, China, Honglong Wang, Guoxin Li

Live streaming e-commerce is becoming prevalent and its rapid rise attracts much attention from marketing and information systems fields. In this paper, we examined the impact of mega-influencers on the live streaming e-commerce platform. Based on a large-scale dataset, we explored what other influencers' consumers' visits and gross merchandise volume change when mega-influencers left in the live streaming platform. We found that mega-influencers have significant effect on leading consumer visits to other influencers. When the mega-influencers left, the unique visits of the platform significantly decrease. However, the impact of mega-influencers could be different on heterogeneous influencers. The decrease of visits mainly exist in the micro influencers. The impact of mega-influencers' left on macro influencers is limited.

3 - Growing Influence

Zheng Gong, University of Toronto, Toronto, ON, Canada

How do new firms grow and get established through their product design? I answer this question with theoretical modelling and empirical evidence on online influencer market. I develop a dynamic reputation model in which an influencer faces audiences with hetereogeneous tastes, and show that new influencers start their careers with niche topic and low advertisements in their contents. Over time, as influencers gain reputation, they broaden the range of topics they cover and include more advertisements. I test the model predictions with a new data from Wechat Official Account. Using machine learning methods to categorize topics and identify advertisements in the historical publications of the largest 1002 influencer accounts, I find strong evidence for these predictions. The model has further implications on the dynamics of ratings, and how different influencers react to big general interest events, which are also supported by the data.

4 - Matching Fashion Brands to Influencers and Consumers Using Social Media Postings

Zijun (June) Shi, HKUST, Hong Kong, Alan Montgomery, Ruohan Li

Influencer marketing is a fast-growing online customer-acquisition method that is being leveraged by a wide range of companies. This is especially true for the fashion and beauty product industries, where many firms spend over half of their marketing budget on influencers. Managing the recruitment of influencers is especially critical as the breadth of influencer types increases from only celebrity influencers to macro, micro, and nano influencers. Similarly from consumers' perspectives, it is important to follow the right influencers to get the desired recommendation and avoid information overload. In this research, we focus on developing a method to quantify fashion using images posted on social media sites to create a recommendation system for brands and users. Specifically, we use a deep neural network to derive interpretable style embeddings from the user's fashion postings. Using a Gaussian LDA approach, we develop a score that measures each user's fashion interests that may evolve over time. We take our fashion scores to match influencers with brands and also match users with influencers. Our proposed method allows brands to find influencers who have high consistency with the brand's positioning while at the same time retain authenticity with the influencers' image; and it also helps users identify influencers who share similar fashion interests with them.

FB04

Virtual Room 04

Customer Engagement in Online Communities and Social Networks

General Session

Chair: Martina Pocchiari, Erasmus University, Rotterdam School of Management, Rotterdam, 3062 PA, Netherlands

1 - The Effect of Digitizing Community Activities on Community Participation: Evidence from Meetup.com

Martina Pocchiari, Rotterdam School of Management, Erasmus University, Rotterdam, Netherlands, Jason M. Roos

Online (brand) community managers are increasingly offering digitized community activities to their members. At first glance, activity digitization appears cheaper and more convenient than face-to-face meeting options. However, digitizing community activities comes at the cost of the social benefits that members extract from community participation. Effectively, increased digitization could lower members' participation in the communities, and threaten the existence of the communities in the long run. In this research, we study how the extent of digitization of community activities affects members' participation intentions on Meetup.com. Using structural causal models and machine learning methods, including causal random forests and LDA topic models, we show that higher activity digitization has a negative effect on community participation, and that the effect is heterogeneous across members, activities, and community types. This study has practical implications for the sustainability of brand communities and communities of interest, and provides important insights for managers handling the transition to increasingly digitized community experiences.

2 - The Good, the Bad, and the Ugly: Social Dynamics in Virtual Support Communities

Ana Babic Rosario, University of Denver, Denver, CO, United States, Doreen E. Shanahan, Cristel A. Russell

The marketing discipline provides much evidence that virtual support communities (VSCs) help their members achieve their goals. Yet, in other disciplines, evidence is mounting that the social dynamics within virtual communities can also involve judgment and pressure that hurt community engagement and bonds. Informed by a review of the literature and a qualitative study (netnography and interviews), we advance and test a model of the social dynamics in VSCs that accounts for the fact that these groups can be perceived as both caring and hurtful and thus generate a complex array of social processes and relational and engagement outcomes. Using structural equations modeling, we analyze cross-sectional survey data collected from 287 members of health- and wellness-focused VSCs. The study reveals the complex relational and engagement consequences of mixed social dynamics. Positive group perceptions can generate social empathy that ensures that the group's informational value is helpful to the members' goals. In parallel, negative group perceptions create social pressure, which can be helpful as it increases social empathy, but also detrimental to the relational and engagement outcomes if it turns into angst. The dual role of social pressure in VSCs suggests that it may be the source of both distress, a form of negative stress that we capture as social angst, as well as a source of positive stress or eustress, which can increase community engagement. We hope that these novel insights into the paradoxical social dynamics inherent to VSCs will motivate further research in online communities.

3 - The Effect of External Events on Online Community Resilience

Yaniv Dover, The Jerusalem School of Business Administration, Hebrew University, Jerusalem, Israel

Online communities are becoming increasingly important for companies and brands. Online interactions become even more important during brand-related events that can make or break a customer community - such as product-harm crises and investor events. A common perception of brand managers is that negative events, which affect communities should be strongly censored and positive events encouraged. In this study, we assess the impact of external, brand-related events on members' activity in online brand communities, and on the properties of the social networks underlying the communities. In the empirical context of online sport communities, we integrate structural models with social network analyses to show that contrary to current beliefs, negative events increases engagement and participation within online communities, relative to positive events. Furthermore, social networks after negative events appear less fragmented, denser, and with sparser ego-networks. This study supports community managers in maintaining their community in times of crisis, and in creating more value for their members during advantageous times.

4 - Bittersweet in Visual Narratives: How Emotional Shift Amplifies Consumer Engagement

Ka Wing Chan, University of New South Wales, Sydney, Australia, Junbum Kwon, Srikaanth Srinivasan, Felix Septianto

Effective sequencing for visual narratives is important for a variety of contents such as book, movie, and video advertisement. One manifestation of visual narrative is carousel content, which has been actively promoted by social media platforms because the composition of multi-images is a form of storytelling. By analyzing 10,211 carousel posts with 43,206 photos across 19 media publisher's Instagram accounts, this research finds that carousel posts with a greater number of shifts between contrasting emotional valences (positive vs. negative) receive a greater number of comments and likes. This effect is robust even after accounting for a range of other factors. A follow-up experiment also supports causality and provides initial evidence on the role of emotional ambivalence in driving this effect. These findings thus substantiate the growing demands on carousel contents on social media and extend the knowledge on how to improve visual narratives using emotional shift.

FB05

Virtual Room 05

Retailing/New Markets

Contributed Session

Chair: Elliot Shin Oblander, Columbia Business School, New York, NY, United States

1 - Wheels to Meals: Measuring the Economic Impact of Micromobility on the Local Economy

Kyeongbin Kim, Goizueta Business School, Emory University, Atlanta, GA, United States, Daniel McCarthy

Micromobility services have grown significantly in recent years, but their impact upon consumer purchase behavior has remained largely unstudied. We estimate how the largest and fastest growing subsegment of the micromobility market - the dockless electric scooter ('e-scooter') sharing industry - impacts consumer purchase behavior in the restaurant and other eating places sector, one of the largest segments of the local economy. Our study leverages a novel collection of data sources, including a unique credit card panel data set and data regarding the supply of e-scooters over time within twelve major cities. To obtain the causal effect of e-scooter usage upon spend in this sector, we use an instrumental variables approach, together with coarsened exact matching and two-way fixed effects estimation. We find that e-scooter usage has a significant positive effect upon spending in this sector, but that this effect varies by category, with strong positive effects upon quick service restaurant and other food and beverage store spending and no effect upon sit-down restaurants. This effect is larger for individuals with higher income, and for businesses that sell at lower prices, have higher market shares and higher penetration. Taken together, the results imply that e-scooter activity's economic spillovers for this sector are largely driven by an increase in unplanned purchase frequency. Our analysis suggests that these spillovers are economically significant, with existing e-scooter programs in cities such as Austin and Washington DC increasing sales in this sector over the second half of 2019 by approximately 0.5%.

2 - Manufacturer-retailer Relationships and the Distribution of New Products

Bowen Luo, University of Rochester, Rochester, NY, United States

Manufacturer-retailer relationships are often cited as an important determinant in product distribution. By coordinating the channel and aligning incentives, relationships can significantly affect both manufacturers' and retailers' profits and potentially contribute to market concentration. Yet, empirical evidence is scarce because relationships are usually trade secrets. I study how beer manufacturers leverage their relationships with retailers to promote new products in the U.S. hard cider market. I present novel empirical evidence on the effect of manufacturer-retailer relationships on new product distribution, and use industry regulations on trade and wholesale pricing to rule out alternative mechanisms, including non-linear contracts. I estimate a structural model of consumer demand, retail and wholesale pricing, and assortment, in which manufacturers and retailers can incorporate the relationships in their wholesale pricing and assortment decisions, respectively. The findings show that the relationships increase Anheuser-Busch InBev's and MillerCoors' new cider availability by 16.6% and 7.4%, respectively, and present a double win to both the manufacturers and retailers.

3 - Teaching an Old Fox New Tricks: How Sustained E-commerce Sales Lift From Pandemic Lockdowns Depends on Age

Maximilian A Kaiser, Peekd, Berlin, Germany, Florian Ellsaesser, Christian Schulze, Koen Pauwels

The global Covid19 pandemic and state-mandated closures of most offline stores in many countries led consumers to shift purchases online. But what happens after the lockdown is lifted, and does it depend on consumer age? We analyze e-commerce sales to answer this question with first party data from over 500 online retailers in Germany, Australia, Israel, and New Zealand. The panel covers physical products ordered online, totaling over $25 billion in revenue. Results show that e-commerce buyers under 65 years increased their revenue by 35%, then dropped to 16% growth post lockdown. Age group 65+'s revenue increased by 109% during the lockdown and remained at a growth rate of 78% after the lockdown, regardless of brick-and-mortar shops reopening. We discuss potential implications for off- and online managers in a post-Covid world.

4 - How Has Covid-19 Impacted Customer Purchase Behavior at Food Delivery Businesses?

Elliot S. Oblander, Columbia Business School, New York, NY, United States, Daniel M McCarthy

Since COVID-19 began to overtake the United States in March, the economy has undergone sudden and extreme shifts, disrupting consumers' food consumption patterns. In this project, we quantify the immediate and longer-term causal effects of COVID-19 on the customer base of the food delivery category - firms such as GrubHub, DoorDash, and Uber Eats - and decompose the mechanism by which these effects have arisen into their "causal paths," such as changes in income, compliance with government shutdown mandates, stay-at-home compliance, and reluctance to travel. We do so by leveraging a unique collection of "big data" sources, including a large credit card panel dataset, geolocation data, store employee timesheet data, and two large-scale scraped panel data sets from the websites of major restaurant meal delivery platforms, in addition to more traditional government data sources. We employ an event study approach, extrapolating from a parametric model to impute the counterfactual "baseline" customer behaviors that would have occurred had COVID-19 never occurred, allowing for flexible estimation of long-run effects. We then apply a fixed effects regression to disentangle the mechanisms driving these results. Our findings have significant implications for the economic impact of COVID-19 and the extent to which this category has benefitted from it, how much it has benefitted, and suggestive evidence of its longer-term effects.

■ FB06

Virtual Room 06

Online Marketplaces and Platforms I

Contributed Session

Chair: Shibo Li, Indiana University Bloomington, Kelley School of Business, Bloomington, IN, 47405, United States

1 - Seller Incentives in Sponsored Product Listings on Online Marketplaces

Mingyu (Max) Joo, Assistant Professor of Marketing, University of California-Riverside, Riverside, CA, United States, Vibhanshu Abhishek, Jiaqi Shi

Many online marketplaces offer sponsored product listings for third party sellers that are visually similar to and located within organic product listings, as a type of native advertising. The potential benefit of sponsored listings to sellers is non-trivial, as organic listings are already in order of inherent popularity and consumers may avoid to click "ads". This paper investigates a noble, field-experimental dataset from a large online marketplace, where both exposure and position of sponsored listings were randomized. In doing so, we find that click-through and conversion rates tend to be higher for sponsored listings in the lower positions, whereas those tend to be higher for organic listings in the upper positions. The empirical results suggest that sellers with low inherent popularity would be better off with the signal of advertising at the given position, while sellers with high inherent popularity would be worse off with the signal of advertising.

2 - Collaboration and Competition in Media Markets: The Strategic Interaction Among Publishers and the News Aggregator

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

News aggregators, such as Google News and Apple News, are posing an existential threat to news publishers. This paper examines on how a competing publisher should react to the entry of a news aggregator: (1) Should the publisher join the aggregator, (2) What content, if any, should the publisher share with the aggregator, and (3) How should the publisher modify its price structure in reaction to the news aggregator. We address these questions using a duopoly model where each publisher offers two articles on two diverse topics. First, we find that in the absence a news aggregator, inter-publisher competition is high because of publishers' inability to unbundle their articles. Second, joining a free aggregator becomes attractive to the publishers only when the aggregator generates new traffic. Then, depending on the advertising revenue accruing from each consumer eyeball, publishers let the aggregator access a) articles on different topics, in which case both inter-publisher and publisher-aggregator competitions coexist, or b) articles of the same topic in which case inter-publisher competition is fully eliminated. Third, if the aggregator permits publishers to collect micro-payments, both publishers join the aggregator but offer qualitatively different content. Even in the absence of additional traffic, publishers find it profitable to join a free aggregator that permits micropayments because such an aggregator enables publishers to unbundle their articles, soften inter-publisher competition, raise subscription prices and engage in price discrimination. Lastly, even a powerful aggregator that dictates the terms of the revenue-sharing arrangement with the publishers, earns positive profits without hurting the publishers' surplus.

3 - Spillovers Effects Between Online Marketplace and Online Store

Yongdong Liu, UCL School of Management, London, United Kingdom, Bilal Gokpinar, Yiting Deng

With the help of ecommerce platforms such as Shopify, it has become very easy for small business owners to set up online stores. At the same time, these business owners can also list their products on online marketplaces such as Amazon and eBay. While the products may face direct competition from similar products by competing sellers, being listed on online marketplaces can potentially enhance the seller's exposure to an established customer base. We examine the spillover effects between online marketplace and online store using a unique dataset consisting of purchase journey of individual consumers of an online cosmetics store. We find a positive spillover effect from product listings on an online marketplace, and that the effect is mainly driven by enhanced exposure.

4 - May I Have Your Attention Please? Digital Serialization as Cultural Entrepreneurship Strategy

Shibo Li, John R. Gibbs Professor of Marketing, Indiana University Bloomington, Bloomington, IN, United States, Jeffery S. McMullen, Amy Wenxuan Ding

Digital democratization has transformed the cultural economy, lowering barriers to entry and affording customers direct access to media content. However, it has also significantly increased competition and uncertainty, shifting much of the responsibility for preselecting cultural goods for potential consumption from cultural intermediaries to consumers. In response, artists as cultural entrepreneurs have used digital serialization as an economical strategy to signal product quality and capture the attention of both customers and cultural intermediaries. In this study, we identify the conditions under which the strategy is effective and offer theoretical insight into how and why cultural entrepreneurs might make better use of it in a marketplace with products of highly variable quality. Using hierarchical Bayesian modelling, we offer a discovery model of the digital publishing industry to explain the performance of cultural entrepreneurs employing a digital serialization strategy. We show that digital serialization can capture value in two ways: first by attracting the attention of customers in the digital literature market and second by attracting the attention of cultural intermediaries interested in adapting the e-book into a movie, TV drama, physical book, or digital game. We find that cultural entrepreneurs can target book reviews and book lists, making digital serialization effective. Furthermore, to the extent that customers and intermediaries use popular and critical acclaim as heuristics to discern quality signals from noise, book reviews or weekly book lists create a flywheel effect that makes the subsequent capture of attention easier. Finally, we find that the direct return enabled by digital serialization is best achieved by competing in more popular categories that promise enough customer attention to interest artists and intermediaries. Thus, we conclude that digital serialization is more efficacious for long-term success as "a small fish in a big pond" than short-term success as "a big fish in a small pond."

■ FB07

Virtual Room 07

AI-Demand

Contributed Session

Chair: Pan Li, New York University, Stern School of Business, New York, NY, United States

1 - Predicting Next Purchase Behavior From Shopping Basket Data Using a Supervised LDA Approach

Luis Aburto, Universidad Adolfo Ibañez, Santiago, Chile, Andres I. Musalem

Machine learning has experienced major growth in research and applications during the last years. In retailing, there are many opportunities to use the vast transactional and loyalty card information to improve predictions and support managerial decision-making. This work introduces a supervised Latent Dirichlet Allocation (LDA) model to classify shopping baskets and use them to predict the next purchase amount and the time of the next visit. The prediction of these two metrics are relevant for the design of incentives aimed at influencing customer behavior in the next shopping trip. The model is calibrated using loyalty card data. We rely on Latent Dirichlet Allocation (LDA) as proposed by Blei (2003), 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 a supervised LDA approach in a retailing setting, modifying the basic model to jointly estimate the latent shopping motivations and the relationship between these motivations and next purchase information such as the amount spend and time lag. We show that we outperform different supervised machine-learning methods to predict the next purchase using previous transaction information in an out-of-sample prediction test.

2 - Automatically Discovering Unknown Product Attributes Impacting Consumer Preferences

Ankit Sisodia, Yale University, New Haven, CT, United States, Vineet Kumar, Alex Burnap

Marketers use quantitative models of consumer preferences over products to understand and predict market demand. Conventionally, this requires the marketer to manually define which product attributes are relevant to model for the consumer. However, it is not always easy to understand from observational data which product attributes actually drive consumer demand. In this work, we aim to automatically discover attributes using a combination of machine learning and econometrics. We build on recent advances in disentangled representations to learn independent factors of variation--discovered attributes-in large-scale unstructured data (e.g., images). These discovered attributes are jointly inferred within an econometric model to simultaneously quantify their impact on an economic primitive (e.g., willingness to pay (WTP). Our approach does not rely on marketer judgment to discover attributes, yet outputs attributes that are semantically interpretable and statistically independent. This ensures discovered attributes are both economically important and interpretable to managers. We apply this approach to automatically discover visual product attributes of high-end watches auctioned at Christie's, in which the auction format ensures truthful estimates of WTP to permit causal identification of discovered attributes' economic impact. We evaluate discovered attributes along their semantic interpretability, statistical independence, and ability to explain variation within the econometric model. Our preliminary results for all three evaluation criteria indicate the proposed method has promise for automatic discovery of attributes that impact consumer preferences.

3 - The Impact of AI-based Diagnosis Systems on Medical Aesthetic Service Purchases

Mengxin LI, PhD student, Tsinghua University, Beijing, China, Lili Wenli Zou, Cheng Yi, Harry Jiannan Wang

With the advancement of technology and economic growth, an increasing number of consumers attempt to improve their appearance through medical aesthetic services. Medical aesthetic service purchases are often high-involvement decisions due to the fact that the services are usually expensive with risks and the decisions are tied to consumers' self-concept. To reduce the uncertainty and encourage trials, some medical aesthetic service platforms have introduced online diagnosis systems enabled by artificial intelligence (AI), such as deep learning computer vision algorithms, to analyze users' facial characteristics and recommend related products/services as well as promotions accordingly. However, empirical evidence regarding the economic consequences of deploying such AI-based diagnosis systems is lacking. Building upon consumer decision making literature, we explored the impact of users' usage of an AI-based diagnosis system on their purchases and its boundary conditions by analyzing a unique dataset obtained from a leading O2O platform of medical aesthetic services in China. Our data consists of anonymized demographic information and click stream records of 82,455 users from July to September, 2019. We found that system usage frequency had a U-shape, instead of linear positive, effect on purchase. Furthermore, users, especially those with lower physical attractiveness, are less likely to be influenced by the system when facing more complex (and thus riskier) medical aesthetic services. These findings provide evidence on the economic impact of AI diagnosis systems for medical aesthetic service platforms and shed light on better design and tuning of such systems.

4 - When Variety-seeking Meets Unexpectedness: Incorporating Variety-seeking Behavior Into Design of Unexpected Recommender System

Pan Li, New York University, Stern School of Business, New York, NY, United States, Alexander Tuzhilin

Variety seekers represent those customers who might get bored of the products they purchased before, and therefore prefer new and fresh content to expand their horizons. Despite its prevalence, the variety-seeking behavior has hardly been studied in the context of recommender systems. On the other hand, while unexpected recommender systems serve as a powerful tool to provide novel and fresh content for consumers and have the potential to address consumers' desire for product variety, existing unexpected recommendation models do not explicitly model the preferences of variety-seekers. In this paper we fill this research gap by proposing a two-stage recommendation framework in which we, first, utilize a novel deep-learning based model to automatically identify variety-seekers from the consumer groups based on their transactional histories, and then provide targeted unexpected recommendations for the identified variety-seekers to meet their needs. We show that by incorporating consumers' variety-seeking behavior in the design of unexpected recommender system, we can significantly increase various business performance metrics and also consumer satisfaction, as demonstrated through a large-scale online controlled experiment at a major video streaming platform. In addition, we show that it is beneficial to provide more unexpected recommendations for variety-seekers, and less unexpected recommendations to non-variety-seeking consumers. The proposed recommendation methods described in the paper are currently in the process of being deployed by the company.

■ FB08

Virtual Room 08

Online Badges, App Engagement, and Mail-in Rebate

General Session

Chair: Shengyu Zhu, Rochester, NY, 14620, United States

1 - Effect of Badges: Evidence From a Field Experiment

Mimansa Bairathi, London Business School, Regent's Park, London, NW1 4SA, United Kingdom, Anja Lambrecht, Xu Zhang

Online marketplaces with asymmetric information often employ quality signaling features like `badges'. However, little is known about the effect of badges on consumer behavior and market outcomes. Using data from a field experiment conducted on an online labour market, we examine the effect of badges on consumer search and purchase. We find that exposure to badges results in more search on the platform. Moreover, consumers who filter search results place more orders on the platform due to exposure to badges. This increase is driven by an increase in orders for both- services that get the badge as well as services that do not get the badge. Hence, we find positive spillover effects of the badge on both badged and non-badged services. We propose that consumers who filter search results are closer to a purchase decision i.e. have a higher propensity to purchase. Hence, additional search due to exposure to the badge increases the likelihood of finding a match and results in an increase in orders for both, the services that get the badge as well as the services that don't get the badge. We confirm our findings using multiple robustness checks.

2 - Consumer Demand under Mail-in Rebate Promotion

Shengyu Zhu, Simon Business School, University of Rochester, Marketing Department, Rochester, NY, 14620, United States, Yufeng Huang, Mitchell Lovett, James Prinzi

This paper studies consumers' inter-temporal decision-making on the mail-in rebate. By leveraging panel data from a large auto service and tire retailer in the U.S. consisting of over 14 million trips made by over 6 million consumers in 3 years, we find that limited memory causes redemption slippage. In the short run, firms can save the marketing budget via mail-in rebate promotion instead of an instant discount. Nevertheless, in the long run, the churn rate goes up by 5% for consumers who fail to redeem the rebate. Our result suggests that saving the marketing budget and preventing churn is a key trade-off of mail-in rebate promotion.

3 - Increasing Dynamic App Engagement with Peak-end Effects

Wei Lu, PhD Candidate, University of Toronto, Toronto, ON, Canada, Daniel Goetz

What evidence is there for peak-end effects in online apps, and can these effects be leveraged to increase engagement? We examine this question empirically using data from two popular free-to-play online games, and document three facts about user behaviour: app usage (games played) clusters temporally in sessions, negative outcomes tend to prolong sessions, and positive outcomes at the end of a session decrease time to the next session. We build and estimate a structural model of app usage that is capable of replicating these facts. Adjusting the matching algorithm that pairs opponents to decrease opponent skill over a session can increase expected usage by between 12.6% and 19.0%.

■ FB09

Virtual Room 09

Branding Strategy

Contributed Session

Chair: Amrita Mitra, Ivey Business School, London, ON, N6G ON1, Canada

1 - Multi-professional Collaborations and Product Success: A Case of the Popular Music Industry

Jiani Liu, Zhongnan University of Economics and Law, Wuhan, China, Yaxuan Ran

As an inherently collective creativity, the production of popular music combines multiple professions, including songwriters, producers, and performing artists, to work together. Although previous research has demonstrated the connection between collaboration and outcome performance, most research stems from the structure of the one-mode collaboration network, ignoring the different roles of professions (i.e., songwriter, producer, and performing artist) and their different impacts on creativity product performance. This study, therefore, argues that collaborations of popular music in the multi-professions network significantly predict their success. Using tools from network science, we construct a novel dataset for nearly 8000 songs that released during 1999-2019 and their credits information, allowing us to define the collaboration strategy (i.e., exploration vs. exploitation) among different professions of each song from a dynamic perspective. Specifically, the exploration strategy refers to the pursuit of innovations, in which all of the professional collaborators exhibit different styles or never worked together before. In contrast, the exploitation strategy refers to the efforts of maintaining and refining the existing resources (e.g., existing partners, styles). Contrary to the claim that music should reflect innovations as much as possible, we find an inverted U-shaped relationship between the level of a song's exploration and its success on Billboard's Hot 100 Charts. Furthermore, we find that the attributes (i.e., network status, genre diversity) of different professions moderate the relationship asymmetrically. These findings offer a new perspective on success in cultural market by specifying how multi-profession-based collaborators organize the creativity product performance and market reaction.

2 - Social Network Analysis for Identifying Co-branding and Extension Opportunities

Pankhuri Malhotra, Northwestern University, Evanston, IL, United States, Siddhartha Bhattacharyya

The use of co-branding and brand extension strategies, as a way to gain access to new markets and improve overall brand salience, has grown tremendously in the past few decades. Despite the continued success of alliances between brands belonging to diverse categories, there is surprisingly little or no research on identifying these broader cross-category effects using current digital approaches. In our work, we introduce a new, scalable approach for inferring cross-category branding insights using implicit brand networks on social media. Unlike traditional social networks that involve explicit interaction between the entities, links within a brand network are implicit and arise due to common followership between brands on Twitter. By incorporating directionality into the network edges, we capture the asymmetric relations among brand pairs and show which brands will benefit the most from a cobranding alliance. Asymmetry among brand pairs is also taken into account to calculate the 'transcendence' of brands onto new categories. Overall, the analysis is conducted over time to study the shift in brand transcendence and investigate its impact on emerging co-branding opportunities. To ensure the usefulness of our proposed methodology, all findings are validated against external survey ratings and extensive robustness checks are conducted.

3 - Cultural and National Values of Consumers' Perception in Logos

Merav Weiss-Sidi, Ben-Gurion University of the Negev, Beer-Sheva, Israel

The logo is the essence of the visual communication between consumers and products. This research examines the link between logos and the cultural values it represents. Moreover, the perceptions, preferences, and attitudes of consumers towards these logos. I explored the logo symbols and focus on the visual expression of Israeli-cultural values on the logos. The first study (N=104) investigated 63 symbols of well-known Israeli firms and examined the attitude towards the cultural aspects of the various components. The second study (N=507) examined the participants' attitudes about twelve logo symbols and ethnocentric consumer behavior scale. The results reveal that the features of the logo that were examined are positively correlated. Moreover, it appeared that it was possible to identify a clear scaling of the Israeli's cultural expression in the presented symbols. Some of the symbols that were graded as perceived to be highly [vs. hardly] Israeli. Regarding the visual characteristics, the use of the blue color and its shades, and the written language in symbols has positively affected the perception as an Israeli value. Significantly, the logo symbols displaying highly Israeli characteristics are perceived as higher quality and are preferred by consumers for food category over presenting of non-Israeli symbols. While consumers perceive positively brands in the technological category that express values as non-Israeli. Based on these findings, I suggested that there are some components in the logo symbol that are perceived as Israeli and impact the perception of the consumers of the brands. Practical implications allow marketers to characterize cultural values ideas by using visual elements, to effective persuasive appeals towards specific cultural target audiences.

4 - A Study of Rebranding of Multilateral Co-branding Alliances

Amrita Mitra, Ivey Business School, London, ON, Canada, Erik Mooi, Kenneth H. Wathne, Kersi Antia

Multilateral co-branding alliances—three or more independent firms operating under a single brand co-existing with individual participants' brands—pose unique governance challenges even while offering significant potential benefits on individual participants. The resulting risk-return trade-off informs the value each participant perceives from alliance participation and determines their extendedness—their intent to extend their association with the alliance. Importantly, participants' extendedness is susceptible to change due to so-called "transformational events" (cf. Harmeling et al. 2015). One such potentially extendedness-altering transformational event is a rebranding. Although rebranding may significantly alter alliance participants' risk-return trade-off, its impact has yet to be studied in a multilateral co-branding alliance context. We assess the causal impact of a rebranding on the extendedness of individual participants, relying on a Regression Discontinuity Design (RDD)-informed analysis of a unique database synthesizing multiple waves of survey-based and archival sales and financial performance data on 86 European banks participating in a multilateral co-branding alliance. We find that while rebranding serves to increases participant extendedness by 6.8% on average, the participant's prior value assessment is a key determining factor in assessing the effect of rebranding across the alliance participating members. As such, the "shadow of the past" helps to selectively inform the "shadow of the future". We also show that, on average, every 1-point increase in each bank's extendedness is associated with a 5.8% percent increase in deposits and loans, demonstrating a significant financial impact of rebranding on individual alliance participants.

■ FB10

Virtual Room 10

Issues on Advertising, Search and Platforms I

General Session

Chair: Joonhyuk Yang, Stanford University, Stanford, CA, United States

1 - Close Enough? A Large-Scale Exploration of Non-Experimental Approaches to Advertising Measurement

Brett R Gordon, Kellogg School of Management, Evanston, IL, 60208-0814, United States

Randomized controlled trials (RCTs) have become increasingly popular in both marketing practice and academia. However, RCTs are not always available as a solution for advertising measurement. In practice, RCTs can be technically difficult or even impossible to implement in many settings. Since the need to measure advertising effects does not go away when RCTs are infeasible, what should advertisers do? Using a representative sample of 1,009 experiments at Facebook, we attempt to answer this question using two non-experimental approaches. First, we use stratified propensity score matching, a method drawn from the program evaluation literature. This method performs poorly, with an average prediction error exceeding 1,500% of the causal effect of advertising. This poor performance comes despite using an extensive set of user-level covariates, a sophisticated machine learning model to estimate the propensity score, and over one million users per RCT. Our second approach uses predictive models based on simple proxy metrics, with the unit of analysis at the level of an RCT. This approach performs much better, achieving prediction errors between 30% and 60%. Finally, we examine whether an advertiser would reach the same conclusion about a campaign's success using either an RCT or a non-experimental method. We find that our best proxy metric-based predictive approach would lead an advertiser to reach the same conclusion in 80% to 95% of cases.

2 - A Bandit-based Experimentation System for Online Advertising

Harikesh Nair, Stanford University, Graduate School of Business, Stanford, CA, 94305-5009, United States

Online experimentation is now pervasively used by ad-platforms to help evaluate and enhance digital marketing campaigns. This talk describes an engineered experimentation system ("Comparison Lift") we developed and deployed for testing online advertising audiences and creatives at JD.com, an e-commerce company and a publisher of digital ads. The system provides experimentation-as-a-service (EaaS) to advertisers. Unlike many other EaaS tools that focus primarily on fixed sample A/B testing, Comparison Lift deploys a custom bandit-based experimentation algorithm. The advantages of the bandit-based approach are two-fold. First, it aligns the randomization induced in the test with the advertiser's goals from testing. Second, by adapting experimental design to information acquired during the test, it reduces substantially the cost of experimentation to the advertiser. Since launch in May 2019, Comparison Lift has been utilized in over 1,500 experiments by various advertisers. We estimate that utilization of experimentation has helped increase click-through rates of participating advertising campaigns by 46% on average. We estimate that the adaptive design in the experiments has generated 27% more clicks on average during testing compared to a fixed sample "A/B" design. Both suggest significant value generation and cost savings to advertisers from experimentation.

3 - Passive versus Active Search: Understanding the Role of Online Advertising in Consumer Search

Raluca Ursu, New York University Stern School of Business, New York, NY, 10012-1701, United States, Andrey Simonov, Eunkyung An

Online advertising spending on activities such as paid search, email marketing, display ads, or social media ads, is constantly growing. As a result, consumers browsing the Internet will be reached by advertising messages even while engaged in shopping-unrelated activities, such as checking email, reading the news, or visiting social networking websites. Nevertheless, these ads may expose consumers to purchase-relevant product information in a passive manner, not allowing them to choose the information they are exposed to, but only how to react to it. Correctly measuring consumer preferences and search costs requires understanding the type of search process consumers use (active or passive). However, this is challenging because data typically only reveal the information consumers obtained (e.g. quality, price), but not how they obtained it (actively or passively), while most models of costly search assume all search is active. In this paper, using a clickstream data set capturing the entire URL address of a website visited by a consumer, we make three contributions. First, we show how to classify clicks into active and passive searches using specific keywords indicating whether a click was redirected by an advertiser or was performed actively by the consumer. Second, we document that passive search is extensive and that it is more likely to occur early in the search process rather than close to a transaction. Also, we show that passive search typically involves searching fewer and more expensive products. Third, we propose a model where search can be either active or passive and document the estimation bias arising in models that assume all search is active, highlighting the importance of accounting for the type of search process consumers use.

4 - Platform Search Ranking, New Products, and Advertising as Information

Joonhyuk Yang, Stanford University, Stanford, CA, United States, Navdeep Sahni, Harikesh Nair

It is crucial for e-commerce platforms to display options that match the searching user's need. In doing so, platforms often rely on information about prior consumer engagements with products (e.g., clicks, sales and/or reviews). While this strategy has proven its effectiveness for well-established products, the challenge remains for new products for which platforms typically suffer from a lack of sufficient data points (i.e., cold-start problem). As a result, new products can be disproportionately discriminated at the stage of exposure to consumers. Guided by economic theories on advertising as information, we evaluate the value of sellers' advertising decisions in partially addressing the cold-start problem for new products. We conducted a large-scale field experiment that involves about 11.5 million users at an Asian e-commerce platform. The experiment assigned users into two treatment conditions: (A) new products' search rankings are boosted based on observables, and (B) new products' search rankings are boosted based on their advertising status plus the observables used in (A). We find both economically and statistically significant effect of using advertising information in product rankings - users are 0.13% more likely to place an order, and the number of orders increases by 0.24% when assigned to (B) relative to (A). We discuss the potential mechanism behind our findings and its implications.

■ FB11

Virtual Room 11

Political Marketing I

Contributed Session

Chair: Yunhao Zhang, Massachusetts Institute of Technology, Cambridge, MA, United States

1 - Intensified Ideological Online Clashes with Group Political Bias

Xintong Han, Concordia University, Montreal, QC, Canada, Mantian Hu

We collect the data from Hong Kong's major news media Facebook pages from 2019 to 2020 to examine the online ideological clash between pro-democracy and pro-Beijing parties. We show that the increase of pro-police comments in Simplified Chinese induced a stronger reaction from the opposite side with more comments promoting anti-police and supporting Hong Kong independence. We attribute the intensification of ideological clashes to the longstanding inherent bias among netizens after the "Official Character Simplifications" reforms implemented by the Communist Party of China in the 1950s. At the same time, the presence of bots greatly alleviated the intensification.

2 - How Political Ideology Shapes Customer Loyalty

Mike Lindow, Researcher, University of Utah, Salt Lake City, UT, United States, Keith Botner, Arul Mishra, Himanshu Mishra

Conservative and liberal consumers exhibit different marketplace behaviors which has broad implications on targeted marketing strategies. Past work has shown significant behavioral differences in political ideological groups that have downstream effects on brand loyalty and consumption. Conservatives are more responsive to fear and are motivated by risk aversion, while liberals tend to have more openness to new experiences and be more variety seeking. Drawing on past work examining the differences in ideological behavior, the construct of loyalty could be seen as a more traditional, or conservative trait. We examine whether liberals or conservatives will place a higher focus on loyalty both semantically and behaviorally. We conduct a semantic analysis of the loyal construct in six languages and conduct a field experiment considering spending habits across self-identified conservative and liberal consumers. We find that semantically across English several non-English languages, the construct of loyalty is more closely related to liberalism than conservativism, indicating a close link between liberalism and loyalty. We also find that liberal consumers are more likely to be loyal shoppers as shown in a lower dropout rate compared to conservative shoppers. We discuss theoretical and practical applications of these findings. This research is the first to demonstrate the influence of political identity on customer-specific dropout behavior and suggests a link between ideology and consumption. As firms feel more pressure to identify with a political identity, our findings have implications for how to find a best fit between brand and political identity.

3 - The Impact of Political Ideology on Consumers' Variety Seeking Behaviour in the Face of a Global Pandemic

Ada Choi, The University of Sydney, Sydney, Australia, Steven Qiang Lu, Jia Li

While the increasingly polarised political landscape has contributed to the divergence of political attitudes in recent decades, the emergence of COVID-19 pandemic has made the United States more politically segregated than ever. Indeed, political ideology does not only influence individuals' behaviour in politically related contexts (i.e. voting) but also plays an imperative role in consumers' choices of brands and products. Typically, conservatives have a stronger inclination for status quo and conformity, whereas liberals are more open to new experience and novelty, and these fundamental psychological differences are likely to affect their consumption choices. Recent research has attributed a number of consumer behaviour consequences to the intensification of political polarisation, however, much less is known about whether conservatives and liberals will differ in their variety seeking behaviour facing a global pandemic. Drawing an extensive set of demographic variables obtained from the United States Census, results of the 2020 presidential election and panel data that contains transaction details from supermarket chains across eleven states, this study compares and examines the impact of political ideology on consumers' variety seeking behaviour pre- and post-COVID. Understanding the multiplicity of these consumer decisions will contribute clear and actionable implications for operators in the retail industry, especially for those already struggling to meet changing consumer needs pre-COVID, and might likely to disappear in the foreseeable prolonged period of challenges and uncertainty.

4 - Motivated or Not? Information Friction Among Political In-group vs Political Out-group

Yunhao Zhang, Massachusetts Institute of Technology, Cambridge, MA, United States, David G. Rand

We find that Republicans and Democrats are less subject to the influence from their out-partisans than their co-partisans when completing non-political tasks. To identify whether such political identity-based discrimination is based on motivated reasoning toward an influence's political identity, we propose a novel experimental design to identify political-identity based motivated belief through the lens of belief-based utility. The results indicate that subjects do not exhibit motivated reasoning toward the political identity of the influence. A follow-up study suggests that the political identity-based in-group vs. out-group bias in advice-taking is consistent with subjects' prior (they believe their co-partisans are actually better at the task than out-partisans). Finally, we examine whether subjects update their priors about Democrats and Republicans' task performance given a pro-co-partisan vs pro-out-partisan signal and find that subjects actually are willing to update their prior belief regarding task performance according to the given signal. Overall, this result suggests that friction of information flow across partisanship might happen because people indeed believe their own party's information is more valuable, yet informing people that the out-partisans are actually capable may change such belief.

■ FB12

Virtual Room 12

Diversity & Markets

Contributed Session

Chair: Justin T. Huang, University of Michigan Ross School of Business, Ann Arbor, MI, 48104-1754, United States

1 - Rising Above the Glass Ceiling: The Effects of Female Chief Marketing Officers on Firms' Marketing Spending and Performance

Nandini Ramani, Texas A&M University, College Station, TX, United States, Venkatesh Shankar

Increasingly, firms and their stakeholders are prioritizing gender diversity in their top ranks. Yet, research has largely overlooked the effects of executives' gender on firms' strategies and performance, especially as they pertain to marketing and the chief marketing officer (CMO) in particular. Addressing this gap, we examine the effects of a female CMO on the firm's marketing spending and firm performance. Building on upper echelons and gender differences theories, we develop hypotheses of the effects of the female CMO on two key components of marketing spending (advertising and SG&A) and on two measures of performance (profitability and firm value). In addition, we examine the moderating effects of other female members of the top management team (TMT), specifically, the presence of a female CEO and female CFO. We test these hypotheses using a propensity score matching combined with a Heckman selection model to account for selection bias. The results show that the presence of a female CMO increases both advertising and SG&A spending and improves firms' profitability. These effects are further enhanced by the presence of a female CEO. Although the CMO's gender is not directly related to firm value, the presence of a female CMO indirectly enhances firm value through advertising, SG&A spending and profitability. The findings offer valuable insights for managerial decisions and public policy on gender diversity.

2 - How to Become an Antiracist Brand

Dionne Nickerson, Assistant Professor, Indiana University - Bloomington, Bloomington, IN, United States, Omar Rodriguez-Vila, Sundar G. Bharadwaj

In the summer of 2020, shortly after the police killing of George Floyd, millions of people mobilized across the globe to protest racial inequality. In the wake of Mr. Floyd’s tragic death and global uprisings, many companies rushed to express support for the Black Lives Matter movement in their social media messages often communicating a commitment to focus on diversity, equity, and inclusion (DEI) work. Indeed Fortune 100 companies have pledged over $2 billion to support Black Lives Matter-related causes. Despite these efforts, there are no clear standards guiding managers’ actions as brands take social stands nor for assessing the quality of these stands. The proposed study takes a theories-in-use approach to answer the following questions: (1) What factors influence a brand's decision to support racial justice issues? (2) What are the consequences in the marketplace of taking a stand on racial justice issues? (3) What factors prevent a brand from taking a stand on racial justice issues? To answer these questions, we will conduct in-depth interviews with executives from a variety of industries. We will also draw upon the extant marketing and management literature to derive managerial insights and conceptual themes to understand why brands take stands on racial justice issues. This work will develop a conceptual model that identifies antecedents and consequences of brands’ stands on racial justice. The ultimate goal of this project is to provide insights for practitioners, academics, and communities on how a brand may become an “antiracist brand”.

3 - Black Lives Matter and Digital Platforms: Diversifying the Narrative in the Classroom

Ananya Sen, Carnegie Mellon University, Pittsburgh, PA, United States, Saharsh Agarwal

The past decade has seen the rise of digital platforms such as Uber, Airbnb and Kickstarter that have disrupted markets and created significant value. While a number of studies have shown ways in which such platforms can perpetuate structural inequalities in society, we ask whether such platforms can be a force for equality and inclusion. We quantify the impact of high-profile police brutality events in the US (2010-2020) on teachers’ online crowdfunding activities. We use proprietary data from DonorsChoose.org, the largest crowdfunding platform for public school teachers in the US, to identify `(anti) racism-related’ requests by school teachers. We use these as a measure of demand for race-related conversations in the classroom. We use a diff-in-diff analysis using the precise timing of these events and looking at requests before and after the event relative to a control group. We find a significant increase in requests with the effect being driven by the killing of George Floyd in 2020. These requests by school teachers are related to books written by African-American authors and those that have Black protagonists. The impact is higher in locations that witnessed protests in the aftermath of these events. We find that the effect spills over to requests for books related to other minorities such as Asian-Americans, Muslims and Immigrants, indicating potential positive effects for other marginalized communities. The effect is higher for schools in Democratic zip codes though Republican areas also see a statistically and economically significant increase in requests. We do not see any polarization or backlash on the platform with requests for `white-supremacist’ books. There is a market expansion effect with a significant increase in first-time teachers using the platform to make such requests. These requests have high rates of being successfully funded, indicating that thousands of students across the country got exposed to books on/by African Americans and other minority groups. Our results provide strong evidence of a digital platform mitigating structural inequalities in society.

4 - Discrimination in the Age of Trump And Covid-19: Social and Economic Impacts on Asian American Communities and Businesses

Justin T. Huang, Assistant Professor of Marketing, University of Michigan Ross School of Business, Ann Arbor, MI, United States, Julia Lee Cunningham, David Rothschild, Masha Krupenkin, Francesca Gino

The past year has seen a dangerous rise in discrimination and violence directed at Asian Americans. We track these events back to the onset of Covid-19 in the United States and statements by former President Trump directing blame for pandemic spread using terms such as 'Kung Flu'. Through a series of analyses combining survey data, online search trends, and consumer cellular device mobility data, we demonstrate how bias exacerbated by media impacts consumer search and eventually consumer choice. Our survey results provide a mechanism for how statements of pandemic blame directed at China can impact Asian American businesses, as respondents perceive Asian Americans as less American than other ethnic groups and overestimate the fraction of Asian Americans that are Chinese. These perceptions have downstream implications for consumer choice - mobility data shows Asian restaurants suffered a 10.9% drop (95% CI: -9.7% to -12.9%) in traffic relative to non-Asian restaurants in the post-pandemic period, with non-Chinese Asian restaurants experiencing larger drops in locations that voted for Trump in 2020.

■ FB13

Virtual Room 13

Digital Marketing

Contributed Session

Chair: Sarit Moldovan, The Open University of Israel, Department of Management and Economics, Raanana, 4353701, Israel

1 - The Role of Time in Customer Reactions for Scarcity Appeals

Woo Li Ko, Musashino University, Tokyo, Japan, Sungkyu Lee

Scarcity appeals are effective advertising tactics used by online booking platforms to influence consumers’ desirability of the products. This study examined the joint effects of two levels of scarcity appeals (low level vs. high level scarcity), and the time, such that how much time is remaining from the travel date (short vs. long) on purchase intention. The first finding indicates when the timing remaining from the travel date is close, a high level of scarcity appeal increases the positive attitude toward the advertising but has no significant influence on the purchase intention. It suggests that a firm’s marketing manager needs to consider utilizing a scarcity appeal to achieve a positive attitude toward advertising though it does not guarantee to improve a consumer’s purchase intention when the time remaining from the travel date is close. The second finding indicates when the timing remaining from the travel date is far, a low level of scarcity appeal increases the positive attitude toward the advertising and purchase intention. This result indicates a firm’s marketing manager should use a low scarcity appeal to increase a consumer’s attitude toward the advertising, in turn, an increase of purchase intention when the time remaining from the travel date is far. The present research leads to a rationale for disparate advertising strategies of a scarcity appeal to successfully achieve a positive attitude toward advertising and purchase intention with considerations of the temporal distance of a consumer’s hotel booking. Specifically, this research suggests a marketing manager needs to differentiate scarcity messages according to the temporal distance of a consumer’s booking.

2 - The Influence of Access-based Consumption on Consumers' Self-interested Behaviors

Lijing Zheng, The University of Hong Kong, Hong Kong, Liyin Jin, Echo, Wen Wan

The digital technology enables the growth of access-based consumption mode. People engage in consumption by accessing to the products without obtaining ownership of the products. In this research, we examine the impact of access-based consumption mode on consumers’ self-interested behavior in unrelated contexts. We differentiate between company-to-customer business model, in which companies are the owner of access-based products (e.g. Bird, Lime), and peer-to-peer business model (e.g. Airbnb, Uber), in which companies play the role of intermediary between individual owners and consumers. Across one field study and four controlled experiments, we demonstrate that engaging in the company-to-customer access-based consumption mode makes consumers more self-interested in general. This tendency is captured by both self-reported measures (e.g. social orientation scale, trade-off between self-interest and others' interest) and real behaviors (e.g. stewardship behavior, public goods game). We further show that the increase in self-interested behavior in general is due to a reduced sense of responsibility to the accessed products and to other people. In the peer-to-peer access-based consumption mode, the negative effect on consumers’ self-interested behavior does not occur. We further demonstrate that by increasing extrinsic motivation (i.e. salience of contract and social presence), the negative effect of access-based consumption mode on consumers' self-interested behavior will be mitigated. Our work contributes to the literature by identifying a novel negative consequence of access-based consumption and reveal the underlying mechanism. It also makes managerial contribution by suggesting two feasible solutions.

3 - Too Much of a Good Thing? How Incongruent Signals of Popularity Diminish Product Appeal

Sarit Moldovan, Professor, The Open University of Israel, Raanana, Israel, Meyrav Shoham, Yael Steinhart

A high volume of sales or online reviews can make a product seem more popular and established and consequently enhance its appeal. However, sometimes these two signals are incongruent: The volume of sales considerably exceeds that of the reviews, or there are many reviews compared to the sales volume. We focus on the interplay between the volume of reviews and sales, and explore what happens when these signals are perceived as congruent versus incongruent. Findings from five studies, including an analysis of real-world data, demonstrate the implications of various incongruities between the volume of reviews and the volume of sales. When consumers perceive the ratio of reviews to sales as incongruent, they make unfavorable inferences that reduce product appeal. We further show that there are two types of incongruities lead to distinct inferences: when the volume of sales clearly exceeds that of the reviews, consumers infer that the product was not popular enough with fellow consumers to spur them to write reviews. When there are many reviews compared to sales, consumers question reviewer trustworthiness, as it is unclear who posted these reviews given the volume of sales. The effects are attenuated when justification is available for each type of incongruity between review and sales volumes: Many sales compared to reviews can be justified if the product is new, and buyers did not have time to review it. Many reviews compared to sales is justified if the platform allows reviews by non-buyers. We discuss the results and their theoretical and managerial implications.

Friday, 11:30AM - 12:30PM

■ FC01

Virtual Room 01

Theory Models

Contributed Session

Chair: Qihong Liu, University of Oklahoma, Department of Economics Norman, OK, 73019, United States

1 - Product Upgrade with Secondhand Market: The Case of Smartphone

Yeon Ju Baik, PhD Student, University of Wisconsin Madison, Madison, WI, United States

Fast progress in technology and the new device's rising cost make the second-hand cell phone market proliferating. Since second-hand product and a new device can be a substitute, the manufacturer has to carefully decide pricing, release, and investment strategy that can consider potential cannibalization effect from the secondary market and the profits from the primary market. This paper provides a model of monopolistic manufacturer's investment and new product release decisions considering the trade in the secondhand market. The market equilibrium effect is investigated by building a theoretical model to capture consumers' choices and the linkage between the primary and secondary markets. The model extends the two-period decision framework of Hendel and Lizzeri(1999) and Yin et al. (2010) to a dynamic structure that endogenized the firm's investment and release decisions. I quantified the effect of friction in the secondhand market and the technological progress on the market equilibrium. The model suggests the probability of new release increases as the technology gap between consecutive models gets narrow and the friction in the secondary market increases. Manufacturers would intend to intervene in the secondary market by increasing frictions to release newer models frequently. In the empirical analysis, the decreasing gap between the new releases has a positive relationship with the expansion of secondary market trade and slowing technological progress. Model prediction and empirical evidence explain why smartphone manufacturers actively engage in trade-in programs which raises friction in the secondary market to reduce the cannibalization effect and frequent new releases.

2 - Competition and the Infantilization of Markets

Luc R. Wathieu, Professor, Georgetown University, Washington, DC, United States

This analytical paper explores the link between the diminution of shopping costs and the specialization of firms towards infantilizing products that accentuate immediate experiential benefits and don't perform as well in terms of outcome satisfaction. We assume a duopoly where firms select product features along experiential and outcome attributes, and set the price of their product. There are two periods. Product design decisions last for two periods, whereas prices can be adjusted in each period. In addition to price, consumers pay a shopping cost to check any offering at the beginning of each period. Consumers value outcomes more than experience, but experience is observed directly after purchase, while outcome is delayed and subject to random circumstances. We find that the balance between experiential and outcome attributes tilts towards experiential attributes when the shopping cost goes down. This, contrary to intuition about the advantages of lower shopping costs, leads to less welfare and more profits. The model is preceded by a review of economic thought about "infantilization" and the meaning of "experiential marketing."

3 - Advertising Content and Viewer Attention: The Role of Ad Formats

Qihong Liu, University of Oklahoma, Norman, OK, United States, Anthony Dukes

Ad content and viewer attention are strategically intertwined. Consumers watch an ad only if they expect sufficient benefit to doing so and advertisers structure ad content (information and entertainment) to make it attractive for consumer attention. We conceptualize these strategic interactions as a game and then derive viewer attention and ad content choices as an equilibrium. Equilibrium outcomes are moderated by the ad format - either skippable or non-skippable. Our analysis indicates that (i) relative to non-skippable ads, costly entertainment has lower return under the skippable format; (ii) an advertiser can structure content to induce curiosity for continued viewing; (iii) inducing curiosity is most effective for ambitious advertising goals; and (iv) the skippable format is better suited for less ambitious advertising goals, such as brand awareness, when attention-spans are shorter. Finally, we connect our findings to outcomes observed in practice.

■ FC02

Virtual Room 02

Pricing - Structural

Contributed Session

Chair: Sohum Mehrotra, Indiana University at Bloomington, Bloomington, IN, United States

1 - Dynamic Pricing and Reference Price Effects

David Z Prakash, LMU Munich School of Management, Munich, Germany, Martin Spann

Dynamic pricing enables online retailers to dynamically adjust prices in response to demand and supply conditions. However, dynamically changing prices may also affect how consumers assess current retail prices compared to their reference prices. This paper studies the effects of dynamic pricing on consumer purchase behavior in a field experiment at an electronics retailer. We systematically manipulate 181 products in two dimensions of dynamic price variation (amplitude and frequency) and estimate internal reference prices. The study uses a full-factorial 2 (amplitude high/ amplitude low) x 2 (frequency high/ frequency low) experimental between-products design. We find an asymmetric reference price effect on sales as well as a moderating impact of dynamic price variation on the reference price effect. Customers react strongly to price increases but not to price reductions at this retailer. However, higher variance of prices in either dimension (i.e., amplitude or frequency) attenuates the reference price effects. The study concludes that high price variation in dynamic pricing may provide an additional benefit for retailers by reducing potentially detrimental reference price effects on sales.

2 - Dynamic Competition in The Era of Big Data

Elena Pastorino, Stanford University Department of Economics, Stanford, CA, United States, Patrick Kehoe, Bradley Larsen

The advent of rich and highly--detailed information on individual web--browsing and purchase histories---an instance of so--called Big Data---has begun to make feasible sophisticated forms of personalized pricing, heretofore considered too informationally demanding to implement. We argue these pricing strategies are especially relevant in markets for differentiated experience goods. Taking the view that this ability to price discriminate both intertemporally and interpersonally will become increasingly relevant in the future, here we investigate its implications on the dynamics of prices and on efficiency in such markets. In particular, we derive a simple characterization of the equilibrium pricing rule that shows how prices contain a variety--specific dynamic component that depends on the relative informativeness of competing varieties about consumers' tastes. Over time, this pricing rule leads to discontinuous price changes that take the form of fluctuating price discounts for a given consumer. We provide evidence on the gains associated with these sophisticated forms of price discrimination using data on individual consumers' purchases of Apple and Samsung products over time. We estimate primitives in the setting in which firms use the uniform pricing rule we observe in the data and then simulate the counterfactual world with first-degree price discrimination. We find that a significant fraction of consumers are better off under price discrimination relative to uniform pricing, as price discrimination intensifies competition for each individual consumer. Consumers worse off under price discrimination are those who are a good match for only Apple or Samsung. Firm profits from these consumers are correspondingly higher under price discrimination.

3 - Brand-Loyalty-Driven Competitive Price Promotions

Dan Horsky, Professor, University of Rochester, Rochester, New York, NY, United States, Polis Pavlidis

Recent game theoretical results suggest the use of price promotions by competing profit maximizing manufacturers of brands of frequently purchased consumer goods may stem from the existence of the consumer phenomenon of brand loyalty. We thus investigate empirically whether managers of brands in categories in which consumers do not exhibit loyalty do not offer price promotions, whereas for brands in categories where loyalty exists, the frequency of offering price promotions is positively related to the magnitude of consumer loyalty. We examine brands from 20 product categories that are part of the IRI household panel data set. We use an MCMC algorithm to jointly estimate,models of consumer demand and price promotion supply, of all 20 categories, thus addressing the issue of non-random marketing mix variables. We find, that in all product categories, consumers exhibit brand loyalty and brands offer price promotions. Moreover, controlling for category, store, and brand factors, brands with higher consumer loyalty effects indeed offered price promotions more frequently.

4 - Dynamics of Consumer Static and Forward-looking Decision Rules and its Impact on Purchase

Sohum Mehrotra, Indiana University at Bloomington, Bloomington, IN, United States, Jingcun Cao, Amy W. Ding, Shibo Li

Brand managers seek improved understanding of consumer decision rules to improve business revenue and profits. However, empirical marketing research on the dynamics and impacts of such decision rules is scant. To fill this gap, we propose a novel model to investigate the dynamics of consumer structural heterogeneity in terms of unobserved time-varying decision rules (static vs. forward-looking), and their impact on purchase over time. The model also accounts for customer cross-sectional heterogeneity. To estimate and validate the proposed model, a hotel-booking clickstream dataset is used. Our results demonstrate the presence of consumer decision rule dynamics, and that the proposed model outperforms benchmark and conventional models that do not consider both decision rules. Further, price and promotion effects could be over-estimated in traditional models not accounting for decision rules dynamics. Therefore, this research provides important actionable implications for marketing practitioners on the improvement of their pricing and promotional strategies.

■ FC03

Virtual Room 03

Influencer Marketing VII

Contributed Session

Chair: Charlene Chu, Chapman University, Orange, CA, United States

1 - Influencers' Versus Brands' Own Livestreaming Impacts on Sales

Yanwen Wang, University of British Columbia, Vancouver, BC, Canada, Shuai Yang, Hongju Liu, Zining Wang

Livestreaming e-commerce has experienced explosive growth in 2020. Livestreaming allows influencers and brands to connect with audience and promote products in live shows. We compiled a unique data set that combines daily level livestreaming records with product sales. We empirically investigate the impact of livestreaming on sales in the short and long term. We decompose the livestreaming sales lift into purchase timing acceleration, product switching, and category expansion. Next, we provide empirical evidence on the variation in a brand' strategy to choose to collaborate with individual influencers or to do livestreaming on its own. We compare the sales lift differences between brands' own and individual influencers' livestreaming. The results suggest that the sales lift differences between the two forms of livestreaming are likely due to different levels of integration of livestreaming videos in the search process, as only brands' own livestreaming videos are seamlessly integrated in the product search landing page.

2 - Optimizing the Use of AI-powered Virtual CGI Influencers for Social Media Marketing – A Structural Model Analysis with Instagram Data

Serim Hwang, Carnegie Mellon University, Pittsburgh, PA, United States, Xiao Liu, Kannan Srinivasan

Computer-Generated Imagery (CGI) virtual influencers have rapidly gained popularity since their debut in 2016. Brands, such as Calvin Klein, Dior, and Porsche, expect that these AI-powered influencers may offer significant potential benefits, so they have partnered with them to create branded content. Among 137 virtual influencers' Instagram posts published between 2016 and 2020, 287 brands have sponsored virtual influencers. Meanwhile, human influencers are becoming costly and have limited ability to increase consumer engagement, leading to face an "influencer crisis." Furthermore, as AI investors continuously invest in creating and upgrading these AI-powered influencers, virtual influencers are becoming an attractive alternative for brands to sponsor. Yet, no research has examined the brand's optimal decision when sponsoring either influencer type — subsequently, no research has studied either type of influencers' optimal branded content strategies. We employ the dynamic structural model to account for the tradeoffs of choosing between human and virtual influencers. For our study, brands are on demand-side to hire influencers, and influencers are on supply-side to create branded content. Following the literature, we incorporate content determinants (e.g., emotional/personality factors, motivational factors) and external determinants (e.g., social influences). Then we model the difference between two influencer parties by characterizing their textual & visual humanity with deep learning models and the originality of influencers with fixed effects. By estimating the impact of humanity upon consumer engagement, we will implement a counterfactual analysis of producing celebrity-faced virtual influencers. Recently, tech start-up companies (e.g., Unreal Engine) are making available a simple, browser-based Graphical User Interface (GUI), allowing human influencers to create high-fidelity 3D human characters. Our paper evaluates how such virtual 3D character influencers can be profitable to human influencers.

3 - When Does a Brand-influencer Matching AI Backfire?

Yi Liu, University of Pennsylvania, Philadelphia, PA, United States, Jessie Liu

In this paper, we consider a social media platform where marketers are matched with influencers through AI technology. We find that it is not always in a platform's best interest to adopt such AI technology. Even when AI adoption is preferred, a platform does not necessarily have the incentive to perfect its AI prediction accuracy, even if the implementation cost is negligible. The results rise from two countervailing effects on the participation incentives of influencers, which in turn affects the platform's profit. On the one hand, influencer marketing generates higher sales from a better influencer-marketer match, which benefits both influencers and the platform as they share a commission proportional to sales. On the other hand, users may stop following an influencer if they bought a low-quality product via the influencer's recommendation channel. The former "sales effect" induces the influencer to participate in a marketing campaign, whereas the latter "quality concern effect" deters one from doing so. Furthermore, the proportional size of loyal followers moderates the trade-off between these two effects. We derive conditions under which adopting such AI technology is profitable for a platform. We also extend our baseline model to study when and how a platform should integrate its AI strategy with its communication strategy for product quality assurance.

4 - Less is More: The Effect of Influencer Reach on Consumer Engagement and Persuasion Knowledge

Charlene Chu, Chapman University, Orange, CA, United States, Cristina Nistor, Ekin Pehlivan, Taylan Yalcin

Influencer marketing is being used more and more as brands attempt to engage consumers across the world. Social media influencers create organic and sponsored content that engages and attempts to persuade their followers about brands and products. We use three novel datasets to analyze the effect of influencer reach on consumer engagement and persuasion knowledge. Our results indicate that the number of followers (the influencer's reach) affects the consumer engagement with the content created by the influencer. We find that smaller influencers are able to engage consumers more deeply than large influencers. Moreover, influencers with a larger reach are less likely to be regarded as credible in sponsored posts, suggesting that persuasion knowledge plays a key role in the ability of smaller influencers to engage consumers more deeply. The managerial implications are notable: influencer advertising is an effective promotional tool, but the reach of the influencer is an important consideration for marketing managers as the level of engagement and perceived credibility of the source and message depend on the reach of the influencer.

■ FC04

Virtual Room 04

Social Media Engagement

Contributed Session

Chair: Jun Yan, Huazhong University of Science and Technology, Wuhan, China

1 - Weather Abnormality Effects on Social Media Behavior and Category Sales

I ıl Büdeyri Turan, PhD Fellow, Özye in University, Istanbul, Turkey, M. Tolga Akçura

Variations occur in consumer behavior, the reasons of which cannot always be measured or understood explicitly. Being among factors affecting human physiology and psychology, weather conditions provide means to explain these variations at some context, and can be further used to predict sales and improve the accuracy of sales forecasting. Moreover, literature indicates weather affects mood and behavior, and such effects may be observable online given the prevalence and penetration of social media. Abnormalities in weather conditions may even create a more distinctive and evident impact. This study, therefore, examines the effect of abnormal weather conditions on sales volume, social media sentiment and use intensity, and proposes an econometric model. In the model, sales volume, social media intensity, positive and negative valence are jointly modeled using monthly data. The data cover six-years category level beer sales and social media metrics including Facebook, Twitter, Instagram, YouTube, blogs and others. A daily analysis indicates that weather influences social media use at granular level. Increasing abnormal temperatures negatively influence sales volume, social media use intensity, and positively influence negative valence. The model allows for social media's influence on sales both at lags and contemporaneously. The study extends the scope of weather-marketing studies and generates important implications for managers, advertisers and researchers.

2 - Impact of Nature of Brand Crises on Online Consumer Polarization – Insights From a Network Analysis of Twitter Data

Sayan Gupta, PhD Student, University of Pittsburgh, Pittsburgh, PA, United States, Vanitha Swaminathan

In the wake of an increasingly opinionated and polarized social media landscape, we investigate social media firestorms (Pfeffer et al. 2018; among others), and their impact on polarization of Twitter sentiment through a potential underlying mediating process - network-level controversy. We employ a differences-in-differences event-study approach on a cross-industry sample of ~600 events over the period 2015-19 to provide evidence for the hypothesis that values-based brand crises behave differently from functionality-based crises (Dutta and Pullig 2011; among others) in terms of Twitter conversation network characteristics (Garimella et al. 2018), and consequently, on sentiment dispersion (Bramson et al. 2016). Our findings indicate that although the two types of crises in our sample cause comparable levels of volume increases and valence dips in brand-related Twitter conversations in their aftermath, values-based crises lead to increased network controversy scores (indicating higher insularity and clustering of discussions) which subsequently result in reduced sentiment dispersion. On the contrary, network controversy scores as well as sentiment dispersion undergo no significant changes in the aftermath of functionality-based crises. The study's findings are expected to assist managers in taking remedial actions against social media firestorms through network-level interventions - for example, by seeding influencers or planting conversation topics. We thus contribute to marketing literature by taking a first step in investigating social-media polarization as a consequence of brand actions, while also demonstrating theoretical and managerial applications of this in the context of brand crises events in marketing.

3 - The Impact of Brand-related User-generated Content Functional Appeal on Social Media Engagement: Moderating Role of Physical Attractiveness

Yuhua Liu, Renmin University of China, Beijing, China, Xia Wang

Brand-related user-generated content is one of the main channels for consumers to obtain information about products and brands. Prior work points to the content characteristic as a driver of social media engagement, but research into functional appeal and user's profile image is scant. We adopt the Heuristic-Systematic Model to understand how textual information characteristic and visual information source characteristic influence social media engagement. Specifically, we analyze the impact of functional appeal (systematic cue) on social media engagement, and test the moderating role of user's profile image physical attractiveness (heuristic cue). Based on the data of skincare products from Xiaohongshu App, we use XGBoost machine learning classification algorithm to get the functional appeal, and use Baidu AI's face recognition algorithm to get the physical attractiveness. The two-stage least square method (2SLS) is used to verify the model. The findings suggest that the functional appeal has a significant positive impact on social media engagement, and the physical attractiveness has a positive moderating effect on it. This moderating effect is consistent with the bias effect in the Heuristic-Systematic Model. This study uses machine learning algorithm to process unstructured data to explore the impact of textual information and visual information source characteristics, and examine the bias effect in the Heuristic-Systematic Model. The Results brings meaningful suggestions to brands on effective blog campaign.

4 - Rewarding You or Your Friend? Enhancing Virus Spread of Social Media Advertising

Jun Yan, Professor, Huazhong University of Science and Technology, Wuhan, China, Siqi Cheng, Yaping Chang

It is recognized that users' voluntary forwarding of ads can greatly reduce the spread costs for advertisers on social media, enlarging the benefit of "earned media". But advertisers are facing the big challenge to motivate social media users forward their ads because users may not be willing to forward pure commercial messages out of compliance with social norms. One of the effective tools to solve this problem is inserting incentive strategies into ads, such as offering a coupon. But whom should the coupon target? The sender or the receiver? This study examines the effect of rewarding user vs. user's friend on the forwarding behavior of the ads posted on social media, as well as the moderator role of user's social capital. Through two experiments on Wechat, we found: 1) the two strategies are not significantly different in creating forwarding behavior, but difference appears when distinguish users by their social capitals; 2) for high social capital users, "rewarding you" coupon gains more positive forwarding than "rewarding your friend" coupon. For low social capital users, the outcome is opposite. 3) the motivations of two segments are either different. High social capital users are driven by social belonging. While low social capital users driven by utilitarian. The present research contributes to literature and practitioners in two ways. First, it is a pilot examination on a pair of incentive tools that usually be misused in promoting virus spread. The finding alerts advertisers consider the right match of incentive tools with the targeted users' social capital that can be easily observed on social media. Second, the research reveals the underline motivations of high vs low social capital users in forwarding social media advertising, which implies that advertisers can obtain "earned media" by stimulating different motivations.

■ FC06

Virtual Room 06

Online Marketplaces and Platforms II

Contributed Session

Chair: Andreas Kraft, University of Texas, Austin, TX, 78753, United States

1 - Choice Frictions in Large Assortments

Olivia Natan, University of Chicago, Booth School of Business, Chicago, IL, United States

This paper studies how the growth and evolution of product assortments impact consumer adoption, churn, and long run consumption. Most economic theories of product market variety suggest consumers are at least weakly better off under larger assortments. In contrast, the psychological literature on the phenomenon of choice overload finds that larger assortments overwhelm consumers with decision costs or induce more regret. I document how these effects change on net over the customer lifetime in an online platform market that provides restaurant delivery. I find that assortment expansion benefits the acquisition of new consumers but reduces ongoing consumption among consumers who remain on the platform. I rationalize these impacts via a model of costly attention and choice under limited information. Counterfactual exercises show that targeting choice set reductions can improve revenue among existing customers.

2 - How Much Content Should Be Paid? Managing Freemium Along the Customer Journey

Daniela Schmitt, The Wharton School, University of Pennsylvania, Philadelphia, PA, United States

A primary challenge for providers of information goods (e.g., news websites) is to convert visitors into subscribers as well as to retain these subscribers beyond the initial subscription purchase decision. Subscriptions typically grant access to paid content which is otherwise locked behind a paywall. As such, the user's valuation of the subscription is highly influenced by the share of paid compared to free content on offer. However, this share of paid content might matter differently depending on both the user's subscription status and interest in different content categories. In this paper, we assess how much the share of paid content matters for subscription purchase and churn decisions and conduct a comprehensive analysis encompassing both the pre- and post-purchase stages of the customer journey. We use a novel dataset from a major news website which captures the entire individual customer journey for more than thirty thousand visitors and subscribers in July and August 2017. Our results reveal that in the pre-purchase stage, a higher share of paid content in categories that interest the user exhibits a positive relationship with initial purchase probability, but only up to a certain turning point. Meanwhile in the post-purchase stage, more paid content in categories of interest is negatively related to churn probability. We discuss the implications of these findings for uncovering important customer segments and for targeting them effectively.

3 - Strategic Aspects of Pay What You Want (PWYW) Pricing in the Context of User Generated Content

Jieun Lee, University of Connecticut, Storrs, CT, United States, Debanjan Mitra, Joseph Pancras

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.

4 - How do Peer-to-peer Platforms Affect the Prices of Durable Assets? Theory and Evidence from a Natural Experiment

Andreas Kraft, University of Texas - Austin, Austin, TX, United States, Raghunath S. Rao, Garrett Sonnier

Peer-to-Peer (P2P) platforms enable sharing of durable assets and power nascent decentralized economies, especially in short term housing and transportation. When an asset is both utilized and displaced by a platform the effect on prices is ambiguous. Potential income from monetizing slack capacity may raise asset values. However, platform services may obviate the need to own the asset, depressing values. Empirical analysis is complicated due to entry, and resulting asset price changes, likely being due to unobserved factors. We use the 2016 exit of Uber and Lyft from Austin, TX as a natural experiment to study the impact of P2P platforms on vehicle prices. Utilizing data on over 5 million transactions, we construct vehicle price series within hundreds of TX zip codes. Classifying zip codes as treatment and control units, we estimate the change in the asset prices revealing the causal impact of P2P platforms. Our estimates suggest that platforms result in a decrease in new vehicle prices across sedans, utility vehicles and pickups. Conversely, the price of used sedans, highly utilized on the platform, experience a significant increase. Our estimates are economically meaningful in size and are consistent with a theoretical model of a durable good seller with an active decentralized used-good market and a P2P platform.

■ FC07

Virtual Room 07

When Algorithms Produce and Reduce Biases In Decision-Making

General Session

Chair: Kalinda Ukanwa, University of Southern California, Los Angeles, CA, 90089, United States

1 - The Reflection of Historic Injustice by Algorithm: Evidence from the Prediction of Ethnic Affinity on Social Media

Catherine Tucker, MIT, Cambridge, MA, United States

The advent of machine learning has allowed companies to identify correlates of potential segmentation variables in large quantities of data. For example, it may be possible to try and try and predict someone's ethnicity by their behavior on websites such as on social media. This paper investigates the consequences of such practices. It examines the consequences of Facebook using data on `likes' to predict ethnic affinity on Facebook. It finds evidence that this leads Facebook to predict that people are more likely to be African American in areas that have been subject to historic racial discrimination, relative to the baseline population suggested by the census. The paper presents some suggestive evidence that this occurs because only lower income households create the kind of data used to predict ethnic affinity, and historic racial discrimination has generally lowered incomes for affected groups.

2 - Modelling the Role of Algorithms in Crowdfunding: A Multiple Discrete Continuous Choice Approach

Anja Lambrecht, London Business School, London Business School Sussex Place, London, NW1 4SA, United Kingdom

In any typical online choice contexts (e.g. travel or retail), firms today use algorithms to determine the order in which hundreds or thousands of choices are presented to customers on the firm's website. Researchers intending to model customer preferences in such digital environments often have little information about the exact sorting algorithm used by the firm. In this research, we ask if omitting the sorting algorithm from the customer choice model leads to systematic bias. We use data obtained from the US educational crowdfunding website Donors Choose and develop a structural model of donors' contributions to projects using a multiple discrete continuous choice framework. We estimate the model first based on the available data but abstracting from any information on the sorting algorithm. In a second step, we explicitly account for how the sorting algorithm prioritizes choices. We demonstrate that not accounting for the algorithm that determines the order by which choices are presented leads to systematic bias in the estimated customer preferences, especially with respect to the variables that enter the sorting algorithm. We conduct a counterfactual analysis where we replace Donor Choose's algorithm that prioritizes projects from low-income schools with an algorithm that does not. Our results indicate that this leads to a significant decrease in the average donation contributed to schools in high poverty regions and an increase in donations to schools in low to moderate poverty regions. To the ongoing debate about algorithmic bias, we thus add evidence that the use of algorithms can benefit disadvantaged groups.

3 - Consequences, Rules and Interventions for Saliency-Based Image Cropping Algorithms

Broderick Turner, Northwestern University, Blacksburg, VA, United States

Which would you rather see; a picture of Barack Obama or Mitch McConnell, a photo of a Black man or a White man, an image of a smiling woman or a frowning woman? Saliency-based image cropping algorithms make these decisions for platforms, and decide what parts of images are displayed to their users. These algorithms underlie many of the largest social media and software platforms, including Facebook, Android and Adobe. This research explores underexplored consequences of these saliency-based image cropping algorithms through a series of algorithm audits on Twitter. These audits uncover that these algorithms are1) more likely to display images of White (vs. Nonwhite) people and women (vs. men), 2) are more likely to display images of White people in which they are smiling (vs. neutral or angry), and 3) images of Black people are not afforded the same prioritization and are equally as likely to be shown smiling, neutral, or angry. Using another series of algorithm audits paired with lab experiments with social-media users, this work demonstrates that the bottom-up determination of saliency used in these algorithms is brittle and does not follow the top-down saliency determination of their users. Because computer vision can only "see" pixels, and the underlying algorithm rules reduce complexity to binary decisions, these saliency-based image cropping algorithms will necessarily be subject to perceived racial and gender biases. In a final intervention study, we capitalize on the implied rules of the saliency-based image cropping algorithm to provide a simple adversarial technique that users can employ to increase the likelihood that the image they want seen is selected for display. This intervention ensures that smiling (vs. angry) Black faces are prioritized at a similar rate as smiling White faces.

4 - Algorithmic Discrimination in Service

Kalinda Ukanwa, University of Southern California, Los Angeles, CA, 90089, United States

This research investigates conditions under which algorithmic bias can impact long-term demand and profits. The authors employ an agent-based model and experiments to demonstrate that algorithmic discrimination in service can be profitable in the short-run but can backfire in the long-run. This research demonstrates that although there can be a short-term profit advantage from biased algorithms, non-biased algorithms earn higher long-term profits, on average, when consumer word-of-mouth and competition are factored in. Large error in measuring consumer quality (value or profitability to the firm) exacerbates algorithmic discrimination, while large intra-group variation in consumer quality attenuates it. This research emphasizes the long-term benefits of switching to an algorithmic design that does not use group identity information, as well as incorporation of word-of-mouth considerations in the algorithm's objective function. However, for firms that must persist in using group identity information, this research recommends increasing investment in methods of measurement error reduction and increasing exposure to consumers of different populations. By doing so, a firm could reduce algorithmic discrimination in service while improving its long-term profits and societal well-being.

■ FC08

Virtual Room 08

Special Session on Sharing Economy

General Session

Chair: Hui Li, Carnegie Mellon University, Pittsburgh, PA, 15217-1704, United States

1 - Sharing Bike-sharing and Car-sharing: An Empirical Analysis

Yiqi Li, University of Michigan, Ann Arbor, MI, United States, Puneet Manchanda, Emanuel Schuster, Martin Spann

Bike-sharing and car-sharing are important components of the "Sharing Economy." However, it is not clear whether and how these two interact with each other. Using a dataset with over 20 million bike-sharing bookings and 0.35 million car-sharing bookings from a European company that operates both bike-sharing and car-sharing, we investigate the relationship between the usage of bike-sharing and car-sharing. We carry out this analysis at two levels of aggregation. At the station-level, we exploit the entry of a new station to identify the patterns of co-usage via a difference-in-differences approach. We then turn to individual-level analysis to obtain the preference parameters for each type of service from a structural model. We also test whether environmental conditions e.g., weather conditions and location of traffic-relevant sites (e.g., transportation stations, tourist attractions) impact our results. Our findings are likely to be helpful to sharing economy companies, city planners and policymakers.

2 - Estimating the Impact of Airbnb on the Local Economy: Evidence from the Restaurant Industry

Yongseok Kim, The University of Texas at San Antonio, San Antonio, TX, United States, Suman Basuroy, Davide Proserpio

In this paper, 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, we show that a 1% increase in Airbnb reviews in a zipcode is associated with a 0.011% increase in restaurant revenue in the same zipcode. Considering the median annual Airbnb growth in each zipcode, this result implies that Airbnb can explain about 12% of the median annual restaurant revenue growth. Moreover, we show that this increase in revenue is driven by an increase in restaurant demand that stems from additional tourism demand generated by Airbnb. Finally, we show that the positive effect of Airbnb is more pronounced for independent restaurants and in less commercial - and therefore with less economic activity- zipcodes. Overall, our results provide evidence that home-sharing platforms like Airbnb can increase economic activity for businesses and in neighborhoods that are more likely to need it the most.

3 - Competition Between P2P Platforms and Traditional Service Providers

Baojun Jiang, Associate Professor of Marketing, Washington University in St. Louis, Saint Louis, MO, United States, Wen Diao, Lin Tian

This paper provides a game-theoretic model to study the competition between p2p platforms and traditional service providers in the personal-transportation industry. Our analysis shows that consumers' waiting costs and the relative size of the consumer segments play a critical role in determining the firms' equilibrium targeting and pricing decisions. We show that the p2p platform's adoption of price discrimination can lead to win-win or loss-loss outcomes for both the platform and the traditional service company depending on the relative size of the consumer segments and the consumers' waiting cost. Our results suggest that regulators' optimal policy regarding price discrimination in the personal-transportation industry depends on the market characteristics and their policy objectives (whether to protect the traditional service providers or the consumers).

4 - Market Shifts in the Sharing Economy: The Impact of Airbnb on Housing Rentals

Hui Li, Carnegie Mellon University, Pittsburgh, PA, 15217-1704, United States, Yijin Kim, Kannan Srinivasan

This paper examines the impact of Airbnb on the local rental housing market. Airbnb provides landlords an alternative opportunity to rent to short-term tourists, potentially leading some landlords to switch from long-term rentals, thereby affecting rental housing supply and affordability. Despite recent government regulations to address this concern, it remains unclear how many and what types of properties are switching. Combining Airbnb and American Housing Survey data, we estimate a structural model of property owners' decisions and conduct counterfactual analyses to evaluate various regulations. We find that Airbnb mildly cannibalizes the long-term rental supply. Cities where Airbnb is more popular experience a larger rental supply reduction, but they do not necessarily have a larger percentage of switchers. Affordable units are the major sources of both the negative and positive impacts of Airbnb: they cause a larger rental supply reduction, which harms local renters; they also create a larger market expansion effect, which benefits local hosts who own affordable units and may be economically disadvantaged. Policy makers need to strike a balance between local renters' affordable housing concerns and local hosts' income source needs. We also find that imposing a linear tax is more desirable than limiting the number of days a property can be listed. We propose a new convex tax that imposes a higher tax on expensive units and show that it can outperform existing policies in terms of reducing cannibalization and alleviating social inequality. Finally, Airbnb and rent control can exacerbate each other's negative impacts.

■ FC09

Virtual Room 09

Negative Effects on Brand Equity

Contributed Session

Chair: Niket Jindal, Indiana University, Bloomington, IN, 47401-7886, United States

1 - The Drug Effect of a Star Player on the Team Brand Equity in the Professional Sports League using MLB Game Level Data

Hyeongchan Cho, Kyung Hee University, Seoul, Korea, Republic of, Yeujun Yoon

This study investigates the effect of star player's unethical behavior, particularly performance-enhancing drugs (PEDs) use, on the brand equity of the team that they belong to in the professional sports league. Unlike previous literature where most studies focused on verifying the star power effect enhancing the team brand equity, this study explores the negative effect of star players to harm the team brand equity. Particularly, it expands our understanding of the drug effect of star players by investigating how the media bias and word-of-mouth effect among fans accelerate its impact on the team brand equity development process. For this purpose, we collected comprehensive data relevant to PEDs use from various sources: MLB game and player data, online news articles, and Twitter twits from 2007 to 2019. It includes 10,000 news articles, 150,000 twits, and 100,000 MLB player and match data. Using these data, we find significant effect of PEDs use of players on the deterioration of the team brand equity. More interestingly, we find that media bias covered by headline news intensify the harmful effect of PEDs use on team brand equity building. Also, this negative effect would be accelerated through the word-of-mouth among fans in social media. Our finding provides important managerial implications to both team owners and league designers who have tendency to give an indulgence to those unethical star players with mild penalty due to their importance in the team squad quality or star power. It suggests that the light punishment may become backfired to the team by hurting the team brand equity furthermore.

Key word: drug effect, performance-enhancing drugs (PEDs), team brand equity, star power, media effect, social media effect

2 - Country of Origin and Marketing Mix Strategies in a Product-harm Crisis: Evidence From the 2008 Infant Milk Scandal in China

Huidi Lu, Hong Kong University of Science and Technology, Kowloon, Hong Kong, Ralf Van der Lans, Kristiaan Helsen

A product-harm crisis can cause devastating harm to the brand. How managers can buffer the brand against such damage is a very important marketing topic. This study looks at the impact of a product-harm crisis on marketing mix effectiveness in the context of the 2008 infant milk scandal in China. Our contributions to the literature are threefold. First, in addition to advertising and pricing, which has been the main focus of pervious research on product-harm crisis, we also investigate the effectiveness of discounts, product line length, and distribution. Second, we are the first to empirically study the role of country-of-origin spillover effects. Third, we extend existent findings to an emerging economy (China) where customers tend to be more value driven compared to developed markets. We formulate and estimate a dynamic hierarchical linear model (DHLM) which enables the study of both short and long-term marketing mix effects while also considering endogeneity, individual brand heterogeneity and temporal variations in consumer and retailer response parameters. Our most important findings are that consumers tend to ignore discounts by involved brands while they pay more attention to those by uninvolved brands. We also find that distribution becomes more important for domestic brands in driving their sales. Finally, we find that for all brands it becomes harder to build brand equity through marketing activities after the crisis. Our findings suggest that in emerging markets, pricing and advertising may not be powerful instruments to mitigate losses in a crisis, whereas product line length and discounting are, depending on brand country of origin and involvement in the crisis.

3 - Dynamic Subscription Choices in a Multitier Subscription-based Retailer

Aashish Pandey, University of Arkansas Fayetteville, Fayetteville, AR, United States, Dinesh Gauri, Yu Ma, Jialie Chen

The subscription model has become increasingly popular in retailing. Despite its managerial importance, few studies have examined consumer choices within such programs. Leveraging a unique, individual-level dataset sponsored by a national leading membership-based retailer, we examine what drive the subscription decisions in a multi-tier membership program. Members decide not only whether to renew subscription or not, but also which tier of membership (base or premium) to renew. We propose a dynamic model that captures a number of consumer, shopping, and retailer factors that contribute to this decision. Such an understanding further enables us to develop related strategies to promote consumer retention and upgrade/downgrade of membership tiers.

4 - Differential Effects of Advertising and Research and Development Investments on Investor Reaction to a Rival's Bankruptcy

Niket Jindal, Indiana University, Bloomington, IN, United States

With numerous large firms filing for bankruptcy, extant research has shown how marketing investments can play a pivotal role in the firm's bankruptcy. However, there are even more firms that are not confronting bankruptcy themselves yet face spillovers from a rival's bankruptcy. For these firms, it remains unknown whether their marketing investments affect these spillovers. To investigate the value of a firm's marketing investments on investor reaction to a rival's bankruptcy, we use the event study methodology to isolate the portion of a firm's stock return (i.e., the investor reaction) caused by a rival's bankruptcy from the portion caused by unrelated events. Results reveal differential effects for advertising versus R&D investments, with advertising's effect contingent on industry growth and R&D's effect contingent on industry concentration. Advertising investments mitigate (exacerbate) the negative investor reaction in a growing (declining) industry and R&D investments mitigate (exacerbate) the negative investor reaction in a high (low) concentration industry. These results highlight the differential value of marketing investments that arise when new shocks occur within an industry, and reinforce the importance of marketing efforts. For firms not facing bankruptcy, our research reveals how their marketing investments can help them prepare for spillovers from a rival's bankruptcy.

■ FC10

Virtual Room 10

Issues on Advertising, Search and Platforms II

General Session

Chair: Joonhyuk Yang, Stanford GSB, Stanford, CA, United States

1 - Sophisticated Consumers with Inertia: Long-Term Implications from a Large-Scale Field Experiment

Navdeep Sahni, Stanford University, Stanford, CA, United States

We study consumer inertia - the tendency to remain passive, and not switch from the previously endowed state. Past research indicates the prevalence of inertia and market frictions caused by it. However, little is known about how sophisticated consumers are in accounting for it in their decision-making. Even if consumers are inert, will they avoid products or contracts that exploit inertia? We conducted a large-scale randomized field experiment spanning a total of 2M readers of a large European daily newspaper. We randomly vary between subjects several terms of promotional contracts for digital subscription to the newspaper. Most importantly, our experiment varies whether the offered contract renews automatically, or cancels by default after a promo period. We observe the initial take-up, long-term subscription up to two years, and usage of the entire experimental sample. We find that 30% less people subscribe to the newspaper initially when they are offered an auto-renewal contract, relative to an auto-cancellation contract. Despite this drop in initial take up, subscription rates are 10-20% higher in the "auto-renewal group" up to six months after the promotion period ends. After this time period, we see a significant decline in subscribers in the auto-renewal group. At the extensive margin, 11% fewer readers ever become paid users if they are offered the auto-renewal contract. Overall, even though the newspaper receives higher revenue from the auto-renewal contract in the short-run, in the longer run it has fewer paid subscribers. Taken together our findings are consistent with "sophisticated" consumers who have inertia, but are able to anticipate it and correct for it. Due to this behavior, the business is unable to exploit higher revenue from consumers.

2 - The Design and Analysis of A/B/n Tests and Mega-studies

Ron Berman, The Wharton School, University of Pennsylvania, Philadelphia, PA, 19104-6340, United States, Christophe Van den Bulte

A/B/n tests are online experiments with many concurrent treatments that are compared to one control. In behavioral science such designs conducted in the field are known as mega-studies and are gaining traction. When designing such studies, researchers need to decide on the number of treatments, the sample size allocated to each treatment, and the interpretation of the outcomes. We analyze such studies when the goal is to implement the best observed outcome, and address the following questions: (1) is the top-performing intervention the best intervention? (2) what can be said about the relative performance of various treatments? (3) are there specific challenges to designing and interpreting such experiments?

3 - Auction Throttling and Causal Inference of Online Advertising Effects

George Gui, Stanford University, Stanford, CA, United States, Harikesh Nair, Fengshi Niu

Causally identifying the effect of digital advertising is challenging, because experimentation is expensive, and observational data lacks random variation. This paper identifies a pervasive source of naturally occurring, quasi-experimental variation in user-level ad-exposure in digital advertising campaigns. It shows how this variation can be utilized by ad-publishers to identify the causal effect of advertising campaigns. The variation pertains to auction throttling, a probabilistic method of budget pacing that is widely used to spread an ad-campaign's budget over its deployed duration, so that the campaign's budget is not exceeded or overly concentrated in any one period. The throttling mechanism is implemented by computing a participation probability based on the campaign's budget spending rate and then including the campaign in a random subset of available ad-auctions each period according to this probability. We show that access to logged-participation probabilities enables identifying the average effect of treatment on the treated in the ad-campaign. We present a new estimator that leverages this identification strategy and outline a bootstrap estimator for quantifying its variability. We apply our method to ad-campaign data from JD.com, which uses such throttling for budget pacing. We show our estimate is statistically different from estimates derived using other methods such as regression adjustment and two-stage least squares estimators based on auction participation as an instrumental variable.

4 - Coarse Targeting

Walter W. Zhang, University of Chicago Booth School, Chicago, IL, United States, Sanjog Misra

Advances in heterogeneous treatment effects and continuous treatments estimation allow for firms to target consumers at an unmatched level of granularity. However, menu costs, social norms, and other considerations limit such personalized targeting. We focus on the scenario of multi-dimensional, continuous treatments where a firm maximizes profits when allowed to only offer a finite number of treatments that are non-zero in one dimension. The firm chooses both which unique treatments to offer and which consumers to assign to each treatment. We formulate the firm's coarse targeting problem as an optimal transport problem and we propose a two-step solution. First, the firm estimates the continuous conditional average treatment effects. Second, the firm uses the results from the first stage to choose which unique treatments to offer as well as who to assign to these treatments by solving an optimal transport problem. We emphasize that the second step is the main contribution in our paper and is a novel application of optimal transport. The firm can perfectly granularly target after the first step and we will use that as a natural benchmark to evaluate the performance of coarse targeting. We provide an empirical application of our methodology for promotions management for a large food delivery platform and find that after only five unique treatments the firm is able to recoup over 99.5% of its expected profits under fully granular targeting. Coarse targeting outperforms classical marketing segmentation techniques that segment on consumer characteristics or preferences.

■ FC11

Virtual Room 11

Political Marketing 2

Contributed Session

Chair: Eugene Pavlov, University of Miami, Miami, FL, 33131, United States

1 - Emotions and Politics: How do Prediction Market Participants Justify Their Trades?

Vahid Karimi Motahhar, University of Iowa, Iowa City, IA, United States, Thomas S. Gruca

How do people justify their decisions? The justification literature suggests that the presence (vs. absence) of a written justification can alter one's judgments, decisions, or future actions. However, little to no attention has been given to the content of the written justifications. In this study, we content analyze the written justifications of traders in a political prediction market. Recent research in the U.S. finds that people with lower subjective well-being tend to vote against the status quo. Since emotions are often drivers of choice including political choices, they may play a role in their justification. Therefore, we hypothesize that the emotional language of a justification should vary depending on whether the trader's action supports (or opposes) the status quo. This results in a higher proportion of words associated with positive (negative) emotions, respectively. Our data comes from a commercial prediction market (Media Predict) wherein participants buy and sell contracts associated with the election of a specific political candidate. We used LIWC (2015) to identify the positive and negative emotional content in the justifications of more than 1500 traders in the 2012 U.S. Presidential election prediction market. We found that buyers of the contract associated with the status quo candidate (Obama) used significantly more words associated with positive emotions while those choosing the contract against the status quo (Romney) used significantly more words associated with negative emotions.

2 - Geo-social Influence: The Location-specific Effects of Social Influence on Brand Preference

Hyunhwan "Aiden" Lee, Assistant Professor in Marketing, HEC Montréal, Montreal, QC, Canada, Joseph Johnson, Gerard J. Tellis

Politicians, like brands in general, compete and win location by location. This is why political campaigns need micro-geographic monitoring and management. The abundance, spontaneity, and micro-geographic granularity of tweets makes Twitter a suitable platform for campaign management. However, can one predict elections using Twitter? What would be a suitable method for such predictions? How do such predictions compare with existing methods? The authors address these questions by estimating preferences at the micro-temporal and micro-geographic levels. Four contributions of their paper are: 1) finding users' locations, 2) estimating the spatial spread of social influence, 3) measuring geographic voter preferences, and 4) forecasting election results. Testing the method on the 2016 US presidential elections, correctly predicts 459 of the total 531 Electoral College votes (86% accuracy). Among the 12 swing states, the method achieves 75% accuracy while the poll of polls achieves only 42% accuracy. Validation of the method shows micro-temporal, and micro-geographic brand preferences lead state-wise online sales for a top fashion brand. The paper has implications for brand managers, politicians, pollsters, and marketing analysts.

3 - Paywall and Content Polarization

Shunyao Yan, Goethe University-Frankfurt, Frankfurt am Main, Germany

News media connects and charges two groups of users — advertisers and news readers — and thus it is always considered as a two-sided market. Theoretical work on two-sided market predicts that financing content by subscription results in maximum content differentiation because publishers need to soften the price competition by capturing more value from readers with higher willingness to pay. Empirical evidence on this prediction is lacking. This paper empirically tests how financing content by subscription through a paywall impacts the content polarization of the news media. Analyzing news articles from the 4 largest US news media for 3 years based on a novel polarization index trained from the US congress speech (Gentzkow et al., 2019), this paper shows that the New York Times polarized itself on the political dimension by 20% more after adopting a paywall (i.e., NYT leaning to the political left by 20% more). As the mechanism of the effect, this paper finds evidence that the newsroom got more polarized after the paywall adoption: journalists who wrote more left-leaning news articles are more likely to get new byline assignments. This paper contributes to the literature by: (1) providing empirical evidence of the theoretical prediction on content differentiation under Hotelling framework; (2) advancing the knowledge of the effect of paywall on content differentiation of news media; (3) joining the recent discussion about the effect of news media on political polarization. This paper discusses the policy implication of these findings for the media market.

■ FC12

Virtual Room 12

Privacy 1

Contributed Session

Chair: Julia Schmitt, Goethe University Frankfurt, Eschersheimer Landstraße, Frankfurt, 60320, Germany

1 - Towards a More Sustainable Digital Economy: The Effect of Information Control on Consumer Attitudes and Disclosure Behaviors

Ngan Vo, PhD Candidate, University of Manitoba, Winnipeg, MB, Canada, Rajesh V. Manchanda

Consumer information forms the backbone of the digital economy, whose importance has increased greatly by recent developments (e.g., COVID-19). As increased interactions with consumers occur virtually, firms have been gathering consumer information collected directly from their online platforms and indirectly from third parties to devise their mass customization marketing strategy. Despite the vital role of consumer information in the digital ecosystem, governmental legislation and industry self-regulation in North America have failed to secure consumer information from being overly exploited and misused. Given that, the majority of Americans and Canadians have responded via surveys that the most effective way to protect their information privacy is by individual information control. The emergence of a consumer movement in protecting their information privacy signals that consumers are becoming more aware of their rights to information privacy. In fact, consumers have employed self-protective behaviors in information disclosure, such as divulging untruthful information or withholding information from online platforms, to shield themselves against possible violations of their information privacy. In this research, we propose that sustainable growth of the digital economy can be achieved by correcting the power imbalance between firms and consumers. Specifically, we found that firms that offer consumers control of their information result in greater truthful information disclosure, website stickiness, and positive word of mouth. This effect occurs because voluntarily offering consumers information control enhances their perceived empowerment and trustworthiness toward the online firm. We also found that the effect of information control on disclosure behavior depends on the type of online service. Dimensions examined include the level of sensitivity of the information being disclosed, and the level of familiarity to consumers: results suggest that the effect is strengthened in financial and e-commerce but attenuated in healthcare services.

2 - The Impact of the General Data Protection Regulation (GDPR) on Online Tracking

Karlo Lukic, PhD. Candidate, Goethe University Frankfurt, Frankfurt am Main, Germany, Klaus Miller, Bernd Skiera

We determine the impact of the General Data Protection Regulation (GDPR)-the most recent privacy law of the European Union (EU) from May 2018-on the amount of online tracking using data of 5 million users within and outside the EU, browsing 4.5 billion web pages between May 2017 and May 2020. We exploit a difference in differences (DiD) design to evaluate the impact of GDPR using 2,054 websites visited both by EU and United States (US) users that cater to EU and non-EU audiences. We find that GDPR decreased the average number of third parties on each website by 1 third-party (-13%), suggesting a minor positive impact on users' online privacy. However, the effect is short-term and probably driven by the lack of regulatory enforcement throughout 2018. The effect is strongest 4 months after the introduction of the privacy law (September 2018) after which it starts to dissipate. We reveal that websites which need to be compliant with GDPR because they cater to EU users use, on average, more third parties than websites that cater to non-EU users and, thus, do not have to comply with GDPR. We assume this result is driven by the third-party market diversification in the EU or higher trust in local third-party vendors. Lastly, we reveal that online tracking is prevalent even in the post-GDPR world, where some EU catered websites use up to 23 third parties on average.

3 - The Economic Value of User-Tracking

René Laub, Goethe University, Frankfurt am Main, Germany, Klaus M. Miller, Bernd Skiera

Increasing regulation by policy makers and industry self-regulation initiatives by web browsers restrict user-tracking to protect users' privacy online, but with potential negative effects for online advertising. We empirically investigate the effect of restricting user-tracking on ad impression prices by drawing on a data set of over 42 Mio. ad impressions from 100 different publishers provided by a large European ad exchange and estimating a potential outcome framework using Augmented Inverse Probability Weighting. Our results show that the price of ad impressions for users who do not enable user-tracking is 38.5% lower than those that enable user-tracking. The quality and specificity of the content of publishers as well as the strength of ties between publishers and advertisers impact these differences. Given that users' aversion to behavioral targeting based on past online browsing behavior is a major driver of the restrictions to user-tracking, we investigate how important data about user's browsing behavior is for publishers. We find that missing browsing-behavior data only accounts for a minor share of the loss from restricting user-tracking. The major share of the value of user-tracking comes from browsing-behavior-unrelated data. These data are less privacy intrusive and enable advertisers, for instance, to measure the success of advertising. Our results imply that restricting user-tracking has severe negative economic consequences for publishers.

4 - Choose Wisely: The Impact of Cookie Banner Designs on Cookie Consent Rates

Julia Schmitt, Goethe University Frankfurt, Frankfurt, Germany

The introduction of strict consent requirements by privacy laws such as the GDPR requires websites to obtain a user's explicit consent for the use of tracking technologies. Websites commonly obtain this explicit consent via cookie banners. However, obtaining explicit consent usually results in a lower consent rate, i.e., fewer users agreeing to cookies, than obtaining implicit consent. To continuously use and monetize user data, e.g., by using that data to display behaviorally targeted ads, it is crucial for websites to maximize their consent rate. This paper aims to serve as guidance for websites about how to optimize the consent rate by improving their cookie banner design in a compliant way. In two field experiments, the paper examines how three cookie banner design characteristics impact the consent rate: the 1) presence of a close option, 2) cookie banner position, and 3) button labels. The results show that each characteristic significantly impacts the consent rate. By improving these characteristics on cookie banners, websites can increase the consent rate by up to 30.56pp.

Friday, 12:45PM - 1:45PM

■ FD01

Virtual Room 01

Game Theory in Marketing I

General Session

Chair: Evelyn O. Smith, University of Washington, United States

1 - Revenue-based Commission in App-stores

Amir Fazli, Indiana University, Bloomington, IN, 47401, United States

Online platforms selling third-party applications use a variety of revenue split policies to determine the share of application developers. One common policy is for the commission rate to depend on the application's generated revenue. For example, Valve, owner of the biggest online platform for selling video games, employs this policy by allowing developers to keep a bigger share of their revenue, if their total sales is higher than a certain threshold. We study this form of revenue-based commission and find its impact on the developers' choice of price and investment in quality. Interestingly, we show revenue-based commissions can result in lower profit for developers, compared to a flat-rate commission, by forcing developers to over-invest in quality to qualify for higher revenue shares.

2 - Consumer Search and Product Return Policy Design

Qitian Ren, The Chinese University of Hong Kong Shenzhen, Shenzhen, 518172, China, Kinshuk Jerath

In this study, we examine how a firm should design its product return policy considering the consumer search. We find that (1) if the search cost is relatively low, then the firm would charge a positive returning fee and the returning fee becomes higher when search becomes harder or less informative to consumers. In the meanwhile, the firm would adopt a relatively-high-price strategy to induce consumer to search, and the price decreases in search cost and increases in search informativeness; (2) if the search cost becomes relatively high (but not too high), then the firm would allow an unconditional product return without charging any returning fee, and the firm adopts the highest-price-strategy to induce the consumer to buy without search; (3) if the search cost becomes very high, then the firm would switch to adopt a low-price strategy to induce the consumer to buy without search, and in the meanwhile, the firm would not allow product return. In addition, we also find that a more informative search may decrease or increase the firm's profit.

3 - Commercialization of Online Communities: A Blessing or a Curse?

Dongcheng Zhang, Tsinghua University, Beijing, China, Bo Zhou

Online communities (OCs) are growing rapidly and are changing users' way of knowledge or information acquisition in many fields. Although the early community members were usually intrinsically motivated, commercialization in the community, such as the introduction of advertising or other monetization approaches, seems to significantly affect the activities of different members. The central question is whether commercialization would hurt or enhance knowledge dissemination, the latter of which is the original purpose of OCs. In this paper, we build an analytical model to study the impact of commercialization on knowledge generation and dissemination, and examine the welfare and profitability implications. There are two types of content producers (i.e., elite blogger and low-quality blogger) and two types of consumers (i.e., high-type fans and low-type fans). Our analysis shows that, there are three equilibrium outcomes compared to different benchmarks before commercialization. First, generation of knowledge improves but dissemination is negatively affected, indicating that both types of fans obtain less knowledge; the consumer surplus decreases though both bloggers are better off. Secondly, the competition between bloggers intensifies, enhancing the knowledge generation and dissemination; all participants can be better off except for the elite blogger. Thirdly, the total amount of knowledge generation increases but its total value decreases; all participants can be worse off except for the low-quality blogger. We also analyze the effects of intrinsic motivation, advertising revenue per user, and quality differentiation between the two types of bloggers on the equilibrium outcomes.

■ FD02

Virtual Room 02

The Role of Bargaining in Online and Offline Markets

General Session

Chair: Puneet Manchanda, University of Michigan, Ann Arbor, MI, 48109-1234, United States

Co-Chair: Junhong Chu, University of Michigan, Ann Arbor, MI, United States

1 - Designing Dealer Compensation in the Auto Loan Market: Implications From a Policy Change

Zhenling Jiang, University of Pennsylvania, Philadelphia, PA, United States, Yanhao Wei, Tat Y Chan, Naser Hamdi

We study the design of dealer compensation policy in the indirect auto lending market, where most lenders give dealers the discretion to mark up interest rates. To protect consumers from potential discrimination by the dealer discretion, several banks switched to a new compensation scheme by fixing the markup as a percentage of the loan amount. We document that the market share of these banks responded positively (negatively) in the consumer segment where the policy increased (decreased) the interest rate — a reversal of the usual demand curve — which highlights the influence of dealers on the bank choice for financing loans. Accordingly, we develop and estimate an empirical model that allows for dealer-consumer bargaining, which depends on both the dealers' and the consumers' utility. Based on the estimation results, we explore alternative compensation policies that also eliminate dealers' discretion. We show that a lump-sum compensation that pays dealers a fixed dollar amount per loan dominates the current policy for the banks in terms of gaining market share. This is because dealers' equivalent markup rates would better align with their bargaining power. Our study highlights the importance of accounting for the interests and bargaining power of middlemen in designing a compensation scheme.

2 - When and Why Do Buyers Rate in Online Markets?

Xiang Hui, Washington University in St. Louis, Saint Louis, MO, 63130-4862, United States, Tobias Klein, Konrad Stahl

Anonymous markets would be very difficult to successfully operate without the possibility that buyers rate the seller. We develop a model of rating decisions in which the buyer is willing to share publicly her opinion about a transaction if its realized quality differs much from the quality expected by her, where this is influenced by an aggregate of the seller's past ratings. Using raw data from eBay, we demonstrate empirically that this rationalization conforms to a very diverging range of circumstances. While specific behavioral explanations can be given for them, we can rationalize all within one consistent model together with earlier empirical results that ratings are based on extreme experiences. In spite of the non-randomness of responses, rating appears to rather well reflect buyer experience as long as expectations are not extreme.

3 - Multi-dimensional Salesforce Compensation with Negotiated Prices

Pranav Jindal, UNC Chapel Hill, Chapel Hill, NC, 27517-3490, United States, Minkyung Kim, Peter Newberry

Prices are routinely delegated to salespeople who are not only responsible for making a sale but also for selling at a high markup. Recognizing the role of salespeople, retailers design their compensation plan so as to incentivize them along both of these dimensions. In this research, we explore the relative importance of two such aspects of the compensation plan - the selling price based commission, which incentivizes salespeople to negotiate higher prices, and the revenue based quota, which incentivizes salespeople to sell more. Utilizing information on the compensation contract and data on transacted prices from a large durable goods retailer, we first provide evidence that sales in any period within a month depend on the salesperson's progress towards reaching the quota, as has been documented in the extant literature. Importantly, we show that the negotiated prices depend on not only the commission, but also the salesperson's progress towards reaching the quota. Motivated by these findings, we estimate a dynamic structural model where salespeople exert effort in both selling and maintaining a high markup, while taking into account the monthly quota. We use the model to understand the importance of the monthly quota relative to the commission rates in the presence of negotiated prices.

4 - Network Sizes and Bargaining: Empirical Evidence from a Healthcare Platform

Puneet Manchanda, University of Michigan, Ross School of Bus., Ann Arbor, MI, 48109-1234, United States, Xu Zhang, Junhong Chu

We study the bargaining between a business-to-consumer (B2C) two-sided platform and the business side of the platform. Conventional wisdom suggests that bargaining power is influenced by firm sizes. However, unlike a traditional firm, a two-sided platform's size cannot be easily measured, as it can either be represented by the size of the consumer side or the size of the business side or both. The direct and indirect network effects on the two sides of the platform further complicate the determinants of bargaining power. In this paper, using data from a healthcare platform, we investigate how the bargaining power of the platform evolves as the consumer and business network sizes grow and how the change in bargaining power is reflected on both price bargaining outcomes and non-price bargaining outcomes.

■ FD03

Virtual Room 03

Influencer Marketing 8

Contributed Session

Chair: Xia Wang, Renmin University of China, Marketing Department, Beijing, 100872, China

1 - Physical Attractiveness and Live Streaming Performance

Wensi Zhang, University of Southern California, Los Angeles, CA, United States, Sha Yang, Yanhao Wei

How advantageous is it to be physically attractive for participants in the live streaming industry? Using a novel data source from a major Chinese entertainment platform with measurements on streamers' appearance, effort, and performance, we quantify both "beauty premium" and "plainness penalty". Our findings suggest that the beauty premium is more than just appearance-based discrimination: the difference in streamers content exploration (creation versus consumption) partially explains the premium. We also address the endogeneity concern that the recommender system may consistently favor the attractive streamers and drive the performance gap between attractive and unattractive streamers. Surprisingly, we find that such a recommender not only creates an unfair disadvantage for the unattractive, but also suppresses the "beauty premium" for the attractive. We propose the intra-group competition as one possible explanation. Finally, we examine how our results change in response to the physical lockdowns following the COVID-19 pandemic.

2 - Influence Trading on Social Media

Apostolos Filippas, Assistant Professor, Fordham University, New York, NY, United States, John Joseph Horton

Social media users obtain consumption utility by consuming information produced by users they follow, and influence utility by producing information consumed by their followers. Influence can be obtained by producing highly valued information that attracts followers, but also by reciprocation: users agree to follow each other, trading influence. Influence trading profoundly changes the production and consumption of information on social media, compared to traditional media: "clubs" comprising users of similar levels of quality emerge, whose "members" reciprocally follow one another, and actively produce information. If influence trading is possible, more information is produced on the platform, but its average quality decreases. We discuss implications for social media platforms, as well as potential market design responses. We collect data from Twitter, and find that influence trading explains several empirical findings about the #EconTwitter community, which would be otherwise hard to rationalize.

3 - A Dynamic Topic Model for Finding Influential Users on Social Media

Mirai Igarashi, Tohoku University, Sendai, Japan, Kunpeng Zhang, P. K. Kannan, Nobuhiko Terui

In the fields of marketing and sociology, there is a lot of research finding influential users from people's behavioral data on the social networks. However, there has been little discussion about modeling approach considering social influence for unstructured data such as text and images found on social media. In this study, we propose a dynamic topic model with hierarchical structure for capturing social influence between social media users generating image contents. Moreover, we introduce two innovative approaches in model estimation: (1) shrinkage prior for reflecting the sparsity of social influence due to the strong influence of only a limited number of people and (2) scalable sampling method with data augmentation technique for models having likelihood of the logistic function. In this presentation, in addition to the estimated results of the empirical data, we will show the parameter recovery experiment using synthetic data and the validity of the estimated influential users from empirical results.

4 - The Impact of Monetary Rewards on Product Sales in Referral Programs: The Role of Product Image Aesthetics

Xia Wang, Renmin University of China, Beijing, China, Ying Ding

Retailers often use monetary rewards to stimulate word of mouth in marketing. This study examines whether monetary rewards would affect product sales in referral programs and how product image aesthetics moderate this effect. The authors analyze a data set obtained from a social commerce platform and calculate product image aesthetics using a computational approach. The results reveal that the monetary rewards have a positive impact on product sales in general. Moreover, the effect is more salient for products with aesthetically less appealing images but becomes less powerful for products with more appealing images.

■ FD04

Virtual Room 04

Word-of-Mouth

Contributed Session

Chair: Yang Pan, McMaster University, Hamilton, ON, Canada

1 - Monetary Incentives, Encouragement and Online Word-of-mouth: Field Experiment Evidence From an Online Service Platform

Ruhan Liu, Peking University, Beijing, China, Wanqing Zhang, Pradeep Chintagunta

This research compares the effectiveness of i) "encouragement messages" as a new type of non-monetary incentive, ii) monetary rewards of varying sizes, and iii) combinations of i) and ii) in facilitating word-of-mouth (WOM) creation. Moreover, we use WOM to predict important behavioral outcomes such as repurchase and referral behaviors. We conduct a field experiment with over 4000 users on an online service platform. Key findings reveal that incentives have a larger effect on comment length (i.e., the intensive margin) rather than on the decision to provide numerical ratings or to provide any textual comments (i.e., the extensive margin). Besides, monetary incentives which require reviews of a minimum length are generally more effective than encouragement in generating long comments. The size of monetary incentives has little impact on comment length, indicating that a small reward is sufficient in our context. Although the main effect of encouragement on comment length is insignificant, the effect of encouragement turns more positive when consumers' historical price paid per order was low, or historical purchase frequency was high. In terms of linkages among review, referral, and repurchase behaviors, the textual content of reviews is more powerful than numerical ratings in predicting referral and repurchase behavior. Overall, this research extends the WOM literature by investigating the use of encouragement as a novel kind of non-monetary intervention to promote WOM. It also reveals linkages between review, repurchase and referral behaviors. Furthermore, this research provides managerial insights in terms of predicting consumer review, repurchase and referral behaviors by utilizing tools such as causal forests and text mining.

2 - The Role of Word Familiarity in the Effect of Positive and Negative WOM on Consumer Decisions

Yiping Li, University of Massachusetts Lowell, Lowell, MA, United States

WOM has a significant influence on consumers' evaluations and purchase decisions. Language is developing, and novel, unfamiliar words keep emerging and appearing in user-generated content. This work explores how familiar and unfamiliar words in WOM influence consumption decisions. Three studies provided empirical support for the prediction that word familiarity interacts with WOM valence, such that in positive WOM, familiar words have a more positive effect than unfamiliar words, but in negative WOM, unfamiliar words have a more positive effect than familiar words. We also predict that curiosity mediates this effect. Experiments 1a-b demonstrate this effect on purchase intention within different WOM types (i.e., product reviews, tweets), and product types (i.e., backpack, movie). Experiment 2 replicated the effect in the context of product reviews and supported the curiosity mediation prediction. These findings contribute to a better understanding of the effect of word familiarity in WOM. From a practical standpoint, word familiarity is an important factor to consider in marketing analytics, as it can improve managerial prediction of consumer engagement and decision making, especially in light of negative WOM about products.

3 - Keep Calm and be Nice: Deviations in Responses to Movie Trailers Across Social Media Platforms

Ming Chen, Assistant Professor of Marketing, University of North Carolina at Charlotte Belk College of Business, Charlotte, NC, United States, Ye Hu, Sam Hui

Social media listening has become an integral part of most companies' marketing strategies. We analyze the sentiments expressed in user comments on movie trailers on Facebook and YouTube, two social media platforms that are based on vastly different network structures. While Facebook's social networks were established on closely knitted social ties such as family and friends, those on YouTube are more loosely connected. We hypothesize that there is a higher motivation to "keep calm and be nice" on Facebook to maintain social desirability, which is reflected by the sentiments expressed in user comments. Our results suggest that responses to movie trailers on Facebook are less likely to involve sentiments; such restraint is even more pronounced prior to a movie's release. Further, sentiments on Facebook tend to be more positive and less "mixed" or negative than those on YouTube. Additional analyses suggest that a higher polarization in sentimental divergence between Facebook and YouTube is associated with higher movie box office revenue. Our findings highlight the importance of considering the source of social media when listening in.

4 - WOM and Financial Performance: How Does Word of Mouth Differ from Word of Mouse?

Yang Pan, McMaster University, Hamilton, ON, Canada, Thomas Gruca

Word of mouth (WOM) is the act of passing information from one consumer to another (Higie et al., 1987). Traditionally, all WOM was offline. Today, consumers share thoughts and experiences about products via online platforms. While similar, online and offline WOM differ in crucial ways including motivations (Lovett et al., 2013) and downstream consequences (Shen & Sengupta, 2018). WOM is thought to be a powerful influence on the behavior of consumers receiving information from others whether offline or online. Consequently, multiple studies have assessed the impact of WOM on firm performance. However, this stream of research is highly unbalanced with more emphasis on online WOM (e.g. Tirunillai & Tellis, 2012). The few studies of offline WOM are limited to their impact on retail sales (e.g. Fay et al., 2019) or their effects in a single industry (Luo, 2007, 2009) which limits the generalizability of their findings. To our knowledge, no research has studied the effects of online and offline WOM on firm performance across industries. Therefore, we undertook a cross-industry analysis of the impact of online and offline WOM on key drivers of firm value including future cash flow growth and variability. Our study makes several contributions. We utilize measures of offline WOM that reflect conversations between consumers. Second, we compare the impact of online WOM and offline WOM within the same sample of companies. Finally, our findings are more generalizable since they represent 200+ companies across multiple industries.

■ FD05

Virtual Room 05

Practitioner

Contributed Session

Chair: Aharon Hibshoosh, San Jose State University and Lincoln University, Berkeley, CA, 94709-1356, United States

1 - Markdown Price Optimization Under Parameter Uncertainty

Andrew Vakhutinsky, Oracle Labs, Burlington, MA, United States

We propose a prescriptive analytics approach to solving a joint markdown pricing and inventory allocation optimization problem under demand parameter uncertainty for a retailer capable of price differentiation among multiple customer groups. The retailer could be either an e-commerce retailer or a more traditional brick-and-mortar store chain with multiple price zones. In both cases, the demand is fulfilled from multiple warehouses or fulfillment centers that are generally geographically dispersed, which may result in significant shipping cost variability from the warehouse to the end consumer. We consider a retail item with a limited life cycle and known exit date when the item inventory must be cleared. We assume there is no inventory replenishment at the warehouse after the initial allocation period and no large-scale shipping between the warehouses is possible. Since in most practical situations the demand parameters cannot be estimated exactly, we describe a general framework for the price and inventory allocation optimization to maximize the expected profit from selling the item based on the given distribution of the demand parameters and analyze the properties of the solution. This approach is illustrated by obtaining a closed-form analytical solution for a special case that can be implemented for a practical application. We also describe the predictive analytics model that allows estimating the distribution of the demand parameters using the historical sales data and show how using the merchandise hierarchy improves the robustness of the estimations. We conclude by demonstrating the results of the computational experiments using the real-life data from the sales at a national-level retailer.

2 - Research on the Marketing Strategies of China's Commercial Banks' Aggregate Payments

Shihao Xu, College of Business Administration Hunan University, Hunan, China

Due to the progress of the times and the development of science and technology, information technologies e.g. the Internet, cloud computing, big data, and blockchain, has been vigorously promoted and popularized. The mobile payment business has maintained a rapid growth trend around the world. Scan code payment has become the most popular payment method in China. In order to solve the problems of fragmentation of the payment market, decentralization of payment channels, and inconsistent payment information in the mobile payment process, aggregate payments services have emerged. This paper aims to study the marketing strategies of China's commercial banks' aggregate payment business, by using literature research methods, theoretical model analysis methods, and comparative analysis methods, and to analyze the competitive environment of China's commercial banks' aggregate payments business, by using SWOT and PEST. This leads to concluding the problems existing in the marketing strategy of the commercial bank's aggregate payments business from the aspects of product market positioning, price strategy, promotion strategy, sales channels, brand strategy, human resources and performance evaluation, and providing the solutions to resolve the pain points of service, price, channels, and publicity in the progress of marketing and optimize them. The research work contributes to improve the market share of China's commercial banks' aggregate payment business. Based on this, the commercial banks in the world can refer the market strategies of China's commercial banks' aggregate payment business to develop relevant services in their countries.

3 - Bambi Against Godzilla or HILO Against EDLP: HILO Price Strategy, Store Switching, and Cherry Picking

Aharon Hibshoosh, San Jose State University and Lincoln University, Berkeley, CA, United States

A HILO store competes with an EDLP one which has an advantage in procuring and marketing its products. It routinely offers every product at an initially-lower expected price. The HILO store responds by sufficiently discounting some of its product prices, thus attracting some deal-prone consumers to its store. At least some of these customers may not be "cherry pickers" and would purchase some of the higher priced items for which a discount is not offered at the HILO Store. We offer a microeconomics-based model, describing the optimal behaviors of consumers and the HILO store under various circumstances. We assume a focal market segment, where deal-prone consumers differ in the proportion by which they ideally mix two products. Every consumer unit's consumption technology is identified by its unique proportion parameter $R=q1/q2$ of quantities of two products 1, and 2, sold by the two stores. There is no income effect, the consumer demand of each product is perfectly inelastic, and $q1+q2=1$. The distribution of R is of flexible shape. Each store may also have a segment of consumers, which to a limited extent exhibits store loyalty. The HILO store strategizes to attract new customers, by offering a discount, D, on Product 1, in turn enabling sales of product 2 with an overcharge of U (D and U are relative to the EDLP prices). In general, the ability to generate additional profits through HILO's (D, U) strategy, depends on both the distribution of the consumer store switching cost, SWC, and the distribution of consumer's ideal R. If SWC is negligible, the HILO strategy will inevitably lead to cherry picking. Sufficiently large SWC leads to complete store loyalty. If the SWCs are neither negligible nor critically high, some customers will make all their purchases in the HILO store (or in the EDLP store), while others would be "cherry-pickers", purchasing each product at the cheaper store. We offer a new geometric model for the HILO- EDLP competition phenomena which succinctly captures the essence of the competition, and provide conditions for consumer segmentation and optimization of the HILO store strategy.

■ FD06

Virtual Room 06

Peer-to-peer Markets

Contributed Session

Chair: Jie (Doreen) Shen, University of Illinois at Urbana-Champaign, Champaign, IL, United States

1 - Costly Price Adjustment and Automated Pricing: The Case of Airbnb

Qi Pan, Chinese University of Hong Kong (Shenzhen), Shenzhen, China, Wen Wang

On many e-commerce platforms such as Airbnb, StubHub and TURO, where each seller sells a fixed inventory over a finite horizon, the pricing problems are intrinsically dynamic. However, many sellers on these platforms do not update prices frequently. This paper develops a dynamic pricing model to study the revenue and welfare implication of automated pricing which allows sellers to update their prices without manual interference. The model focuses on three factors through which automated pricing influences sellers: price adjustment cost, buyer's varying willingness to pay and inventory structure. In the model, we also take into account competition among sellers. Utilizing a unique data set of detailed Airbnb rental history and price trajectory in New York City, we find that the price rigidity observed in the data can be rationalized by a price adjustment cost ranging from 0.9% to 2.2% of the listed price. Moreover, automated pricing can increase the platform's revenue by 4.8% and the hosts' (sellers') by 3.9%. The renters (buyers) could be either better off or worse off depending on the length of their stays.

2 - Taxi Demand Forecast with Combination of Temporal, Spatial and Weather Features

Yuhong Xu, National University of Singapore, Singapore, Junhong Chu, Han Chen

In a highly dynamic urban space, taxis play an important role in providing on-demand service to satisfy the travel demand of public commuters. The mismatch between taxi demand and supply can be greatly reduced if demand can be forecasted accurately and shared with drivers. The forecast model is essential for taxi regulation and urban planning. In this paper, we propose a spatial-temporal autoregressive (STAR) model to predict taxi demand. To enhance the performance of temporal and location-based forecasting models, we also take the weather shocks like rainfall into consideration. In order to deal with the issue of high dimensionality, we investigate three widely used penalized methods for parameter estimation, in the context of real-time taxi demand forecasting. Our study compares (1) ridge-type penalized method, (2) group lasso penalized method, and (3) elastic net penalized method. The forecasting performance of the proposed models is measured using mean squared percentage error (MSPE) and mean absolute percentage error (MAPE). The model with more accurate prediction results will be selected for real-time application by taxi operators.

3 - The Causal Effect of Surge Pricing on Drivers' Labor Supply Patterns: Evidence from a Ride-sharing Platform

Wei Miao, University College London, London, United Kingdom, Yiting Deng, Yongdong Liu

In this study, we take advantage of an exogenous event that a leading Chinese ride-sharing platform introduced surge pricing in a southern Chinese city in October 2019. We collect detailed trip-level data for a random sample of drivers from the treated city and a nearby city where surge pricing was not implemented. We then investigate the causal impact of surge pricing on drivers' labor supply patterns using a difference-in-differences design facilitated by recent development in causal forest method. Using a 10-month panel covering over 15,000 drivers, we find that the introduction of surge pricing on average increases drivers' weekly income by 14%. We further decompose the average treatment effect into extensive margin and intensive margin and find the former dominates: The increase in drivers' weekly income mainly comes from the change in drivers' extensive margin by working on more days in a week. Furthermore, the causal forest method allows us to estimate individual treatment effect for each driver and hence enables us to examine heterogenous treatment effects across drivers. Our heterogeneity analyses show that the treatment effects are largely moderated by drivers' pre-treatment capacity constraint and driving experience. Finally, we examine the dynamics of treatment effect and find that the increase in income is short-lived and diminishes completely after 2 months, probably due to the increased competition among drivers. We discuss the managerial implications of our findings to ride-sharing platforms.

4 - The Impact of Short-term Rental Policies on Listing Prices and Performance: Evidence from Airbnb

Jie(Doreen) Shen, PhD Candidate, University of Illinois at Urbana-Champaign, Champaign, IL, United States, Unnati Narang

In recent years, there has been a surge in online vacation rental platforms, such as Airbnb. However, due to their conflicts of interest with the traditional hotel industry and their impact on local residents, they have also come under the purview of regulatory action in the form of short-term rental policies (STRPs). These policies are locally enforced and typically require hosts (i.e., renters or property owners) to restrict the number of nights they can rent out their property each year. The goal of our research is to examine the impact of such STRPs on the pricing and performance of listings on Airbnb. We exploit the variation in timing and location of policy introduction using a staggered modeling approach. Furthermore, since these policies apply different rules to different listings based on whether the host is present in the property vs. not, we further exploit this variation using a triple-difference estimator. Our data comprise detailed listing-level information from four cities in the U.S. between 2018/07 and 2020/02. We find that STRPs result in an increase in listing prices and a decrease in performance, measured by customer reviews. We examine the underlying mechanisms and descriptively show that the price increase is primarily driven by host-present listings that are directly impacted by the regulation. Interestingly, the overall number of host-present listings does not change much in response to the policy. Overall, our research has important policy implications for local city and state regulators, renting platforms, and individual/business hosts on these platforms.

■ FD07

Virtual Room 07

Machine Learning Applications

General Session

Chair: Sridhar Narayanan, Stanford University, Stanford, CA, 94305, United States

Co-Chair: Venkatesh Shankar, Texas A&M University, College Station, TX, 77843, United States

1 - The Impact of "Live" on Consumer Price Elasticities in Livestreaming Markets: Causal Inference via Orthogonal Random Forest

Ziwei Cong, Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong, China, Jia Liu, Puneet Manchanda

Livestreaming services encompass a wide variety of topics, from social media to video games to professional sports. The COVID-19 pandemic has further energized the already vigorous growth of the livestreaming economy (133% from 2016 to 2021). A major challenge for livestreamers is to set prices for their events, especially when the event recording is also available in non-live settings. Using rich data from the largest P2P market for knowledge goods in China, we describe the change in consumer price elasticities between the live and recorded version of the same event. We carry out causal inference via the generalization of Orthogonal Random Forest by enabling semiparametric Deep Neural Networks for estimating the functions of all confounding variables. Our proposed approach delivers nonparametric estimation of heterogeneous treatment effects in the presence of high-dimensional confounders whose relationships with the treatment policy (e.g., price) are complex but partially known. Our results show that consumer price elasticity varies across the characteristics of sellers (e.g., reputation) and goods (e.g., topical category and product life cycle). During the pre-live period, we find that consumers become gradually less price sensitive over time till the livestreaming session. However, during the post-live period, consumers stay relatively less price sensitive. We explore the reasons for these findings and layout implications for liverstreamers and platforms.

2 - Interactive Customer Feedback in the Digital Economy: When and How Creators Should Respond to Customers

Minjee Sun, University of Toronto, Toronto, ON, 158-758, Canada, Matthew Osborne

Technological developments have enabled content producers and their customers to interact with each other in real time. Moreover, content producers may modify their offerings in response to customer feedback. Using data from an online book platform, we explore how novel writers modify their novels as a result of customer feedback and what kind of modifications enhance the novels' performances. In this research, we apply natural language processing and text mining to characterize readers' comments and quantify the changes in writers' novel contents. Our preliminary analysis suggests that the sentiment of readers' comments matters, as well as writers' past publishing experience.

3 - Behavioral Targeting, Machine Learning and Regression Discontinuity Designs

Sridhar Narayanan, Stanford University, Stanford, CA, 94305, United States, Kirthi Kalyanam

The availability of behavioral and other data on customers and advances in machine learning methods have enabled targeting of customers in a variety of domains. Typically, such targeting involves first training a machine learning algorithm on a training dataset, and then using that algorithm to score current or potential customers. When the score crosses a threshold, a treatment (such as an offer, an advertisement or a recommendation) is assigned. In this paper, we demonstrate that this has given rise to opportunities for causal measurement of the effects of such targeted treatments using regression discontinuity designs (RDD). Investigating machine learning in a regression discontinuity framework leads to several insights. First, we characterize conditions under which regression discontinuity designs can be used to measure not just local average treatment effects (LATE), but also average treatment effects (ATE). In some situations, we show that RD can be used to find bounds on the ATE even if we are unable to find point estimates. We then study two different ways in which the score required for targeting is generated using machine learning based algorithms, and explore the utility of RDD to these contexts. Finally, we apply our approach in the empirical context of the targeting of retargeted display advertising. Using a dataset from a context with a targeting policy in parallel with a randomized controlled trial, we examine the performance of the RDD estimate in estimating the treatment effect, validate it using a placebo test and demonstrate its practical utility.

4 - Who will Drop the Mobile App and When? Machine Learning Predictive Approaches

Venkatesh Shankar, Texas A&M University, Mays Business School College Station, TX, 77843, United States, Unnati Narang, Shreya Shankar

Over 82% online users shop using a mobile device, and 92% of mobile use is through mobile apps, many of which are retailer mobile apps. However, an overwhelming percentage of users disengage and drop (stop using) a retailer app within months after download. It is critical for researchers and managers to understand the predictors of app drop. We address this important research questions using machine learning approaches. Specifically, we ask what in-app (e.g., number of app sessions) and out-of-app (e.g., past purchases, loyalty program level) factors drive or predict drop. In-app factors primarily predict both who will drop the app and when, while out-of-app factors predominantly predict the time of app drop. Our findings suggest that managers should mitigate app drop by updating in-app product catalogs and by frequently notifying users about updates through the app. Furthermore, managers should boost loyalty program level and frequency of purchases, two key out-of-app factors. Our research provides managers with useful predictive tools they can use to monitor app drops on a real-time basis and to identify and preempt users prone to dropping the app with timely actions.

■ FD09

Virtual Room 09

Integrating Habit Research into Consumer Choice Modelling

General Session

Chair: Ryan Webb, University of Toronto, Toronto, ON, M6G 2M5, Canada

Co-Chair: Matthew Osborne, University of Toronto - Mississauga, Bureau of Economic Analysis, Toronto, ON, Canada

1 - A Neuroeconomic Theory of Habit

Peter Landry, University of Toronto, 105 St. George St, Room 555, Toronto, ON, M5S 2E8, Canada

We provide a theoretical framework that integrates a neuroeconomic concept of habit into a consumer choice model. We propose that habit represents one of two distinct decision-making modes. The habit mode automatically repeats past choices with minimal thought or deliberation. The other mode, which we refer to as the "preference" mode of decision-making, instead involves conscious deliberation over all available options. The transition between these decision modes is governed by the reliability of a reinforcement learning algorithm, in which the agent learns the values of alternatives and tracks their cumulative reward prediction errors. This transition rule has many interesting implications for consumer choice. For instance, in habit mode small price/quality changes might have no impact on behavior, whereas large price/quality changes for even one good might jolt a consumer to re-optimize their entire basket.

2 - A Neuroeconomic Concept of Habit: Evidence from Canned Tuna

Clarice Yulai Zhao, University of Toronto, Toronto, ON, Canada

This project provides empirical evidence for a neuroeconomic concept of habit by analyzing consumer choices in the canned tuna category. In 2008, canned tuna producers shrunk the size of their packaging in the US market from 6oz to 5oz per can, with the introduction of the 5oz cans staggered across each brand/store. During and after the introduction of the new cans, we observe far more brand-switching, conditional on price, than would be expected if consumers were simply employing "preference-based" decision-making. We also observe more sensitivity to price changes during the introduction of the 5oz cans, which would be predicted by a habitual model in which consumers are re-optimizing. We then develop and estimate a novel structural model of habitual choice which provides a test for habitual decision-making. We use counterfactual exercises to explore how the implications of our model for pricing differ from standard discrete choice models that simply treat habits as switching costs.

3 - Neural Autopilot in Social Media

Matthew Shum, California Institute of Technology, Division of Humanities and Social Sciences, Pasadena, CA, 91125, United States, Jessica Fong

During the COVID-19 pandemic, people were forced to try new routines at school, work, and home— "forced exploration". Forced exploration can actually be beneficial if it shows people better ways of school, work, and social interaction. This wave of forced exploration raises important questions: What new habits are formed that will persist— what will be the "new normal"? This research project uses a new approach to habits based on animal learning and human cognitive neuroscience. The "neural autopilot" framework which, while tested in lab studies of animal and human habituation, has never been systematically explored using a large amount of data about how people actually behave in everyday life. This project will use data from Weibo (the largest social media network in China) to develop and test a statistical neural autopilot model, to recover values for the model's main parameters. The estimated parameter values will be used to make predictions about which habits acquired during the pandemic will persist, and which behavior will revert to pre-pandemic patterns.

4 - Predicting Context-Sensitivity and Habit Formation in Field Data Using Machine-Learning

Colin Camerer, Cal Tech, Pasadena, CA

We use machine learning to characterize habit formation in two large panel data sets tracking gym attendance and hand sanitizing. The important aspect of habitual behavior we focus on is predictable context-sensitivity (PCS): the set of observable variables that predict whether a person performs a behavior or not at each opportunity. We find that overall PCS is rather high for most individuals in our datasets, with a mean AUC of 0.75-0.80. We then use this PCS method to estimate the time to habituation for the individuals who developed habits during our observation period in the two datasets. We estimate that it takes 3-7 months to develop a gym habit, but only 4-9 weeks to develop a handwashing habit, confirming survey research suggesting that the speed of habit formation depends on behavioral complexity. Our PCS approach can be applied to understanding habit-like behavior in numerous other field settings, and can serve as a foundation for improving personalized behavior change.

■ FD10

Virtual Room 10

Empirical Advertising Strategy

General Session

Chair: Avery Haviv, Simon School of Business, Rochester, NY, 14620, United States

1- Dynamic Advertising Content, Effectiveness, and Pulsing

Avery M. Haviv, Rochester, NY, 14620, United States

Each May, advertisers and media channels meet to make TV advertising deals for the coming year. Major advertisers pre-commit their advertising spending in this market in order to get favorable rates. However, this pre-commitment may prevent rival firms from responding to changes in the market, and the advertising of their rival. This paper uses a structural model to study how the pre-commitment of advertising spending affects advertising competition. I look at this question in the context of the US battery industry, which features duopolistic competition between Duracell and Energizer.

2 - The Effects of Worker Advertising on a Labor Market Platform

Caio Waisman, Northwestern University

This study assesses the impacts of advertising in an online labor market. It makes use of data from an experiment conducted by a large online labor platform, in which workers gained the ability to advertise themselves and employers are randomly enabled to see ads. The results of the experiment are described and leveraged to study how the market would operate when advertising was fully available.

3 - Investigating the Effects of Network-Studio Affiliation on TV Advertising of Motion Pictures

Sylvia Hristakeva, UCLA Anderson School of Management, Los Angeles, CA, 90095, United States, Vera Sharunova

Firms often rely on intermediaries to develop and execute their advertising campaigns, where separate ad agencies are responsible for ad creation, media buying, and digital advertising. The decision of which ad agency to hire for each service is complex and evaluates terms of trade, past performance, and incentives to get all services within the same umbrella company. An important feature of this market is that advertisers are concerned about information leakage to competitors using the same agency. As a result, advertisers are reluctant to share a common agency with a competitor - what we call client conflict. We analyze how the tension between agency size and client conflict differs across ad services. If this trade-off tilts in different directions across services, then we expect to see different levels of concentration across agency types. This is a first step towards understanding the structure of the ad-agency market, which is characterized by large holding companies managing a portfolio of ad agencies. Anecdotally, this company structure was developed to circumvent the advertisers' concern over sharing an agency with a competitor. In addition, the best practice in the industry is the use of “firewalls” to actively prevent information leakage within an agency across competing clients. We use data on advertisers' ad placements on national TV and the identity of their media-buying agencies to analyze whether agencies buy similar ads for their clients. This descriptive analysis allows us to evaluate whether firewalls are strictly enforced within an ad agency and within the holding company.

4 - Display Advertising Pricing and Allocation in Dual Channel

Hana Choi, University of Rochester, Simon Business School, CS3-219, Rochester, NY, 14627, United States

A publisher in a display ad market sells its advertising inventory both via ad exchange auctions and via direct sales. The direct sale involves the advance sale of a bundle of ad impressions directly to the advertiser at a fixed price through a guaranteed contract, prior to users’ arrivals on the publisher’s site. On the other hand, the ad exchange auction involves the buying and selling of single ad impressions in real-time through auctions. This research studies two important questions: why these two sales channels co-exist, and how to allocate and price ad impressions across these two sales channels.

■ FD11

Virtual Room 11

Regulation

Contributed Session

Chair: Praveen K. Kopalle, Dartmouth College, Tuck School of Business, Hanover, NH, 03755, United States

1 - Price Parity Clauses and Product Prices: Evidence From Amazon and EBay

Yu Song, University of Michigan, Ann Arbor, MI, United States”

The rapid growth of digital platforms has created antitrust concerns in many countries; price parity clauses (PPCs), in particular, have attracted growing attention from policymakers. Our large-scale empirical study explores how Amazon’s removal of PPCs in March 2019 in the United States affects product prices on Amazon and eBay. Our identification strategy exploits varying treatment intensity as a result of the differences in Amazon and eBay commission rates across product categories. We find that, after Amazon removes its PPCs, products in categories with greater differences in commission rates between Amazon and eBay experience greater price reduction on both. The price reduction on Amazon is greater for products sold directly by Amazon than for those sold by third-party sellers. These results suggest that Amazon’s removal of PPCs increases platform competition and reduces product prices. Besides, Amazon as a retailer is more responsive to the policy change than its third-party sellers are. This paper adds to the growing marketing literature on how regulation affects firms and consumers, and offers implications for platform firms and competition authorities.

2 - Direct and Spillover Effects of Product Recalls in Business-to-business Secondary Markets: A Study of the US Automobile Industry

Khimendra Singh, Doctoral Candidate in Marketing, University of North Carolina-Chapel Hill, Chapel Hill, NC, United States, Sriram Venkataraman, Rajdeep Grewal

Adverse events, such as product recalls, transcend business-to-business (B2B) secondary markets (i.e., used product markets), affecting the purchase behavior of B2B buyers (i.e., intermediaries). To study the effect of such events on secondary markets B2B buyers (e.g., auto dealers), the authors conceptualize vehicle recalls as exogenous shocks to the automobile secondary market. The authors deploy a descriptive causal inference model based on the difference-in-differences method with a rich set of controls. Individual-level dataset on used vehicles in the secondary market facilitates this design and allows for comparison across treated units (passenger vehicles) and control group (cargo vans unaffected by the focal recall). Results show a decline of around 10% for recalled vehicles’ prices in the B2B secondary market. A recall that involves multiple models or governmental mandates inflicts more damage. Due to the adversity facing the recalled product, the demand for the substitute products (i.e., non-recalled vehicles) could increase (positive spillover effect), or could decrease if the recall increases buyers’ uncertainty about substitutes (negative spillover effect). Consistent with the negative spillover, the results show that the demand for non-recalled vehicles that belong to the same segment as the recalled vehicle declines. Essentially, the negative spillover suggests a 5.54% drop in prices of the substitute vehicles that belong to the focal automaker (which experiences the recall). In contrast, focal automaker’s non-recalled vehicles that belong to a different segment experience a 4.91% price increase, highlighting buyers’ switch to non-recalled vehicles within the focal automaker (positive spillover). Competing automakers’ vehicles that belong to the same segment as the recalled model also experience a 5.63% drop in prices (in comparison to different segment vehicles). These economically relevant patterns in B2B buyers’ purchase behavior in response to product recalls contribute to the sparse literature on the impact of product crises in B2B markets.

3 - How Does Regulatory Monitoring of Cause Marketing Affect Firm Behavior and Donations to Charity?

Praveen K. Kopalle, Professor of Marketing, Dartmouth College, Hanover, NH, United States, Aradhna Krishna, Uday Rajan, Yu Wang

Cause marketing (CM) typically involves for-profit firms donating part of their sales revenue to a charity, with the hope that this will increase the revenue. We argue that it is important for a regulator to monitor firms’ CM activities and study how differences in enforcement of CM impact its practice by firms. Our analytical model uses a Stackelberg leader-follower game that endogenizes the regulator’s decision to enforce CM. The firm then decides whether to truthfully declare or overstate the amount it contributes to charity. We find that any of the following can occur in equilibrium: (i) CM campaigns are a win-win-win situation - they increase profit for the firm, generate large donations for the charity, and generate a cause marketing surplus for the regulator, resulting in doing well while doing good, (ii) the best response of the firm is to be strategic, even when the regulator is strict with monitoring, (iii) the regulator itself decides not to monitor, even though it knows that this results in untruthful behavior by firms. A survey with consumers supports key modeling assumptions regarding consumers' lack of knowledge of CM laws. Our results are important for three reasons, First, firm behavior with respect to CM varies a lot in terms of what they disclose/announce to consumers about their donation to a cause. Second, unlike product quality disclosures where consumers can easily verify quality via third party sources such as Consumer Reports, consumers cannot on their own discover if firm disclosure of CM amount is accurate. Third, prior work on disclosure of product quality does not apply to the CM context because of the unverifiability of the claims by consumers.

■ FD12

Virtual Room 12

Memoriam Kalyan Raman

General Session

Chair: Murali K. Mantrala, University of Kansas, Lawrence, KS, 66045, United States

1 - Why we Miss Kalyan and are Remembering Him Today

Murali K. Mantrala, University of Kansas, Lawrence, KS, 66045, United States

We are saddened to announce the passing of former Northwestern professor Kalyan Raman on the morning of February 11. A brilliant scholar, Kalyan will be greatly missed by all in our field. Having received his MS in Statistics at the University of Madras in 1980, Kalyan completed his PhD in Marketing Science at the University of Texas at Dallas in 1985 under the tutelage of Dr. Frank Bass, examining a variety of metrics detailing the effects of advertising and promotion on reference prices. After completing his doctoral work, Kalyan held positions at Auburn University (1985-7), the University of Florida (1988-94, the University of Michigan at Flint (2001-4), and Loughborough University (2004-8), before joining Northwestern in 2008. While at Northwestern, Kalyan specialized in marketing mix optimization, resource allocation problems, and optimal budgeting allocation through the IMC program, while also leading courses in executive development through Kellogg's MBA programs. Moreover, Kalyan also served as an affiliate faculty member with the Department of Psychiatry and Behavioral Sciences at the Feinberg School of Medicine and completed a second PhD in electrical engineering, specializing in neuroscience, at Wayne State University in 2012. A true cross-disciplinary collaborator, Kalyan made great strides in the field of neuromarketing, merging marketing, high-level mathematics, and electrical engineering to better understand the psychology of marketing. Kalyan was a celebrated and prolific researcher who was a two-time finalist for the American Marketing Association's William F. O'Dell award (1999 and 2008) and was featured in the "Excellence in Research" section of the 2013 Northwestern Annual Report. His research also garnered a number of prestigious honors such as the Dorothy Ann and Clarence L. Ver Steeg Distinguished Research Fellowship for his interdisciplinary work in cerebrospinal (CSF) dynamics and media mix optimization (2014). Kalyan was also an active member of the editorial boards of many journals, including the International Journal of Research in Marketing, Production and Operations Management, Open Journal of Statistics, and the Journal of Telecommunications System and Management. Furthermore, Kalyan also served as an ad hoc reviewer for many leading journals in marketing, including the Journal of Marketing Research, Management Science, and Marketing Science. A true citizen of the world, Kalyan also offered coursework and presented research to a number of business schools and Fortune 100 companies domestically and internationally, including in the U.S., the United Kingdom, Germany, Austria, the Netherlands, France, Belgium, India, Singapore, and Australia.Kalyan was a universally admired scholar and thought-leader, who bridged seemingly disparate disciplines to revolutionize how we conceptualize the human experiences intricately woven into advertising and marketing. He will be greatly missed by all, and I hope that you will join me in keeping him and those close to him in your thoughts.

2 - Kalyan Raman's Contributions to Marketing Mix and Dynamics Research

Prasad Naik, University of California, Graduate School of Management, Davis, CA, 95616, United States

3 - Kalyan Raman's Contribution to New Frontiers in Integrated Marketing Communications

Vijay Viswanathan, Northwestern University, Evanston, IL, 60202, United States

4 - Kalyan Raman's Contribution to International Marketing Science Research Collaborations

Kay Peters, University of Hamburg, Hamburg, 22297, Germany

■ FD13

Virtual Room 13

Cues

Contributed Session

Chair: Lawrence L Garber, Elon University, Elon, NC, 27244-2010, United States

1 - Forgotten Needs and Unplanned Wants: The Effect of Purchase Motivation on Consumer Behavior

Alice Harter, Ludwig-Maximilians-Universität München, Munich, Germany, Martin Spann

Research only recently started to differentiate stable product characteristics, such as degree of hedonicity, from subjective purchase reasons, such as impulse purchases. Yet, this distinction is essential to gain a better understanding for unplanned buying behavior in both online and offline contexts. Chocolate, for example, is a hedonic item and may be purchased on impulse or as a forgotten ingredient for a birthday cake. Neither time is the purchase planned prior to entering the store. Yet, once, the chocolate is a true necessity, making it a forgotten need, and once, it is not actually needed, making it an unplanned want. Using a series of online experiments (both hypothetical and consequential), we examine the impact of purchase motivation on choice probability and find that the recommendation of unplanned wants shows a significantly lower choice probability than forgotten needs in a food, mobility and entertainment setting. Furthermore, we identify a positive main effect on choice probability when a utilitarian product is recommended as opposed to a hedonic one and when someone else's utility is at stake as opposed to one's own. Drawing on self-signaling and social signaling theory, we argue that the observed effects can be attributed to the signaling values of the specific situations. Overall, our findings suggest that firms should fine-tune their recommendations with need-prone, utilitarian and prosocial items. These optimizations become especially relevant whenever spatial restrictions, such as in checkout areas or mobile screens, are present.

2 - The Meaning That Primary Color Conveys to Restaurant Logos: An Exploratory Study

Lawrence L. Garber, Associate Professor, Elon University, Elon, NC, United States, Ünal Ö. Boya, Kacy Kim, Eva M. Hyatt, Lubna Nafees

We explore the meaning to consumers of primary versus non-primary colors as they are portrayed on restaurant logos. In a between subjects design, respondents are exposed to a restaurant logo whose background color represents one level of a primary/non-primary color manipulation and asked to evaluate the logo and the restaurant it represents. The analysis is in two steps. In the first step, two perceptual maps associate each of the three primary colors, yellow, blue and red, as well as three selected non-primary colors matched to their analogous primaries, with respective sets of logo personality and restaurant performance attributes. In the second step, a series of regression models test the effect of primary versus non-primary color on these same attribute sets over and above the effects of individual color preference, logo attractiveness and restaurant liking. This study may be seen as a first step in a bottom-up approach to developing a general theory of color meaning when used in a visual marketing communication context, an important but scientifically understudied phenomenon. Theoretical and managerial implications are discussed.

Saturday, 9:00AM - 10:00AM

■ SA01

Virtual Room 01

Game Theory in Marketing II

General Session

Chair: Evelyn O. Smith, University of Washington, United States

1 - Strategic Implications of Fairness Concerns in a Dynamic Channel

Wen Diao, Fudan University, Shanghai, China, Mushegh Harutyunyan, Baojun Jiang

The extant literature has shown that when a firm increases its price due to increased demand or consumer valuation, some consumers may have fairness concerns and experience a psychological disutility when buying the firm's product. This paper provides a two-period model to study the effects of consumers' fairness concerns on firms' dynamic pricing strategies and profits in a channel. Our analysis reveals a strategic link between the two periods—the retailer has a cost-reduction incentive of lowering its first-period price to induce the manufacturer to reduce the wholesale price in the second period. We show that consumer fairness concerns can lead to lower retail prices in both periods though the wholesale prices tend to increase in the first period and decrease in the second period. A higher demand increase in the second period can lead to a decrease in both wholesale and retail prices. Furthermore, we show that consumer fairness concerns can result in an all-win outcome for the manufacturer, the retailer and the consumers.

2 - Behavior-based Pricing Under Data Protection Regulation Policy

Yunhyoung Kim, University of Minnesota, Twin Cities, Minneapolis, MN, United States, Yi Zhu, Tony Cui

Recent data protection regulation policies (e.g. EU's GDPR, California's CCPA) require firms to acquire permissions in order to collect consumers' data. Under the regulation, consumers can protect their privacy by explicitly denying to gather their information (opt-out), or delegate firms to protect their data (opt-in) based on an expectation to be served better products or services personalized to them. Since many firms have used consumers' data for marketing purposes, the impact of the regulation might be huge and comprehensive in various areas. As an attempt to understand its impact, we investigate a competitive situation where firms use behavior-based pricing (BBP)-a price discrimination for new and existing customers-under the data protection regulation. Knowing the purchase history of consumers is necessary for BBP, but firms cannot obtain the information if consumers choose to opt-out. Consumers must choose between uncertain risks from privacy breach and potential gains from a personalized product or service. Forward-looking consumers might opt-out to avoid (unfavorable) price discrimination afterwards because firms cannot distinguish between opt-out consumers and new consumers. It is also possible for consumers to opt-in if they can be served a personalized product or service with higher quality enough to compensate for the loss from potential privacy risk and price discrimination. We study equilibrium outcomes for this situation by considering consumers' strategic decisions. The result shows that firms can get higher profits with BBP under data protection regulation.

3 - Ignorance is Bliss: The Value of Lack of Information in Online Advertising

Lei Zhuang, University of Minnesota Carlson School of Management, Minneapolis, MN, 55454, United States, Tony Haitao Cui, Yi Zhu

The technological advancements have dramatically expanded the online advertiser's ability to bid based on consumers' interests, which is normally inferred based on consumers' personal information such as such as customer demographics, browsing histories and purchase histories. Advertisers may not immediately know all about the consumers, especially when a new consumer just shows up in an ad network. Instead, it takes time for them to accumulate the information. We develop a two periods model to study how the dynamic learning of consumers' information will influence advertisers' online bidding strategies. Despite the advantage of consumer information, our result indicates that advertisers may prefer to know less about consumers and underbid (bid less than expected consumer valuation) in the first period. On the other hand, advertisers may overbid (bid more than expected consumer valuation) in the first period such that they can extract more consumer information, especially when advertisers are less differentiated. Furthermore, we analyze the advertisers' payoffs and the ad network's revenue and we show it may not always be the ad network's best interests to collect consumers' information.

■ SA02

Virtual Room 02

Diffusion Models

Contributed Session

Chair: Radu Tanase, University of Zurich, Zurich, Switzerland

1 - New Product Life-cycle Forecasting with Temporal Hierarchies

Oliver Schaer, Darden School of Business, Charlottesville, VA, United States, Nikolaos Kourentzes, Doug Thomas

Predicting new product sales with life-cycle curves have traditionally been applied to data of low-frequency nature, e.g. annually or quarterly observations. However, with big data, companies now often have access to sales data at higher frequencies, e.g. weekly or daily. While this naturally provides more data points, it can introduce seasonality, higher signal to noise ratio, and various irregularities. Although one can extend life-cycle curves, such as diffusion models, to capture seasonality, this can substantially increase model complexity and complicate the estimation of model parameters further. Furthermore, these additional high-frequency details can harm the long term predictive performance of the life cycle curves. To address these issues, we suggest using temporal hierarchies that use optimal suited time-series models at each aggregation level to extract model structure and subsequently combine it to increase predictive accuracy. For example, fitting a diffusion model at the quarterly level, with a long term focus, and a seasonal exponential smoothing model at the weekly level, with a short term focus. Combining these hierarchically results in a prediction that retains both aspects. Another benefit of using temporal hierarchies is that it allows continuing obtaining valuable model parameters, e.g. innovator and imitator coefficients of the Bass model, refined by the information in the more short-term and detailed models. We demonstrate the usefulness of the approach from a large computer manufacturer's dataset and provide insights on how to put these type of models into practice.

2 - Exploring Country Differences in the Adoption of Mobile Payments

Yunxin Liu, Ku Leuven, Leuven, Belgium, Zhongda Wu, Siegfried Dewitte

The current COVID-19 pandemic may accelerate the advent of a cashless age. Mobile payments tend to be a cleaner mode compared to traditional modes such as cash. However, the adoption of mobile payments varies around the world. This paper investigated the adoption of mobile payments by introducing cultural factors (i.e., individualism and uncertainty avoidance) into the UTAUT2 model in different countries. Data were from web surveys of Chinese, the U.S., and Belgian mobile internet users (Total n = 1068). In the total sample, the structural model revealed that social influence, performance expectancy, hedonic motivation, price value, and habit positively affected behavioral intention to use mobile payments. Meanwhile, behavioral intention was an important predictor of use behavior. Moreover, we found two moderation effects of cultural factors. Specifically, we found that individualism and uncertainty avoidance moderated the effect of behavioral intention on use behavior, such that the association was stronger among people with more collectivistic cultural traits and people with lower levels of uncertainty avoidance. From a theoretical standpoint, the combination of UTAUT2 with cultural factors advances the understanding of use behavior of mobile payments. From a practical standpoint, to encourage consumers to use mobile payments in the current COVID-19 pandemic, marketers should pay attention to the utilitarian benefits (i.e., reducing the spread of COVID-19) of using mobile payments. Also, policy-makers and application developers should utilize social media to recommend the regular adoption of mobile payments.

3 - Trickle Up Diffusion: An Empirical Analysis of Over 250 Product Categories

Christian Pescher, Assistant Professor for Digital Marketing, FAU Erlangen-Nuremberg, Nürnberg, Germany, Gerard J. Tellis

The authors analyze the diffusion of 278 product categories based on a multidisciplinary review of over 190 peer-reviewed diffusion articles and 8,000 articles from non-peer-reviewed newspapers and magazines. Findings are as follows. First, most peer-reviewed articles study diffusion patterns, not diffusion processes; within the publications that focus on diffusion processes, only a small percentage finds evidence for trickle up diffusion. Second, most peer-reviewed marketing articles analyze functional product categories, while few focus on symbolic product categories. This skewed emphasis suggests a data availability bias in favor of functional product categories and questions the generalizability of existing marketing findings. Third, a substantial non-peer-reviewed literature explains the diffusion of symbolic innovations. Fourth, while a trickle down diffusion (rich to poor) process seems to hold for consumer durables, a trickle up diffusion (poor to rich) process seems to hold for symbolic innovations. Fifth, the authors develop an integrated theory of trickle up diffusion,

4 - Customers' Adoption and Purchasing Decision Towards New Mobile Service-5G

Wenjin Huo, Newcastle University, Newcastle upon Tyne, United Kingdom

Under the development of technology at a fast pace, the challenge in the Chinese telecommunication industry is the most distinctive and intensive one all over the world. With the development of technology in the telecommunication industry, the 5G network service is already prepared for customers to use. In 2020, industry revenue is expected to grow 5.8% to $208.5 billion (China, 2020). Within this industry, the mobile data service segment has expanded rapidly among others. Until the end of 2020, there are 13.49 billion mobile subscribers in China, and 80.9% of them are 4G service users. Although the telecommunication market achieved remarkable success in recent years, there are still many problems that must be solved. For instance, the telecommunication system in china is always criticized for lack of innovation in both products and service, not being open enough, and its monopoly situation, etc. (Yu and Tan, 2015). Because of the unique character of the telecom industry, some researchers consider marketing promotion and customer behaviour analysis as the weakest part of the industry (Mu and Lee, 2010), especially when social media becomes a major promotion channel on the marketing battlefield. Therefore, this study focuses on the new mobile service 5G in the telecommunication industry and customer's adopting behaviour, which can have both theoretical and practical insights. The aim of this research is to analyze customers' decision-making process, diffusion and adoption behaviour of innovative service in the telecommunication industry, especially the marketing promotion influence through WeChat. This research attempt to answer the following question :1. Which factors in the telecommunication industry will influence the diffusion of innovative products (services), and which factors influence customers' adoption decision? 2.How does WeChat influence consumer's decision-making process in the telecommunication industry? 3.How does WeChat influence the diffusion of innovative technology in the telecommunication industry?

5 - Optimising Seeding Strategies by Incorporating Empirical Evidence Into Influence Maximisation Models

Radu Tanase, University of Zurich, Zurich, Switzerland,
Manuel Sebastian Mariani, Rene Algesheimer

The opportunity to capitalize on social contagion has led many firms to invest significant resources in modelling the diffusion of products in a network and in identifying the best seeding strategies. While extensive literature has been devoted to addressing both topics, incorporating this knowledge to predict and engineer virality remains a difficult task. Recent findings show that many existing influence maximization models surprisingly fail to integrate empirical evidence, which leads to a biased estimation of the influence propagation and to a sub-optimal identification of the seed nodes. In this article, we propose a framework to estimate the individual susceptibility to social influence from observed product choices and integrate it into modelling product diffusion. To illustrate the approach, we integrate a lab experiment with an agent-based model and validate our results on empirical data. In the lab experiment, we use a conjoint design to measure the susceptibility to social influence from observed choices. We show that the mean individual threshold has a positive, significant correlation with the psychological measurement of susceptibility to social influence. We use the experimental results to calibrate a threshold model of product diffusion in a social network, where the thresholds are empirically estimated in the lab experiment. We find that using artificially generated thresholds can lead to a biased estimation of the influence propagation and quantify this effect. Furthermore, we propose a method to construct an optimal portfolio of seed nodes with an ordinary number of contacts and show that it outperforms seeding high degree nodes. We validate our results on susceptibility inference and diffusion predictability in an empirical study of an online food community 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.

■ SA03

Virtual Room 03

Understanding Conversations

General Session

Chair: Reihane Boghrati, University of Pennsylvania, Philadelphia, PA

Co-Chair: Jonah Berger, University of PA-Wharton, Philadelphia, PA, 19104, United States

1 - What Drives Longer Word-of-Mouth Conversations?

Reihane Boghrati, University of Pennsylvania, Philadelphia, PA,
United States, Jonah Berger

Word of mouth is both frequent and important. Consumers have dozens of conversations each day and these conversations have a huge impact on consumer behavior. But while recent research has studied the drivers and consequences of interpersonal communication, there has been less attention to the broader consumer conversations in which such transmission takes place. Why do some conversations, for example, or discussion about particular topics, last longer than others? Natural language processing of everyday consumer conversations begins to address this question. Using different techniques (i.e., machine learning and dictionaries) demonstrates that even though people find certain topics naturally more interesting, the way conversation partners talk about a topic (i.e., the language used) seems to have a larger impact on how long it is discussed. We demonstrate the important role of question type. Topics last longer when people asked narrow questions, but broad questions did not have the same positive effect. Topics also lasted longer when people spoke more concretely (rather than abstractly). Overall, the findings shed light on linguistic drivers of conversation, the impact of different question types, and how natural language processing can be used to increase understanding of consumer behavior more generally.

2 - Conversational Receptiveness: Improving Engagement with Opposing Views

Michael Yeomans, Imperial College London, London,
United Kingdom, Julia Minson

Disagreement is often inevitable in personal and professional relationships. However, disagreement can also give rise to biased processing, negative inferences, and conflict. Here we examine whether "conversational receptiveness" can foster co-operative goals during disagreement. In Study 1, writers (n=1102) responded to opponents' policy statements, and raters (n=1,322) who disagreed with the writers evaluated how receptive the writer had been. We built a supervised machine learning model to label receptiveness as accurately as any human raters, by focusing on structural elements of language, from the politeness R package (e.g. hedges, acknowledgment, negation). This made our model interpretable to humans, and scalable, for studying conversations in the field. In Study 2 we collected conversations between senior government officials (n=238) discussing policy disagreements. We found that our receptiveness model could detect which people earned the trust of their partners, even though the speakers themselves were unable to predict how their partner felt about them. In Study 3A we examined receptiveness among students in policy-themed massive open online courses at HarvardX. The receptiveness of students' posts predicted the receptiveness of subsequent replies. In Study 3B, we measure receptiveness during the editorial process of correcting Wikipedia articles. Editors who were more receptive were less likely to incur a personal attack during editorial discussions. Our algorithmic measure of receptiveness could predict conflict spirals in diverse organizations before they start. Our results suggest that receptiveness is measurable and has interpersonal consequences, but can be under-utilized in part because speakers can misjudge their own receptiveness.

3 - Keep Talking: (Mis)understanding the Hedonic Trajectory of Conversation

Michael Kardas, Northwestern University, Kellogg School of
Management, Evanston, IL, United States, Juliana Schroeder,
Ed O'Brien

Conversation is a gateway to stronger social connections and greater happiness, but reaping such benefits often requires prolonging conversation beyond its initial moments. We hypothesize that people tend to engage in shorter conversations than would be optimal for their own enjoyment because they misunderstand the hedonic trajectory of conversation: People expect their enjoyment to decline as conversation continues but experience stable enjoyment in reality. Four pre-registered experiments (N = 893 individuals, including 1,973 sessions of face-to-face interaction) supported this hypothesis. Participants expected their enjoyment to decline as they continued talking with a new acquaintance, but experienced stable enjoyment across several sessions of structured (Experiment 1) or unstructured (Experiments 2-3) conversation. Mistaken beliefs about enjoyment were mediated by mistaken beliefs about running out of things to discuss; participants enjoyed initial conversation, but (wrongly) predicted declining enjoyment thereafter because they (wrongly) predicted that conversation material would run dry (Experiments 2-3). In turn, participants were more likely to underestimate how much they would have to discuss in one prolonged conversation with a single partner than in several short conversations with different partners (Experiment 3). Finally, the misunderstanding was hedonically costly: Participants whose preferences determined the duration of their own conversations ended their conversations earlier, and therefore enjoyed themselves less, than participants who were required to continue speaking throughout the study session (Experiment 4). Misunderstanding the hedonic trajectory of conversation may prevent people from pursuing closer connections.

4 - The (Better than Expected) Consequences of Asking Sensitive Questions

Eric M. VanEpps, University of Utah, Salt Lake City, UT,
United States, Einav Hart, Maurice Schweitzer

Within a conversation, consumers balance competing objectives, such as the motive to gather information, the motive to create a favorable impression, and the motive to build rapport with conversation partners. Consumers can manage these objectives by asking questions, yet many questions go unasked. Across five experimental studies (N = 1427), capturing both online text conversations and audio recordings of face-to-face conversations, we show that individuals avoid asking sensitive questions because they believe that asking sensitive questions will make their conversational partners uncomfortable and cause them to form negative perceptions. However, this aversion to asking sensitive questions is often misguided. Question askers systematically overestimate the impression management and interpersonal costs of asking sensitive questions. In conversations with friends and with strangers, and in both face-to-face and computer-mediated conversations, respondents formed similarly favorable impressions of conversational partners who asked sensitive questions (e.g., “How much is your salary?”) as they did of conversational partners who asked non-sensitive questions (e.g., “How do you get to work?”). We assert that consumers make a potentially costly mistake when they avoid asking sensitive questions, as they overestimate the interpersonal costs of asking sensitive questions.

■ SA04

Virtual Room 04

Reviews/UGC 5

Contributed Session

Chair: Maiju Guo, Peking University, Beijing, China

1 - The "Effectiveness" of Fake Reviews in Online Marketplaces

Jingcun Cao, HKU Business School, The University of Hong Kong, Hong Kong, Xian Gu

Fake reviews have become a prevalent problem in online marketplaces. Businesses create fake positive reviews to promote their own products and are also attacked by fake negative reviews injected by competitors. We examine the effect of various fake reviews in Apple's App Store and show that fake reviews do not necessarily play the role as businesses expect. First, the ``effectiveness'' of fake reviews is not always guaranteed and depends on product attributes and review characteristics. Moreover, we find that fake reviews received by one product also have a spillover effect on the competing products. As a result, businesses posting positive reviews for their own products may also benefit their competitors. We leverage the machine learning approach on the text analysis to explore the mechanism of findings. The text analysis shows that the distinctiveness between the filtered and published reviews play a key role on their relative effects. In addition, we compare fake reviews with legitimate marketing activities such as featured listing and keyword management and find that the latter can be highly effective for app developers. In summary, our findings not only quantify the effect of fake reviews to researchers, but also present empirical evidence to discourage businesses' review fraud and provide crucial managerial implications to online marketplaces.

2 - Rating Score Inflation and the Role of Online Platforms

Feng Qin, PhD Candidate, The Chinese University of Hong Kong, Hong Kong

Online review and rating have been proven influential in consumers' decision-making. Recent years have witnessed a steady and continuous increase in overall rating scores in many online platforms. We empirically examine this phenomenon and provide supportive evidence to substantiate the claim that online review sites have a role in the reputation inflation phenomenon we observe. We exploit longitudinal data including rating scores and review texts and construct a sentimental measure of review contributors' satisfaction. Using the difference-in-difference (DID) approach, we find that there exists a significant and systematic upward deviation of numeric rating scores to the sentimental measure of review texts shortly after the offline local market entry of the online review site, which is consistent with our hypothesis that rating scores are inflated.

3 - Do Online Ratings Accurately Reflect Quality? Price, Reviewed Quality, and Reviewer Expertise in Yelp Restaurant Reviews

Sajeev Nair, University of Southern California, Los Angeles, CA, United States, Gerard J. Tellis, Sivaramakrishnan Siddarth

Online review platforms are a major source of product quality information for many consumers. However, extant literature has not adequately addressed how reviewers' expertise influences the quality ratings they report. The authors analyze 2.2 million reviews of over 5000 restaurants from about 900,000 reviewers on the review platform Yelp.com to document how online ratings may be systematically biased by reviewers' expertise with a product or service. They exploit a quasi-experiment involving differential minimum wage changes in two US cities in the study. They use a difference-in-differences model and text analysis to obtain the following results. First, novice reviewers assign more extreme ratings to restaurants in general than expert reviewers. Second, for high priced restaurants, novice reviewers assign lower ratings than expert reviewers. Third, expert reviewers discuss about more quality related dimensions than novice reviewers do. These findings suggest that reviews in online platforms may be systematically biased by novice reviewers.

4 - Quantity Versus Quality: Revisited in the Knowledge-Sharing Platform

Maiju Guo, Peking University, Beijing, China, Jian Ni, Qiaowei Shen, Yan Xu

Online knowledge-sharing platforms in the question-and-answer format offer learners a unique channel to get quick access to various knowledge topics from crowd wisdom. Such a platform's performance critically depends on both the quality and the quantity of knowledge contributed by the crowd. This paper examines the interrelationship between the early-stage knowledge production and the future production outcomes on knowledge-sharing platforms. We construct novel data that combines the text and graphs in the knowledge, the learner's valuation of the knowledge, and characteristics of the knowledge producers. Our main results revolve around whether the knowledge production at the early stage of a question's life cycle changes the future knowledge production outcomes. To answer this question, we develop measures of knowledge length, variety, and perceived quality. We find that the length of knowledge produced at the early stage harms the quantity of future knowledge production but increases the variety of knowledge. The latter effect is amplified if the knowledge producer is an expert. We further document a positive relationship between the early-stage knowledge's perceived quality and the quantity of future knowledge production and this effect is driven by the crowd contributors. Our findings have important implications for knowledge-sharing platforms, especially when the interrelationship of earlier knowledge contributed by the different crowd and future knowledge is critical drivers of platform growth.

■ SA05

Virtual Room 05

Sales Force Management 1

Contributed Session

Chair: Xinyu Cao, NYU Stern, New York, NY, 10012, United States

1 - Sales Force Performance Rankings, Information Displayed, and Performance Improvement

Yashar Atefi, Assistant Professor of Marketing, University of Denver, Denver, CO, United States, Michael Ahearne, Molly Ahearne, Son Lam, Mohsen Pourmasoudi

Sales leaders use various strategies to increase salespeople's motivation. Among these strategies are performance rankings, an effective method to stimulate competition among salespeople, which despite their prevalence have received meager academic attention. The extant literature mostly focuses on other comparison-based strategies such as contests, investigating issues such as contest rewards, structure, or the number of winners. The authors add to this literature by studying performance rankings, focusing on the information published alongside the rankings and their impact on ranking effectiveness. In particular, the authors ask three questions: what type of information (e.g. salespeople's identities, targets, performance etc.) should be displayed, how much information should be displayed, and when should firms strategically alter the type and the amount of information to increase the motivating effect of ranking. The authors apply peer effect theories in economic and marketing and utilize a unique data of more than 30,000 salespeople across about 160 different firms that use a specific ranking dashboard. The ranking pod allows the sales organizations to choose the amount as well as the type of information displayed alongside the rankings, which could include salespeople's identities, goals (quotas), sales amount, and performance (quota attainment). We find that the amount and the type of information chosen could have a significant impact on performance improvement, but this impact varies across certain structural and individual contingencies. Results offer interesting and actionable implications for leaders on what and how much information should they display in different situations.

2 - Does Higher Pay Lead to Better Worker Performance?

Xinyu Cao, Assistant Professor, NYU Stern, New York, NY, United States, Dennis Zhang

Firms always want to know whether a higher pay can incentivize workers to improve their performance. This question is hard to answer since worker's pay is usually endogenously determined. In this paper, we answer this question making use of a field experiment run by a large online education company which randomizes the hourly pay of a group of workers. The company recruits native English speakers and provides an online platform for them to teach Chinese kids spoken English. We find that workers who get a higher hourly pay not only open more classes, but their classes are also more likely to be booked by students, and these gaps are increasing over time. Based on detailed data from video and audio analytics and limited data on class rating, we identify the key factors influencing worker's performance in a class, and we construct a score that integrates these factors and measures worker's performance in each class. We find that workers who get a higher hourly pay do not have a higher performance score initially, but their performance score increases faster than those who get a lower hourly pay, indicating that workers with a higher hourly pay are incentivized to learn the key influencing factors and improve their performance in a faster way than those with a lower hourly pay.

3 - What Makes Sales Pitches Work? Using Multi-modal Video Data to Uncover Success Factors

Ishita Sunity Chakraborty, PhD Candidate, Yale School of Management, New Haven, CT, United States, Khai Chiong, Howard Dover, Norris Ignatiius Bruce, K. Sudhir

Extant research of sales tactics and persuasion effectiveness tend to use surveys based on ex-post recall and participants' perceptions of their behaviors during the interaction. However, such self-described behaviors and recall of events are potentially biased, but also limited in what is measured. Recent advances in natural language processing, audio analysis and computer vision allow us to directly use objective videos of interactions into its multi-modal elements (video, audio and speech text) to characterize participant behaviors that not only map to conceptual constructs of persuasion identified in the literature, but also other objective metrics based on physical movement, voice characteristics and language that may help identify new constructs. In this paper, the video data on 400 buyer-seller interactions (each about 15 minutes) is augmented with contemporaneous judgments of various elements of persuasion by nine sales experts on a pre-determined sales inventory of scales. Our goal is use this new type of data to make multiple contributions to the literature on selling and persuasion. First, we assess and test how various influence tactics identified in the extant survey literature impact persuasion; but do so more accurately accounting for various forms of heterogeneity at buyer-seller dyad level. Second, we use machine learning models that go beyond the constructs identified in the literature to identify novel constructs using objective elements from the video, speech and text data. Finally, we build an automated real time tool for salesperson screening for recruiting and ongoing evaluations using the developed model based on video interactions between (prospective) salespersons and buyers.

4 - Team Structure, Human Capital Accumulation, and Productivity

Yan Xu, Virginia Tech, Blacksburg, VA, United States, Mantian Hu, Junhong Chu, Andrew Ching

Optimal sales force structures are essential for companies to keep winning the race for customers. This paper studies how sales team structure impacts agents' human capital accumulation and, subsequently, their contributions to team performances. We exploit a six-year panel data set containing team structure changes, team performances, agent characteristics, and house characteristics from a leading real estate company in China. Leveraging the variations in team structure, information on house characteristics, and house demand, we disentangle agent learning from heterogeneous agent abilities. We develop and estimate a structural model of agents learning by doing and learning from other team members. We seek to evaluate the dynamic effects of different team structures on agents' performances with counterfactual experiments.

■ SA06

Virtual Room 06

Platforms 1

Contributed Session

Chair: Ruiqi Wu, University of Rochester, Rochester, NY, United States

1 - Love is Blind: Search And Matching in Online Dating

Chu (Ivy) Dang, University of Hong Kong, Hong Kong, China, Hongchuan Shen, Michael X. Zhang

Using data on user search and matching histories from an online dating site, we study the role of information on matching platforms, emphasizing how partial or full information about the other side influences the final matching outcomes. We find that more information about the other side may make matching outcomes worse. This effect is mainly driven by the misaligned preferences (i.e., preference mismatch) between the two sides. Our findings suggest that there exists an optimal amount of information that the platform should provide to each side before a match is proposed. A consumer theory model is developed to rationalize the behavior and shed light on the optimal information provision strategies.

2 - Long-Term Effects of Acquisition Channels on Customer Loyalty and Cross-Buying

Andreas Michael Musiol, Dr., Friedrich-Alexander-University Erlangen-Nuremberg, Nuremberg, Germany, Professor Dr. Martina Steul-Fischer

Firms are increasingly using price comparison sites (PCS) to acquire new customers. Yet there is no evidence to date that customers acquired through PCS are more or less valuable than customers acquired through the firm's traditional acquisition channels such as direct marketing (DM) (e.g., outbound or mailing). Furthermore, researchers have paid less attention to investigate long-term effects in contractual settings (e.g., car insurance services) by considering only customers who did not defect in the first year after acquisition. We address this research gaps and analyze the extent to which PCS customers are more (less) loyal and likely to cross-buy as compared to DM customers. By assessing approximately 2,100 newly acquired customers of an insurance company for almost three years, we show that PCS customers (1) are less loyal and (2) are less likely to cross-buy than DM customers, remarkably in the long run. Using the Cox proportional hazard model, we demonstrate that the retention rate of a PCS customer is on average 43.3% lower than that of a DM customer with similar demographic characteristics and month of acquisition. With a logistic regression model, we show that the cross-buying probability of a PCS customer is 42.4 % lower compared to a DM customer, after controlling for demographics and month of acquisition. Our findings carry out important managerial and theoretical implications.

3 - Editorial Recommendation and Product Discovery in Apple App Store

Han Yuan, University of Arizona, Tucson, AZ, United States

Editorial recommendation is a major tool for platforms to promote product diversity, which is important to attracting users and avoiding disintermediation. I study the effects of editorial recommendations in Apple app store. Apple recommends several apps in a story and pushes several stories to users each day. I collect detailed information of stories from June 2019 to June 2020. The data are combined with daily downloads of featured apps and other control variables. I find stories will increase downloads of featured apps and the effects are more salient for small and young apps in terms of growth. Stories with more words, pictures, and fewer apps will have larger effects on apps. If an app is ranked higher in a story, it's downloads will increase more. Most importantly, reputations of apps will spill over within a story. The downloads of an app will increase more if it is recommended with apps with more daily downloads.

4 - The Value of Individual Data and Platform Pricing Choice

Ruiqi Wu, University of Rochester, Rochester, NY, United States, Yufeng Huang, Nan Li

Vertically integrated platforms and small firms have asymmetric access to the individual data, which solidifies the market power of the former party. In this paper, we study the competitive advantage of a platform brought by better data and price targeting abilities. Leveraging the granular panel data from a dominant PC-based game platform, we jointly model the purchase and usage decisions, back out the demand primitives, and simulate counterfactual equilibria under different data-sharing and pricing policies. We show meaningful heterogeneity on the platform both across gamers and games, which suggests potential profit gain by price discrimination. However, we further show the platform has an incentive to commit to uniform pricing to avoid the head-to-head competition with other big publishers in the price targeting game at a later stage. This self-regulation choice made by the platform can ameliorate the data disadvantage facing smaller publishers in the pricing game.

■ SA07

Virtual Room 07

AI-Adoption

Contributed Session

Chair: Anastasia Nanni, Bocconi University, Milano, 20136, Italy

1 - Double-edged Effects of Artificial Intelligence for Emotional Labor: The Moderating Role of Emotion Valence and Consumer Contexts

Yuqian Chang, Rutgers University, Newark, NJ, United States, Xueming Luo, Zheng Fang, He Peng, Jaakko Aspara

Many companies use artificial intelligence (AI) to alleviate the challenges faced by human employees in expressing organizationally required emotions to consumers. Our research reveals that AI may backfire, despite its technical superiority in emotion representation, based on a series of randomized field experiments. Experiment 1 suggests that relative to human agents, AI has a higher level of accuracy in expressing both positive and negative emotional tones to consumers. However, AI can be a double-edged sword. Experiment 2 compares the efficacy of AI and human agents in a real-world setting of bill collection. Results suggest that the incremental impact of AI over human agents is contingent upon whether the expressed emotion valence matches or mismatches consumer contexts. In the matched conditions (a negative emotional tone expressed to severely delinquent consumers and a positive tone expressed to slightly delinquent consumers), AI is more effective than human bill collectors who speak the same words because AI can more accurately express the appropriate emotional tones to influence consumers' perceptions (felt seriousness and courtesy) and subsequent payment behavior. Yet, in the mismatched conditions, AI backfires because it expresses the inappropriate emotions more accurately than humans do (i.e., more accurately making the mistake in customer services). Experiment 3 suggests more evidence for the moderated incremental impact of emotional AI versus humans with a different setting of offering promotional deals to consumers. These results caution against a simplistic, linear view of the business value of AI. We discuss the theoretical and managerial implications of AI for emotional labor and the feeling economy.

2 - 'Mine' Your Business Description: Predicting the Funding of Marketing AI Start-ups

Kaushik Jayaram, PhD Candidate, University of Georgia, Athens, GA, United States, Sundar G. Bharadwaj

Startups building AI applications for Marketing need large financial resources to invest to fund the high cost of cloud computing and the cost of storing large volumes of customer data. This drives these startups' need and urgency to obtain venture capitalist (VC) funding. To communicate the AI application's value potential and to obtain funding, marketing AI startups provide textual descriptions of their applications on online databases (e.g. on Crunchbase). We address two research questions: (1) Does a marketing AI application's textual description predict funding beyond other traditional startup factors (e.g. financial, demographic) commonly used to predict VC funding? and (2) What business and marketing strategies communicated through text descriptions are more likely to be associated with VC funding? To address RQ1, we collected data of 1681 marketing AI startup firms from the CrunchBase database. To the data, we applied regularized logistic regression with L1 and L2 penalization, and random forest with best feature selection and extremely randomized trees. We find that the model with textual information adds 2.44% greater predictive power than model with only the startups' other contingent factors. To address RQ2, we employed four approaches: naïve Bayes classification, logistic regression with L1 penalization, LDA and LIWC dictionaries. We find that successfully funded startups' text descriptions communicate benefits of the product offering such as customer engagement and personalization, and they focus on the AI offerings' past success versus future potential. Demonstrating that textual information used to communicate strategy helps predicts VC funding has important implications for struggling AI startups.

3 - Building Bots That Can Beat Beings at Bargaining

Sumon Chaudhuri, ESSEC Business School, Cergy, France, Arnaud De Bruyn

Research on automating the process of negotiation has been given significant attention. However, this attention has not resulted in a commensurate level of acceptance in practice. By studying the literature on human-AI interaction, and automated negotiation, we identify distrust in automated bargaining bots as a key reason for this lack of acceptance. We propose an artificial intelligence (AI) based bargaining bot that can be a possible solution to this problem. Our automated bargaining system uses supervised learning to mimic human behaviour, such that it is undetectable as an AI bot. This will lead to greater trust, and greater willingness to negotiate in the future, in the minds of the bargainer. We use simulation studies to show that our AI bot replicates human behaviour in terms of timing of offers, values of offers, percentage of deals made, and pie splits (when deals are made). We also use generative adversarial modelling to maximize the payoffs that it could earn from each bargaining game. This ensures that the firm utilising such an AI bot can effectively, and consistently, discover the reservation prices of their customers. We intend on deploying our AI bot in a controlled experiment to demonstrate the aforementioned empirically. An AI bot of this sort can be applied to a variety of B2B and B2C settings. It also raises several ethical issues that we also discuss.

4 - The Effects of Artificial Intelligence on Productivity and Quality – A Field Experiment in Banking Services

Anastasia Nanni, Bocconi University, Milano, Italy, Andrea Ordanini, Pallassana K Kannan

We investigate the effects of the implementation of an AI solution using a unique database obtained by a global bank that also helped us to set up a field experiment concerning the rollout of such AI solution. The bank decided to implement an AI solution aiming to automate the responses to tickets opened by employees who, in its various branches, need support to solve issues related to mortgages raised by customers. While until last year all these tickets were handled by a task force of experts at the corporate level, in collaboration with the bank we set up temporary experimental conditions according to which, for two months, a group of branches started to operate assisted by the new AI solution, while another group of branches continued to work with the traditional method. Our findings from a series of diff-in-diff analyses reveal that the AI solution generates i) a positive efficiency effects on the time to handle the ticket ii) a negative effect on the satisfaction of the branch employees involved in the process iii) an unexpected spillover on service offering (fewer mortgages granted), and iv) a positive effect on customer satisfaction for the assigned mortgages (mostly due to a perceived better process). Our analyses contribute to both literature and practice in shedding light on the important and often overlooked trade-off effects associated to the implementation of AI in service organizations.

■ SA08

Virtual Room 08

Machine Learning and Causal Inference

Contributed Session

Chair: Khaled Boughanmi, Cornell University, Ithaca, NY, United States

1 - Sources of State-dependence in Brand Choices: Learning vs. Switching Costs

Daisoon Kim, Assistant Professor, North Carolina State University, Raleigh, NC, United States, Nahyeon Bak

This paper investigates why consumers' brand choices are state-dependent by testing two competing theories: learning and switching costs. We first provide descriptive analyses derived from behavior implications. We then isolate the causal effect using a double-machine-learning estimator applied to a large data set including consumers' transaction history for repeatedly purchased consumer-packaged goods. We find i) the negative impact of a new brand trial on size choice, ii) the negative association between brand switching and experience, and iii) the low repurchase frequency of a brand switched by price cuts. These findings highlight the importance of learning in dynamic consumer behavior.

2 - Off-Policy Learning for Dynamic Content Promotions

Joel Persson, ETH Zurich, Zurich, Switzerland, Stefan Feuerriegel

We present an off-policy learning framework for optimal dynamic promotions of curated web content. Our approach is motivated by a marketer (or online editor, content creator) that sequentially in time must determine which subset of currently relevant content (e.g., "editors picks", top blog posts, latest articles) shall be promoted on owned distribution channels (e.g., website homepage, email newsletter, social media) such that content performance metrics are optimized. The policy is constructed by first learning the causal uplift from promotion, then finding the covariates prescriptive of the uplift heterogeneity, and finally ranking content with respect to the predicted uplift given the prescriptive covariates. We empirically test the performance of our policy by partnering with a leading national newspaper. Here, we test performance by (1) deploying the policy for sequential decision making for new content, and (2) performing counterfactual policy simulations on historical data. For (1), we implement the policy in a decision support system such that it at any decision point in time recommends which currently relevant content to promote. We then study the optimality of the promotion decisions under our policy compared to previous practice. For (2), we study how our policy would have improved historical decisions under a variety of constraints faced in practice. Our research contributes to marketing in two ways: First, by providing an off-policy learning framework tailored to dynamic promotions of curated web content. Secondly, by empirically demonstrating the effectiveness of such policies when deployed for sequential decision making.

3 - Celebrity Endorsement Effects: Evidence from Esports

Sriniketh Vijayaraghavan, PhD Candidate, Wisconsin School of Business, Madison, WI, United States

We examine the impact of celebrity endorsements on the adoption of substitutable products that vary in their popularity. We quantify how these effects vary over time and establish a causal link between the adoption of a product by amateur users and the skill level of the celebrity endorser. We constructed a 30-month consumer panel detailing rich behaviors within a video game with several exogenous shocks to product quality and the exposure that an endorser receives. We use this consumer panel to track daily product usage for over six million amateur players and match these observations with celebrity product exposures from major Esports tournaments. Esports has been booming over the past decade, and global viewership now rivals that of other major professional sports such as the National Football League. We use our unique data to gain insight into the effects of endorsements on consumer product adoption in an environment where there is no advertising or celebrity-brand contractual obligation. We leverage a hierarchical Bayes model to capture the magnitude and shape of celebrity endorsement effects on amateur product usage over time. To the best of our knowledge, this is the first paper to quantify how celebrity endorsement effects vary over celebrity skill levels and their effects over time. Our counterfactuals offer guidance to a brand about the portfolio of endorsers it should consider to maximize adoption.

4 - The Impact of Fame on Artistic Production

Khaled Boughanmi, Cornell University, Ithaca, NY, United States, Olivier Toubia, Asim Ansari

Awards give a valuable boost to firms and individuals that operate in creative industries as they increase visibility and boost growth opportunities. In this paper, we study the causal impact of winning the Grammy for Best New Artist on the subsequent productivity and the growth in musical variety offered by winners. Our causal identification strategy controls for the ability bias by comparing the outcomes of the winners and the contenders to the award. Our empirical investigation leverages a rich data set that we collected from multiple online data sources, and that spans the entire history of the award: the nominees, their characteristics, and the integrity of their repertoires. The data set also contains most of the song releases of these artists as well as their acoustic fingerprints which are digital summaries of the songs' phonic features. Our inference strategy leverages probabilistic machine learning and Bayesian nonparametric techniques to structure an artist's musical repertoire. Specifically, we use a hierarchical Dirichlet process to discover how musical styles emerge in an artist's repertoire before and after the nomination to the Grammy. Our framework provides interesting insights about the effect of fame on artistic production.

■ SA09

Virtual Room 09

Choice Modeling 1

Contributed Session

Chair: Gary J. Russell, University of Iowa, College of Business Administration, Iowa City, IA, 52242-1000, United States

1 - Estimating Personalized Demand with Unobserved No-purchases Using a Mixture Model: An Application in the Hotel Industry

Sanghoon Cho, University of South Carolina, Columbia, SC, United States, Mark Ferguson, Pelin Pekgun, Andrew Vakhutinsky

Estimating customer demand for revenue management solutions faces two main hurdles: unobservable no-purchases and non-homogenous customer populations with varying preferences. We propose a novel and practical estimation and segmentation methodology that overcomes both challenges simultaneously. We combine the estimation of discrete choice modeling under unobservable no-purchases with a data-driven identification of customer segments, providing a comprehensive solution to the theory and practice of revenue management in the travel and hospitality industries. In collaboration with our industry partner, Oracle Hospitality Global Business Unit, we demonstrate our methodology in the hotel industry setting, where increased competition has driven hoteliers to look for more innovative revenue management practices such as personalized offers for their guests. Our methodology predicts demand for multiple types of hotel rooms based on guest characteristics, travel attributes, and room features. Our framework combines clustering techniques with choice modeling to develop a mixture of multinomial logit discrete choice models and uses Bayesian inference to estimate model parameters. In addition to predicting the probability of an individual guest's room type choice, our model delivers additional insights on segmentation with its capability to classify each guest into segments (or a mixture of segments) based on their characteristics. We first show using Monte-Carlo simulations that our method outperforms several benchmark methods in prediction accuracy, with nearly unbiased estimates of the choice model parameters and the size of the no-purchase incidents. We then demonstrate our method on a real hotel dataset and illustrate how the model results can be used to drive insights for personalized offers and pricing. Our proposed framework provides a practical approach for a complicated demand estimation problem and can help hoteliers profile their guests based on their preferences, which can serve as a valuable input for personalized offer selection and pricing decisions.

2 - Relaxing Functional Form in Choice Models through Gaussian Processes

Samuel Levy, Carnegie Mellon University, Pittsburgh, PA, United States, Richard Mirman, Alan Montgomery

Consumers change their choice as expenditures within a category increase. Traditional choice models usually make restrictive structural assumptions to specify the expenditure elasticity. This imposed functional form of utility strongly influences the range of estimable substitution patterns across goods. Consumers with highly nonlinear preferences may have consumption thresholds in which buying patterns dramatically change when price or budget changes. Understanding these thresholds with a flexible utility-based model could lead to improved pricing and promotion decisions. Using Gaussian process priors on utility functions, we relax the functional form of both inside goods and outside good, within the context of constrained utility maximization. We estimate a general direct utility choice model for simultaneous purchases within a product category. Our model captures non-linear rates of satiation for inside and outside goods alike, that traditional nonhomothetic parametric models fail to capture by assuming a given functional form of utility. The proposed model can automatically detect non-linear patterns of consumption from the data and provide a more precise statistical inference.

3 - Confirmation Bias in Quality Learning from Consumer Reviews

Shi Wang, The Ohio State University, Columbus, OH, United States, Anocha Aribarg, Ralf Van der Lans

The extant marketing literature has demonstrated the impact of consumer reviews on firm performance outcomes at the aggregate levels and focused primarily on the role of star ratings, not review content. Only a few papers have investigated how consumers make choice decisions based on review content (e.g., Liu, Lee and Srinivasan 2019; Wu et al. 2015). In this research, we aim to examine how consumers select reviews to read, how they interpret the review content, and how it may affect their choices. Given unobserved orders of reviews read in clickstream browsing and purchase data, we conducted an incentive-aligned review-based choice experiment to test i) whether confirmation bias as a result of endowed brand preference influences consumers to select more positive reviews of a product offered by a preferred vs. less preferred brand to read and ii) whether they interpret information in favor of their preferred brand's product. We confirm these hypotheses based on model-free evidence. We further build a choice model with quality learning to examine how researchers may capture these biases in observational data by relaxing standard learning model assumptions. Based on this model, we conceptualize that confirmation bias in favor of a brand may affect prior beliefs about the quality of its product, review selection, review interpretation, and the extent to which consumers update quality beliefs based on review information. The model also allows us to calculate consumer welfare loss due to confirmation bias in review selection and information processing.

4 - Modeling Bundle Choices: Should You BYOB?

Gary J. Russell, University of Iowa, College of Business Administration, Iowa City, IA, 52242-1000, United States, I-Hsuan Chiu, Thomas S. Gruca

Understanding consumer preference for bundles is a key element of effective new product design. In addition to conjoint analysis, researchers and practitioners often use a bundle configuration approach to study customer preferences for bundles. In a configuration study, subjects are asked to create an ideal bundle from a given menu of various products. The resulting choice data poses two challenges for researchers. First, as the size of the menu grows, the number of possible bundles grows geometrically. This implies a large number of alternatives in the choice set. Model estimation from a large choice set can be computationally expensive or even impossible. Second, because each customer only configures one ideal product bundle, researchers have only one choice observation per customer. Thus, researchers are limited to aggregate level analysis. In this research we propose a modeling approach that deals with the challenges of configuration data and provides clear insights into customer preference segmentation. We show that the configuration data can be represented by a Multivariate Logistic (MVL) choice model, given certain assumptions about the individual choice process and preference heterogeneity. We compare the configuration study results with a conjoint study and illustrate the differences between these two approaches.

■ SA10

Virtual Room 10

Explore/Exploit Strategies

Contributed Session

Chair: Keyan Li, MIT, Cambridge, MA, 02142, United States

1 - Model-based Sampling to Identify Customized Treatments

Marco Gregori, Erasmus University Rotterdam, Rotterdam, Netherlands

In laboratory and field experiments, behavioral scientists and consumer researchers are often interested in identifying the largest Conditional Average Treatment Effect (CATE) for subgroups or covariates of interest: in other words, the aim is customizing the optimal treatment. This can be difficult in high-dimensional settings, with many covariates and many treatments available. We propose a novel sampling algorithm, named Top-and-Challenger, to identify the largest CATEs using the smallest possible sample size. The data are collected in small sequential batches: based on earlier statistical outcomes, the algorithm calibrates the allocation of subsequent treatments. The algorithm is based on the following: a hierarchical spike-and-slab model performs variable selection and, if there is an effect, pools information across treatments. Then, based on the model estimates, the algorithm favors administering the top two most promising treatments. Given that the objective is identifying the most effective treatments, the Top-and-Challenger algorithm easily outperforms random allocation as well as other commonly used algorithms for multi-armed bandits, such as Thompson sampling. In the empirical application, we apply the novel algorithm to customize "earmarking lists" for charity donations, demonstrating practical feasibility. We also show how to design adaptive experiments with Qualtrics, automatically adjusting treatment allocations over batches using Top-and-Challenger.

2 - Beyond Myopia: Model-free Approximate Bayesian Learning for Conversion Funnel Optimization

Raghav Singal, Columbia University, New York, NY, United States, Garud N Iyengar

The capability of choosing the ad action as a function of the consumer state is critical for modern-day marketing campaigns. We study the problem of optimal sequential personalized interventions from the point-of-view of a firm promoting a product under a fairly general conversion funnel model of consumer behavior. Our model captures the state of each consumer (e.g. interaction history with the firm) and allows the consumer behavior to vary as a function of both her state and firm's interventions. In contrast to approaches that focus only on the myopic value of an intervention, our model accounts for long-term value by allowing the firm to make sequential interventions to the same consumer. The objective of the firm is to maximize the conversion probability, and the key challenge here is that the firm does not know the state-specific effects of various interventions and must learn them from customer interactions. We propose a new online learning and decision-making algorithm for this problem that we call model-free approximate Bayesian learning. Our algorithm inherits the simplicity of Thompson sampling approach for multi-armed bandits and maintains an approximate belief over the value (myopic plus long-run) of each state-specific intervention. The belief is updated as the algorithm interacts with the consumers. Despite being an approximation to the Bayes update, we prove the asymptotic optimality of our algorithm. We show that our algorithm significantly outperforms all traditional approaches on a real-world large-scale dataset. Furthermore, we show that our algorithm is able to automatically adapt to changes in consumer behavior (concept shift) and maintains a high level of uncertainty on the value of less explored consumer segments (covariate shift).

3 - Targeting Annual Marketing Campaigns: Rebalancing Exploration and Exploitation

Keyan Li, MIT, Cambridge, MA, United States, Duncan I. Simester

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 tradeoff. This tradeoff is widely studied in online learning domains. However, in many marketing channels, we are forced to learn in batches that occur infrequently. For example, when demand is seasonal, cycles may occur annually, with retailers using data from last year to train this year's policy. We investigate how to optimally combine exploration (more experimentation) and exploitation (direct implementation) in these settings. Our proposed algorithm balances the expected value and opportunity cost of new information from every new batch. We validate our findings using data from a field experiment.

■ SA11

Virtual Room 11

Healthcare Policy And Consumer Decision

General Session

Chair: Minjung Kwon, Syracuse University, Syracuse, NY, United States

Co-Chair: Jong Yeob Kim, NYU Stern School of Business, New York, NY, 10003, United States

1 - Price Transparency in Healthcare: An Empirical Analysis of Price Disclosure in Maine

Minjung Kwon, Syracuse University, Syracuse, NY, 13244, United States, Lingling Zhang, P. K. Kannan

Healthcare costs in the US continue to rise, raising concerns across the country. One of the critical elements to increase the healthcare costs is the fact that price information is not properly provided to the patients, the consumers of the healthcare services. The lack of necessary price information prevents consumers from making informed decisions about where to seek healthcare and leads to bill shocks afterwards to many consumers. In a few states, price transparency law is enacted and requires the disclosure of detailed price information at a publicly-available website with a consumer-oriented interface. In this study, we use medical claim data for all the insured patients in Maine and estimate the causal effect of price disclosure on consumers' healthcare choices and the resulting cost savings across different groups of patients. We also examine how the impacts vary across a number of factors such as geographic areas, patient demographic groups, different medical procedures, types of facilities, and insurance plans. We further discuss the implications of the competition intensity among facilities, the financial incentives of price search, and consumers' ability to shop around for different procedures.

2 - Health Insurance and the Dynamics of Patient Decision Making

Jong Yeob Kim, NYU Stern School of Business, New York, NY, 10003, United States, Masakazu Ishihara, Vishal Singh

An aging population is considered to be a major factor in the rising of medical expenditure. Patients aged over 65 years made up 16% of the population but accounted for 36% of all health care spending in the US [Centers for Medicare and Medicaid Services (CMS), 2016]. This article examines the impact of government insurance expansion for elderly care in the South Korean market. In particular, our research design utilizes dental insurance expansions for elderly patients in South Korea to examine the patients' hospital utilization and treatment choices, and the dynamics of patient decision making. We exploit the price variation in different forms of treatments (dentures vs. implants) to compare outcomes of patients just below age thresholds with those just meeting the age thresholds in a regression discontinuity design. We next develop a dynamic structural 'patient life-cycle' model to examine patients' strategic delays of treatment and adoption of new technology (implants) under different dental insurance policies. Structural parameters are used to conduct a variety of counterfactuals that provide insights on hypothetical government insurance policies and their impact on patient decision making. Drawing on our findings, we discuss the implications of lowering the age threshold for other contexts, such as Medicare expansion.

■ SA12

Virtual Room 12

Corporate Social Responsibility 1

Contributed Session

Chair: Axel G. Stock, University of Central Florida, Dept Of Marketing, Orlando, FL, 32816-1400, United States

1 - Meta-analysis on the Impact of Different CSR Initiatives on Consumer's Behavior

Pedro Verga Matos, Associate Professor, ISEG- Lisbon School of Economics and Management, Universidade de Lisboa, Portugal, Lisboa, Portugal, Rita Coelho do Vale, Filipa de Almeida

Corporate social responsibility (CSR) research has been thriving as a reflection of greater corporate interest. Initially studied from the stakeholder's perspective, recently more attention has been devoted towards CSR's impact on consumer behavior. However, results have not been convergent nor conclusive (Peloza & Shang, 2011). Thus, in order to better understand the impact of CSR initiatives on consumers' behaviour and attitudes towards goods and companies that engage in those CSR initiatives we conducted a thorough meta-analysis on this topic. This meta-analysis studies not only the direct effect between CSR initiatives and consumer behavior, but also the moderating impact that different CSR initiatives (e.g., social or environmental) may have on different types of consumer response (e.g., loyalty, purchase intentions). Additionally, it also analyses the extent to which industry type (e.g., energy, health care), country characteristics (e.g., country's developmental and individualism levels), as well as methods (correlational or experimental) impact this relationship. We present results of a comprehensive meta-analysis covering all available data on CSR and consumer response up to December 2020, including 115 studies and 455 effect sizes. Results suggest CSR has a positive and medium effect on consumer behavior ($r = 0.43$) but with different magnitudes depending on type of initiative and on type of behavior considered. CSR initiatives moderate the effect such that environmental CSR has a marginally lower effect ($p= .061$; by .114) as well as philanthropic CSR ($p= .057$; by .114) than for any other CSR initiatives. Type of consumer response also moderates this relationship such that the effect is lower for purchase intention ($p < .05$; by .084) and for behavioral engagement ($p < .05$; by .146), and higher for brand image ($p < .001$; by .148) in comparison with other types of consumer response. No other effects reached significance. These insights are of the upmost importance to scholars and marketers alike, who can leverage this knowledge to better define CSR initiatives.

2 - The Role of Centrality in Peer Evaluation

Dalal Ahmad, Assistant Professor, Kuwait University, Shedadiah, Kuwait

The majority of marketing courses implement some form of team-based project to prepare students with the collaborative skills needed to succeed as contemporary marketing professionals. These projects require the implementation of peer evaluation to assess the fair contribution of each student. Research on peer evaluation in the marketing literature has primarily focused on the development and assessment of such instruments. However, we have limited understanding of the factors affecting the peer evaluation process. In this study, we use social network analysis to examine how degree centrality and personality traits influence peer evaluation. Data was drawn from 225 undergraduate students divided between 40 groups in nine marketing classes.

3 - The 15% Pledge: Does it Help Minority Owned Suppliers?

Axel G. Stock, University of Central Florida, Orlando, FL, United States, Eric Schmidbauer

In summer 2020 Aurora James, the founder of sustainable accessories brand Brother Vellies, launched the 15 % pledge campaign as a response to racial injustice, urging multi-brand retailers to give 15 % of their shelf space to minority-owned brands, consistent with the % of the black population in the US. However, while some major brands like Sephora and Gap have pledged, many other retailers have not followed suit. We develop a game theoretic model to analyze a retailer's decision to join the 15 % pledge. In our model two retailers compete for a market consisting of segments of consumers who favor, disfavor or who are indifferent to the pledge. Retailers choose their suppliers among majority and minority owned brands consistent with their pledging strategy, and set retail prices. Suppliers set their wholesale prices taking into consideration the retailer's pledges. We identify conditions under which neither, one or both of the retailers take the 15 % pledge. Interestingly, we find that while the possibility of the 15 % pledge increases market participation of minority owned suppliers, there are conditions under which these suppliers are worse off compared to the case when they would be chosen without the pledge.

■ SA13

Virtual Room 13

Reputation

Contributed Session

Chair: Seoyoung Kim, University of Georgia, Athens, GA, 30602, United States

1 - Strikes Against Emerging Competition: Preventing Backfires By Respecting Consumers' Needs

Hyunjung Crystal Lee, Universidad Carlos III de Madrid, Getafe, Spain, Eline De Vries

The current research examines the influence of employees' labor strikes on consumers' perception of the company and the subsequent changes in consumption decisions. While attracting the attention of the public regarding such issues can fuel necessary changes, the way such strikes are carried out can instead fuel stronger misperceptions and oppositions. As prior research on internal marketing notes, consumers strongly link the behaviors of the employees with the corporate image (Wieseke, Ahearne, Lam, & Van Dick 2009). Thus, we argue that even protests and strikes must keep long-term customer orientation in mind. We show that certain types of strikes, such as strikes protesting against a competing company, can drive consumers away from the company where employees initiated the strike and actually prefer the competing firm. Importantly, we demonstrate how such strikes can be framed in a way that can earn consumers' understanding, empathy, and business. Using two experiments, we demonstrate that consumers perceive anti-on demand business strikes as going against their wishes, thus unfair, resulting in a lack of empathy towards the strikers, and ultimately making consumers prefer on-demand businesses over traditional businesses. We then show how specific framing of anti-on demand business strikes can moderate this effect. In doing so, the current research breaks new ground on the management of consumers' perception of labor strikes as a promising new research avenue in marketing. Moreover, we extend prior research on fairness-as-a-motivated-cognition (Barclay, Bashshur, & Fortin 2017) by showing that consumers' fairness perception of the strike hinges on whether the form of the strike communicates respect for consumers' needs.

2 - CSR Messages: Is it the Motives or the Means That Matter the Most to Consumers?

Sofía López-Rodríguez, Associate Professor of Marketing, University of the Balearic Islands, Palma, Spain", Ronn J. Smith

To be in good standing with consumers, companies increasingly need to be socially and environmentally responsible. However, a company's corporate social responsibility (CSR) efforts often fail to create this positive impact. The literature suggests that when company motives for CSR are perceived as intrinsic - out of a genuine social or environmental concern - it has a positive influence on a company's social responsibility reputation. At the same time, because consumers are becoming more and more skeptical about CSR messages, there also is research suggesting consumers need specific information about the social and environmental initiatives undertaken to believe the company is living up to its professed CSR standards. This research sets out to examine the influence on consumers of these two types of CSR messages: i) intrinsic motivations-oriented, why the company cares about social and environmental wellbeing, versus ii) action-oriented, how the company is acting for the public good. We report three studies that test the impact of these messages on consumers across industries with varying pre-tested reputation valence (i.e., a casino vs. a toy company); and across varying pre-tested CSR dimension-industry alignments (e.g., alignment: customer care and the gambling industry vs. misalignment: environmental protection and the gambling industry). The results of this research suggest a positive effect of action-oriented (vs. motivations-oriented) CSR communications, while advancing boundary conditions related to industry reputation, as well as to the CSR dimension-industry alignment. The findings of this research have implications for companies on CSR strategy and communicating this strategy, as well as for a policy/consumer interest perspective to help identify possible company attempts to manipulate consumer perceptions of their CSR performance.

3 - A Marketing Problem-solving Approach Based on the Combination of Inventive Design Method (IDM) and Dynamic Interactions Modeling

Hana Alouaoui, Data Scientist, DO IT, Schiltigheim, France, Remy Houssin, Amadou Coulibaly

The members of a brand community interact continuously. Their interactions allow a better understanding of different behaviors and correspondingly constitute an internalization process leading to gradual value creation. However, ignoring these interactions is likely to result in a significant waste of time and emergence of conflicts and contradictions in the community. In this paper, we propose an approach that aims to strengthen the marketing model and anticipate risks. It is based on the IDM-TRIZ (Inventive Design Method) which examines all the contradictions that may be encountered in order to select the best solutions. Our approach is composed of four steps namely;Analysis of community members interactions and behaviors, Dynamic interactions' modeling,Risk analysis focused on the identification of the most important conflictual interactions, their severity and their occurrence frequency, And an evaluation process to speed up and improve decision-making.

This last step aims to measure conflicts' intensity by setting a specific criticality threshold in order to give a solving priority to those with higher criticality. A primary experimental study is conducted on the Marketing Model of a company in the building trade field.

4 - Beyond Buycott vs. Boycott: Cognitive, Affective, and Behavioral Responses Towards Brand Activism

Seoyoung Kim, PhD Candidate, University of Georgia, Athens, GA, United States, Sundar G. Bharadwaj

The notion of corporate responsibility has evolved significantly over the past few decades. Companies whose sole social purpose used to be profit maximization are now obligated to be conscious of their impact on a broad range of stakeholders. Recently, the evolution of corporate responsibility has taken another step, and brands have begun to engage in brand activism, through which they take a stance on issues of social, environmental, and racial issues. Notwithstanding the rapid institutionalization of brand activism, research has yet to explore (1) various routes through which brand activism generates advantages and perils for activist brands and (2) the value of brand activist trajectory. Accordingly, insights about brand activism implementation strategy are also scarce. In this study, we use symbolic management theory to theorize the influence of brand activism on cognitive, affective, and behavioral responses of consumer. We investigate the ongoing institutionalization of brand activism which enables brands to communicate ideological, comparative, and isomorphic value via brand activism, and the role of brand activism trajectory and symbolic management strategies - i.e., perspective making and sensemaking. Using a rich multi-source daily panel dataset composed of activist posts on brands' social media, brand attitude panel survey data, and scanner panel data with the functional data analysis, this study will shed light on brand activism and strategies to capitalize on brand activism.

Saturday, 10:15AM - 11:15AM

■ SB02

Virtual Room 02

Funding Innovation

Contributed Session

Chair: Beatrice Martin, WHU - Otto Beisheim School of Management, Vallendar, 56179, Germany

1 - An Empirical Investigation of Entrepreneurs' Communication and Gamification Strategies in Crowdfunding

June-ho Chung, Rutgers University, Newark, NJ, United States

Crowdfunding has grown into a popular financing platform where entrepreneurs raise capital from potential investors (i.e., backers) by offering new products or services. Considering the competitive environment within online crowdfunding platforms, creating effective digital communication is particularly important to entrepreneurs. How to create a project campaign message that will communicate their core values and also connect with potential investors is a crucial issue for many entrepreneurs in crowdfunding platforms. Therefore, this research investigates how linguistic cues - entrepreneurs' social mission cues and a sense of unity - in a project campaign message can promote crowd support for entrepreneurs. This study is among the first empirical research to examine the effects of gamification as a motivator on crowdfunding performance. Given the multifaceted nature of potential investors' intrinsic motivation within crowdfunding environments, especially a reward-based platform, this study examines the role of gamification in amplifying the effect of entrepreneurs' social mission cues and sense of unity on crowdfunding success. In addition, conveying gamification features (i.e., challenge goals, extra rewards) in project campaigns can also directly contribute to meeting funding goals. In conclusion, I expect that the effectiveness of an entrepreneur's social mission cues is enhanced when potential backers' sense of unity is increased and the project campaign displays gamification features.

2 - Does Equity Crowdfunding Hurt or Help Reward-based Crowdfunding? Evidence from a Natural Experiment in the US

Jihoon Hong, University of Southern California, Los Angeles, CA, United States, Dinesh Puranam, Gerard J. Tellis

Prior research suggests that reward-based crowdfunding acts as a super catalyst that fosters innovation through direct and spillover benefits. Recently, equity crowdfunding has not only emerged as an alternative to reward-based crowdfunding but has surpassed reward-based platforms in terms of funds raised. However, it is unclear whether equity crowdfunding will replace, bolster, or partially substitute reward-based crowdfunding. The authors exploit a natural experiment in the U.S. to assess the effect of the introduction of equity crowdfunding on reward-based crowdfunding. The authors find evidence that the introduction of equity crowdfunding results in a decline in the volume of (i) successfully funded projects, (ii) projects delivered, and (iii) blockbuster projects on reward-based platforms. Additional analysis suggests that higher-quality creators migrate to equity crowdfunding platforms, irrespective of experience. We discuss alternative mechanisms for our results. For regulators and policymakers, these findings flag an additional reason to strengthen consumer protections on reward-based platforms. We also discuss whether the dilution of benefits from reward-based platforms affects the innovation ecosystem.

3 - Innovation Imprinting: Why Some Firms Remain Innovative After They Go Public and Others Do Not

Simone Wies, Goethe University Frankfurt, Frankfurt, Germany", Christine Moorman, Rajesh Chandy

Growth and innovation are primary arguments for firms seeking to go public and access resources from the stock market. So it is poignant that going public is, for a majority of firms, associated with a pronounced slump in breakthrough innovation. This paper proposes an actionable, marketing-related explanation for why some firms that go public manage to beat the post-IPO innovation slump: innovation imprinting. The paper argues and demonstrates that those firms that engage in innovation imprinting before they go public attract a segment of concordant investors whose risk preferences are more supportive of innovation than investors at large. These investors, in turn, reward the firms' continued introduction of breakthrough innovations even after they have gone public. By analyzing the innovation patterns of 207 firms in the consumer-packaged goods sector before and after an IPO, we observe that one-third of firms are able to maintain or beat their pre-IPO levels of breakthrough innovations after going public. By studying their actions, the investors they attract, and their financial performance and survival rates, we provide empirical evidence for the importance of innovation imprinting and concordant investors in helping firms beat the post-IPO innovation slump.

4 - How Has the Covid-19 Crisis Shaped Social Media Peer-to-peer Fundraising?

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

Non-profit organizations (NPOs) often rely on the success of their fundraising activities for funding. Previous research indicates that a crisis with a severe negative economic impact substantially harms donations. In this research, we study the COVID-19 crisis's impact on a new, digital fundraising channel: social media peer-to-peer (p2p) fundraising. This channel enables any social media user to raise funds for an NPO through their personal network and thus become a fundraiser initiator. The channel thus substantially extends an NPO's reach. While traditional p2p fundraisers are not new, the channel did not have such a large potential in the past, when not supported through social media. It used to be limited to people placing a shoebox for donations at a birthday party entrance. The social ties created by social media may prove ideally suited to be exploited through p2p fundraising. The COVID-19 crisis strongly impacted the social media p2p fundraising channel. In contrast to past crisis research findings, we observe a positive fundraising spike of +530% in the first month of the COVID-19 crisis, which receded only partially. Hence, we study what drove this shift and whether all NPOs benefited equally. Our research shows that for this channel during a crisis, an NPO's size and its cause matters to fundraiser initiators.

■ SB03

Virtual Room 03

NLP in Marketing 1

Contributed Session

Chair: Miriam Alzate Barricarte, Universidad Publica de Navarra, Pamplona, 31004, Spain

1 - "#sad #irritating #sickening #story" and How to Avoid its Repeat in Service Recovery on Social Media – A Case of Double Deviation Specific Complaints

Priyanka Suresh, Indian Institute of Technology Madras, Chennai, India, Vaibhav Chawla

Although negative customer emotions on social media- particularly during complaints and recoveries in double deviation (recovery failures)- are evident, understanding the impact of a firm's recovery efforts on these emotions has gathered little academic interest. Hence, this study focuses on the impact of service recovery on customer emotions by 1) identifying the attributes and themes of recovery on social media and 2) examining the combination of recovery attributes (redress with a status update, apology, loop closed, timeliness of first response and timeliness of final response) that impact the customer emotions of sadness, anger, and disgust, both jointly and individually. For this purpose, we conducted a directed content analysis (using RQDA), followed by Sentiment and Emotions Analysis (using IBM Watson's Natural Language Understanding), on 221 social media conversations. The content analysis revealed that the service providers fell short of adopting complaint-centric recovery strategies. Emotions analysis revealed that although the hypothesized attributes impacted the negative emotions jointly, their impact was not uniform across sadness, anger, and disgust separately. All of them impacted customer sadness, while anger and disgust were impacted by just one each. This study synthesizes the complaint and recovery conversations on social media, enabling the managers to understand the existing online recovery trend. We recommend inculcating status updates and apology to reduce sadness, timeliness of final resolution and loop closure to reduce disgust, and fundamental redress in the recovery strategies to effectively reduce negative emotions in a double deviation scenario on social media.

2 - Featuring Constructs in E-commerce: Massive Scoring of Product Psychological Constructs

Jiawen Li, PhD Candidate, Renmin University of China, Beijing, China, Zelin Zhang, Kejia Yang, Johnathan Z. Zhang

Psychological constructs such as hedonic vs. utilitarian dimensions of product attributes, brand personality and the experiential value of products, are essential in marketing for meaningfully characterizing products and brands. However, as measuring these constructs traditionally relies on human judgments, they are too costly to apply to a massive collection of products in modern E-commerce contexts to help business practice and this frustrating situation greatly restricts academic process, such as large-scale field studies. Fortunately, these attributes are embedded in products' online text such as product descriptions and customer reviews, which can be analyzed using recent advances in NLP. We propose a procedure leveraging NLP and machine learning to solve this issue. First, we manually evaluate a small proportion of products and learn the underlying links between their text features (model input) and the attribute (model output). Next, we apply the learning to a massive number of products. Specifically, we use BERT (Bidirectional Encoder Representations from Transformers) to extract the feature representations and Gaussian Process Regression to learn the input-output mapping. We apply our model on to 4.6 million products across 46 categories and over 18,000 subcategories. We also present a series of scientific assessment to further demonstrates that our algorithm produces almost equally good results compared to human judgments. Therefore, this paper enables industrialization of these powerful psychological constructs of products, providing data abundance and help launch the potential for research and practices in marketing.

3 - The Role of Syntax in Persuasive Marketing Communication: A Natural Language Processing Approach

Florian Ellsaesser, Frankfurt School of Finance & Management gGmbH, Frankfurt Am Main, Germany, Selin Atalay, Siham El Kihal

The use of language is ubiquitous in any marketing communication, such as advertisements or product descriptions, and the decision of how to formulate marketing communications so that they are persuasive is a problem for most marketers. In this paper, the authors take a natural language processing approach to investigate the role of syntax in marketing communications. Using a data set of 134 debates with 129,480 sentences, they show that the syntax of a message communicated, as captured by specific elements of syntax referred to as dependencies, is predictive of its persuasiveness. They identify the specific dependencies that directly influence the persuasiveness of a message and demonstrate how communicators can use the findings to write persuasive marketing communications. In two follow up experiments, conducted in the lab and on Facebook, the authors show that marketing messages written in accordance with their findings are more successful in persuading consumers. Click-through rates on Facebook, for example, increase by 41%.

4 - Mining the Text of Online Reviews to Explore Brand Positioning: Emotional and Psychological Associations

Miriam Alzate Barricarte, Universidad Publica de Navarra, Pamplona, Spain, Javier Cebollada, Marta Arce Urriza

Nowadays, with the growth of the Internet and social networks there is a huge availability of consumer online texts, also known as electronic Word of Mouth (eWOM). So far, papers studying eWOM have mainly analysed how non-textual features of eWOM, such as ratings and volume, influence different types of consumer behaviour, such as information adoption decisions or product choices. However, little attention has been paid to the study of textual aspects of eWOM. At the same time, literature on brand image has mainly relied on survey data to explore brand associations. However, in this new online scenario, some scholars and practitioners are starting to shift their attention to the study of brand image using the textual content of eWOM. When analysing the text of online reviews, the concept of “text mining” arises, which refers to the process of extracting useful and meaningful information from unstructured text. Although this field of literature is still scare, those papers adopting this perspective have been conducted in different product settings and using a wide range of text mining techniques, such as lexicon-based techniques and machine learning algorithms. Thus, extant literature is quite heterogenous in terms of research objectives, research processes and text mining techniques used. Therefore, the main objective of this research is to propose an unified, structured and easy-to-implement procedure to analyse the text of eWOM (we use online reviews in this research), with the ultimate goal of studying brand positioning and brand segmentation.

■ SB04

Virtual Room 04

Social Media

Contributed Session

Chair: Mohsen Foroughifar, University of Toronto, Toronto, Canada

1 - Large-scale SKU-level Product Detection in Social Media Images and Sales Performance

Fariz Abdussalam, Researcher in Marketing AI lab, University of New South Wales, Sydney, Australia, Daniel Han-Chen, Jun Bum Kwon, Osama Al-Qershi, Jeeyeon Kim, Jeonghye Choi

Brand-related posts in social media are on the rise at a staggering rate and these posts often contain images of sponsored celebrities, products or both. However, little is known about which image strategy for social media posts is more effective in gaining post popularity and in turn increasing sales. To seek answers to this question, we propose a novel algorithm to detect large-scale SKU-level products. Our proposed detector named as Product Detector is superior in two ways. First, only a single image for each product is sufficient for Product Detector unlike supervised machine learning alternatives requiring a large number of product images. Second, Product Detector, which is a two-way matching model based on F-SIFT (Flip and Scale Invariant Feature Transformation), shows higher accuracy than standard methods such as one-way matching models based on SIFT. By analyzing 1,440 Instagram posts and corresponding offline sales records, we find that while images of sponsored celebrities are more effective than images of products in driving post popularity, last week’s post popularity of product images contributes more to daily sales performance than the celebrity image-based counterpart. We also find that images having both celebrities and products help enhance post popularity and sales performance. Finally, we discuss our theoretical and managerial contributions.

2 - Networks Speak Louder Than Observables: Representative Sampling in Network Experiments

Yanyan Li, University of Southern California, Los Angeles, CA, United States, Qing Liu, Sha Yang

Random Control Trials (RCTs) have been widely implemented on online social networks to test the effectiveness of various marketing actions. A standard practice of such RCTs is to randomly sample users into treatment and control conditions and estimate the average treatment effect by directly comparing outcomes of the two samples. In this research, we demonstrate that random sampling method can lead to biased causal inference. This is because user behavior on online social networks (e.g., communication) is often affected by their network properties (e.g., degree), but random samples do not preserve these network properties, resulting in the estimated treatment effect being confounded by different network characteristics of treatment and control samples. More importantly, we show that such confound cannot be corrected even after controlling for the observed network properties in estimation. We propose an efficient Metropolis algorithm to draw representative samples such that the treatment and the control samples are comparable in their network properties (e.g. degree distribution) and both preserve the population network properties. Through simulations, we show that representative samples produce more accurate inference of the true treatment effect, compared to standard sampling methods. We characterize the bias of the estimated treatment effect as a function of the difference in network properties between the treatment/control sample and population, as well as between the treatment and control samples. We run counterfactual analysis on 15 large-scale experiments conducted by a leading online social network company in the US, all implemented with random sampling method and having statistically significant treatment effects. We find that the average estimation bias of these experiments can be as large as 174%. For 6 out of the 15 experiments, the company may have made a false positive inference due to the unrepresentative random samples. In contrary, were these experiments conducted with representative samples, the average estimation bias would reduce to 32%.

3 - Why Are Rational Expectations Violated in Social Interactions?

Mohsen Foroughifar, University of Toronto, Toronto, ON, Canada

Individuals often interact with each other through observation --- they observe the choices of other people who possess private information. In such social interactions, it is typically assumed that decision makers have rational expectations, therefore they can infer what other decision makers know via observation of their choices. In this study, I assess the validity of the rational expectations assumption in a social interaction experiment. I use a simple and transparent experimental setting to show that decision makers often fail to exhibit rational expectations in social interactions and this behavior is independent of commonly documented errors in statistical reasoning: subjects exhibit a higher level of irrationality in the presence than in the absence of social interaction, even when they receive informationally equivalent signals across the two conditions. A series of treatments aimed at identifying mechanisms suggests that the behavior of other people are often "ambiguous" to a decision maker who observes their choices. So, the decision maker behaves as if she has limited ability to infer the relationship between what other people choose and what they know.

■ SB05

Virtual Room 05

Sales Force Management 2

Contributed Session

Chair: Binay Kumar, Georgia State University, Atlanta, GA, 30309-1324, United States

1 - Optimizing Pricing Delegation to External Sales Forces via Commissions: An Empirical Investigation

Christopher Amaral, Assistant Professor, University of Bath, Bath, United Kingdom, Ceren Kolsarici, Mikhail Nediak

Sales force activities, including personal selling and pricing, are often outsourced by providers to external firms. Given the importance of these marketing tasks, organizations must ensure that sales compensation is optimized to maximize profitability. In this article, we develop a model of external salesperson behavior in the context of indirect lenders that sell auto loans through external sales representatives at auto dealerships. Using this model, which accounts for the key decision makers in an indirect lending context (i.e., lender, external sales representative, and customer), and a large data set from a North American financial institution, we examine the behavior of external sales representatives, focusing on the demand allocation and pricing decisions made by external salespeople and the impact that commissions have on these decisions. The results indicate that external sales representatives’ decision to allocate customer demand is influenced by commissions provided by competing providers; however, the effect is smaller than suggested in the literature. Also, external sales representatives use a sequential decision-making process, first selecting a lender to allocate customer demand to and then choosing an option from the selected lender’s rate sheet (i.e., menu of prices), rather than a simultaneous process, whereby pricing options from all providers are compared at the same time. Finally, optimal commissions increase exponentially with price to ensure that external sales representatives select higher prices for customers with higher willingness to pay, thus maximizing lender profitability.

2 - The Role of Illegal Rebates in the Pharmaceutical Industry

Jung-Chae Suh, Sogang University, Seoul, Korea, Republic of

Many Korean pharmaceutical companies have recently adopted the self-regulatory compliance programs and implemented 'clean law-abiding management.' This strategy attempts to garner strong support and trust from global and domestic partners. Despite ongoing efforts to crack down on illegal practices, illegal rebates still flourish in the Korean pharmaceutical industry. The current study investigates the role of illegal rebates in competition between branded drug makers (& patent holders) and generic entrants upon patent expiration in the Korean pharmaceutical industry. We examine the actions and reactions of market agents: salesforce/firms, physicians/hospitals, consumers, government, etc. Finally, we will discuss managerial implications.

3 - Adoption of Social-media by B2b Salespeople: A Social Capital Approach

Priyanka Sharma, Indian Institute of Management, Lucknow, India

Social-media platforms such as Facebook, Linkedin, and Twitter provide access to a large network of business professionals as well as information on products and technological trends to B2B salespeople. However, few studies have discussed how social-media influences salesperson performance. We develop a conceptual model based on the technology acceptance model and social capital theory and test it using survey data gathered from B2B salespeople in India. We find that the adoption of social-media is significantly affected by salesperson innovativeness and perceived usefulness. Salesperson innovativeness also strengthens the relationship between perceived usefulness and social-media adoption. Further, social-media adoption positively affects the salesperson performance and this association is moderated by three dimensions of social capital: bonding capital, bridging capital and linking capital. Interestingly, bridging capital also has a positive effect on perceived usefulness of social-media platforms which corroborates the strength of weak ties principle. Therefore, the findings have implications for social selling and to understand how a salesperson's social capital affects the sales performance through the adoption of social-media. The study would also help B2B firms to select salespeople as social-media evangelists to improve sales.

4 - Span of Control and Sales Performance: An Empirical Investigation

Binay Kumar, Georgia State University, Atlanta, GA, United States, V. Kumar

The optimal span of control is crucial for organizational effectiveness as it allows the sales manager to monitor and guide its sales team without being overbearing and stifling individual salespeople's performance. Despite the substantial importance of the sales manager's span of control, research on the topic has been sparse. Using the lens of Leader-Member Exchange Theory, we hypothesize that the span of control has a curvilinear effect on sales performance. The rationale is that as the span of control widens, the sales performance enhances initially because of the reduction in the sales manager's micromanagement of its salespeople. However, after a certain threshold, the performance diminishes as manager may neither be able to devote sufficient energy to high-quality interactions with its salespeople nor observe their performances. Analyzing monthly data of 495 salespeople over the period 2014 - 2018 of a US-based firm, we investigate the effect of sales manager's span of control on the salespeople's performance. Contrary to the common wisdom of a negative association between the span of control and sales performance, our analysis suggests an inverted U-shaped relationship. Moreover, we find that task complexity and salesperson tenure with focal firm flatten the curvilinear effect. To our knowledge, this is the first study to examine relationship between the breadth of a manager's span of control and sales performance. The findings have implications for planning the optimal size of a sales team. We also investigate the impact on sales performance in case of deviation from the optimal size of the sales team.

■ SB06

Virtual Room 06

Platforms 2

Contributed Session

Chair: Nan Li, Tongji University, Shanghai, China

1 - What's in a Name? Seller and Bidder Identities in Online Trade of Digital Collectibles on the Blockchain

Soogand Alavi, The University of Texas - Dallas, Richardson, TX, United States, Ernan Haruvy, Ying Xie

We examine a novel marketplace for a digital collectible card game in which a card has both a play value and a collector's value; i.e., it can be used to battle other players and/or kept as a virtual asset of value. The value of a card to collectors and players is common but information regarding this value is asymmetric, where different individuals have different knowledge about the value, and where knowledge comes from experience playing or trading. Possession of each card is kept in a secure digital blockchain ledger. This allows each card's ownership history to be seen by all. Thus, a reasonable conjecture is that more experienced sellers and buyers would have a bargaining advantage. Accordingly, we find that seller and bidder identities, which are captured by (1) having a username or being anonymous in the marketplace, and (2) being a player of the game or an investor, significantly impacts item valuation and attractiveness. The provenance of a digital item is important, such that a seller of a rare collectible item will gain higher valuation from bidders if they are game players and have a username. Additionally, sellers who have a username in the marketplace receive a higher share of bids compared to anonymous sellers. Bidders with usernames also have bargaining power, meaning that their bids are accepted more easily, and at lower values compared to anonymous bidders. It is expected that the transparency in blockchain-based systems, should increase market efficiency. However, we see that even in a blockchain-based setting reputational elements on both sides of the seller and bidder still play a role in the trade. Digital marketplace; Digital Collectibles (Non-Fungible Tokens); Provenance; Bargaining; Blockchain adoption;

2 - Strategic Recommendation on Digital Content Platform

Kun Qian, University of Texas at Dallas, Richardson, TX, United States, Sanjay Jain

Digital content platforms such as YouTube and TikTok commonly use recommendation systems to match consumers with products that might interest them. Prior research has studied issues such as the optimal design of recommendation systems and the impact of recommendation systems on firm profits (e.g., Li et al 2018, Gardete and Santos 2021). However, recommendation systems can also affect incentives for content producers to invest in content quality. This issue has not been explored in prior literature. Furthermore, prior literature has focused on situations in which the platform aims to design an algorithm that matches consumer preferences with products perfectly. This may however not be optimal from the platform's perspective. In this paper, we examine how recommendation systems can affect compensation design for content producers, content quality, profits, and welfare. Our results show that a platform may benefit by deliberately biasing its recommendations. Interestingly, we find that such strategic recommendations could increase content quality, platform profits, creator profits, and consumer welfare. We also show that the content quality, consumer surplus, and creator profits could decrease when the platform has more accurate information about consumer preferences.

3 - Digital Proxy Wars: A Quasi-field Experiment of International Network Externalities

Willem Smit, Asia School of Business, Kuala Lumpur, Malaysia

The World's two largest Internet economies have produced Digital giants that not only dominate strategic verticals domestically, but also leverage their network externalities abroad. While much is already known about the strategic and financial value of international network externalities for digital platforms, still not much is known about the competitive market entry patterns as a result from international platform expansion. This study compares the competitive international performance of the US and Chinese digital giants: GAFA (Google-Apple-Facebook-Amazon) versus BAT (Baidu-Alibaba-Tencent).To examine these performance dynamics, monthly app download data from 88 different apps in 10 verticals (from different digital giants, GAFA, BAT, or other) over a time period of 5.5 years were captured. To test our hypotheses, we used the relative psychic distance of the 31 host country markets (distance to the US home market / distance to Chinese home market) to design a quasi-field experiment. The experimental setup resulted in three different conditions: 9 host markets relatively closer to China, 15 closer to the US, and 7 markets in the middle. Comparing the competitive performance dynamics among the three conditions allow for studying the temporal competitive patterns in platform internationalization. The (temporary) results show interesting temporal effects: aggressiveness in psychic-distant markets at the start, followed by defensive moves in psychic-closer markets later on.

4 - Copycat and Original Apps on App Markets: Friends or Foes? And for Whom?

Nan Li, Tongji University, Shanghai, China, Jingcun Cao, Avery Haviv

From providing inspiration to outright copying, new apps are frequently developed using the ideas of successful competitors. Mobile app platforms (markets) face a dilemma when choosing whether to allow new, "copycat" apps on to their platform. Consumers may value these new apps even if they are similar to existing apps, and have another participant on the platform may make the platform more attractive. However, consumers might face choice overload when confronted with so many variations. Furthermore, "copycat" apps might stifle or encourage innovation in the app industry. We study this problem using the Chinese Android app market, where consumers subscribe to many different app stores. We identify the degree of similarity between two apps using detailed code inspection of app packages along and other unstructured characteristics such as text. We then identify the effect of copycat apps by comparing the performance of original apps across multiple app markets. We find that 1% increase copycat app downloads increases downloads of the corresponding original apps by as large as 0.078% (an elasticity of 0.078). But the positive impact only exists for low-quality copycat apps but not for high-quality copycat apps. This research increases our understanding of the impact that copyright and content policies have on this market.

■ SB07

Virtual Room 07

AI-Sales

Contributed Session

Chair: Linda Alkire, Texas State University, San Marcos, TX, United States

1 - AI Assistance, Employee Creativity, and Job Performance: Evidence From a Field Experiment

Han Chen, Fox School of Business, Temple University, Philadelphia, PA, United States, Nan Jia, Xueming Luo, Zheng Fang

We examine using AI as trailblazer to take on routine, repetitive portion of tasks at work such that employees can focus on solving nonroutine, higher-level problems. We argue that (1) such AI assistance can increase employees' creativity in terms of creating new solutions for problems—but only for high-skill employees tackling challenging tasks; and (2) such AI assistance can also increase employees' efficiency in correctly retrieving established solutions—but only for low-skill employees handling unchallenging tasks. We provide causal evidence from a field experiment in a telemarketing firm which randomly assigned AI and employees to prospect for customers' interest, and hand over interested customers to human employees for sales persuasion. We find that only for employees with top sales skills handling difficult customers did using AI assistance increase employees' creativity in answering customers' questions, thus increasing the purchase rate. We also find that only for employees with bottom sales skills handling easy customers did using AI assistance increase employees' efficiency of answering customers' questions, hence a higher purchase rate. We thus highlight employees' job expertise and task difficulties as critical conditions to determine whether AI assistance can increase employees' creativity and efficiency in problem solving and consequentially employees' job performance. Our results further suggest that AI assistance under the optimal matched AI-human hybrid labor division leads to an 88% increase on firms' sales revenues, with a fixed and minimal cost of AI systems less than that of hiring a single human employee. This is even more difficult to match if the firm were to use labor to handle repetitive tasks, given that AI can be easily scaled up and serve unlimited number of customers tirelessly.

2 - Salesforce Automation: A Cold-Start-Proof Recommender System

Yuting Zhu, Massachusetts Institute of Technology, Cambridge, MA, United States, Saiquan Hu, Juanjuan Zhang

Helping new salespeople succeed is a priority in salesforce management. We develop a recommender system to help new salespeople identify customers with the greatest conversion potential. One computational challenge is the cold-start problem, meaning the lack of historical transaction data for new salespeople. We approach this problem by constructing and evaluating several deep neural networks using daily transaction data of the entire salesforce of a large insurance company. We uncover neural network structures that can be used in this setting, and analyze the deep features and relationships learned in the model. We present field evidence of how such a recommender system can help boost new salespeople performance.

3 - High Competence and Low Bias of Artificial Intelligence Coaches: Evidence From Field Experiments

Marco Qin, Temple University, Philadelphia, PA, United States, Xueming Luo, Zheng Fang, Nan Jia

We examine whether and how AI can complement employees by coaching them to learn job skills and improve performance, on the basis of a series of randomized field experiments. In Experiment 1, employees are randomly assigned to be trained by either the AI or human coaches for a month. Both types of coaches analyze speech data on employee behavior, identify job mistakes made by employees, and provide professional feedback to correct the mistakes. Results suggest that the incremental effects of AI over human coaches are heterogeneous: AI coaches are as effective as top-ranking managers and significantly more effective than lower-ranking managers in improving employee performance. Given its superior data computation advantages, the AI coach can provide employees with more competent data-driven feedback with greater depth and breadth, thereby enabling them to increase their learning and performance. Further, since AI has a non-human nature without interpersonal prejudice when providing negative feedback, employees perceive AI feedback as less biased, which also increases their learning and performance. Thus, the incremental impact of AI over human coaches on employee performance is accounted for by two distinct channels: high competence and low bias of AI coaching feedback. In a different business setting, Experiment 2 replicates AI's equivalent effectiveness to top-ranking managers and superior effectiveness to lower-ranking managers. Because the lackluster performance of employees coached by lower-ranking managers is a dire problem, Experiment 3 explores an AI-human hybrid strategy, wherein AI assisted the lower-ranking human manager to generate more competent and less biased feedback to coach employees. This hybrid strategy may harness both the data analytical skills of AI and interpersonal communication skills of human. Results suggest that the AI-human hybrid not only overcomes the limitation of lower-ranking managers but also improves employee performance to a larger extent than AI alone.

4 - Different Shades of Artificial Intelligence in Sales and Their Effectiveness

Linda Alkire, Texas State University, San Marcos, TX, United States, Yashar Atefi, Kaushik Jayaram, Irene Nahm

Artificial intelligence (AI) has disrupted the sales function in the past five years, revolutionizing the way salespeople connect to and interact with customers. Despite the growing adoption of AI in sales, little is known about different types of AI in sales and their relative effectiveness across various stages of the sales process. Across two studies (one qualitative and one quantitative), the authors categorized AI applications used in sales into three groups, assisted, augmented, and autonomous intelligence, and studied their relative value across different stages of the sales process. Applying grounded theory methodology to web articles and industry reports as well as interviews with 20 sales leaders working with AI (Study 1), the authors classified different AI solutions used across the stages of the buying cycle and theorized on which categories are more valuable. They then analyzed a unique dataset of all AI startups that provide sales enablement solutions along with their funding history to examine whether each of the three identified categories are more successful in receiving funding (Study 2). Using text analysis methods applied to descriptions of these AI startups, the authors classified each company into one of the identified categories and then tested whether certain categories are less likely to receive funding. First, we used guided LDA method using seed words obtained from Study 1 to predict the likelihood of funding. Second, we used Naïve Bayes classifier to predict the likelihood of investors funding sales AI startups with a specific intelligence. Findings indicate that assisted intelligence is on average valued more by customers and investors, while augmented intelligence is more successful in certain stages of the sales process.

■ SB08

Virtual Room 08

Treatment Effect Estimation and Applications (Session I)

General Session

Chair: Song Yao, Washington University in St. Louis, St. Louis, MO, 63130, United States

1 - Estimating Marketing Component Effects: Double Machine Learning of Targeted Email Promotions

Paul Ellickson, University of Rochester, Simon School of Business, Economics and Marketing, Rochester, NY, 14627, United States

We estimate the causal effects of different targeted email promotions on the opening decisions of the consumers who receive them. To do so, we leverage recent advances in causal machine learning techniques to capture heterogeneity in the content of the email subject line itself, as well as heterogenous consumer responses to the promotional offers and semantic choices con- tained therein. We make two primary contributions to the literature. First, we demonstrate how machine learning can be leveraged in a two-step framework to provide causal estimates of the effect of separate components in a high-dimensional marketing intervention exploiting purely observational data. Second, we apply our methodology to data from 33 distinct email promotions sent by a retailer to over 1.6 million individuals on their contact list to highlight quantitative findings that are relevant to both the marketing literature and managerial practice.

2 - Dynamic Coupon Targeting Using Batch Deep Reinforcement Learning: An Application to LiveStream Shopping

Xiao Liu, Stern School of Business, New York University

We present an empirical framework to create dynamic coupon targeting strategies using a batch deep reinforcement learning (BDRL) algorithm and apply it in a novel, multi-billion-dollar livestream shopping context. Prior solutions to the dynamic coupon targeting problem either ignore long term demand implications or suffer from model bias. Our BDRL 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 the model bias in dynamic structural models, because it is based on Q-learning, a model-free reinforcement learning solution. Third, it alleviates the curse of dimensionality problem by leveraging deep neural networks 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 increases the livestream shopping platform's revenue by 60%, twice as effective as static targeting policies. The dynamic targeting strategy recommends increasing the coupon discount level over time because of the reference price effect, and the rate of increase is faster for low spenders.

3 - Reducing Interference Bias in RCTS in Two-sided Markets

Ali Goli, University of Washington Foster School of Business, Seattle, WA, 60615, United States, Anja Lambrecht, Hema Yoganarasimhan

It is common for online platforms to conduct randomized control trials to experiment with and select strategies before fully deploying them on the platform. Recent studies have highlighted the challenges of estimating the total average treatment effect in two-sided platforms, i.e., the treatment effect of an algorithm/strategy when all users are assigned to a given algorithm. One of these challenges is interference bias due to the failure of SUTVA. Currently, researchers have come up with strategies to change the experiment design to reduce this bias or to use double randomization designs. However, these approaches either do not generalize to contexts such as ranking algorithms or are not able to make use of historical data from previous experiments. We propose a solution that builds on theoretical market equilibrium concepts and employs a customized machine learning model to reduce interference bias. Our method can predict the total average treatment effect using historical data from randomized control trials that may not be ideal.

■ SB09

Virtual Room 09

Choice Modeling 2

Contributed Session

Chair: Arash Laghaie, Goethe University Frankfurt, Rossittener Str 11a, Frankfurt am Main, 60487, Germany

1 - Diurnal Variation in Purchase Behavior: A Scanner Data Application

Sri Devi Duvvuri, University of Washington - Bothell, Bothell, WA, United States, Manoj Thomas, Kalpesh Desai

Preliminary analyses of 1000 shoppers' actual grocery shopping behaviors over a period of six months reveal that time of day has a systematic effect on grocery shopping decisions and behaviors. The total number of food items in the shopping basket first increased till about midday and then decreased as the day progressed. This effect was stronger for virtue products that require deliberation such as beans, vegetables, and meat. In contrast, purchase of vice products that do not require much deliberation—ice cream, cookies, and potato chips—was less affected by time of day and remained relatively constant. This pattern is moderated by shoppers' chronotype and their shopping habits. With the caveat that one cannot make causal inferences about underlying mechanisms with observational data, the authors propose that the results support the hypothesis that people experience diurnal variation in propensity to take deliberative decisions, with the propensity increasing till about midday and declining thereafter. We use a multivariate choice model to extend and investigate these results more thoroughly.

2 - Consumers' Multi-category Search and Purchase Behavior on E-commerce Platforms

Mohammad Zia, Chapman University, Orange, CA, United States, Shahryar Doosti

Online consumer visits on an E-commerce platform such as Amazon are typically characterized by searching and purchasing across multiple product categories. Oftentimes, online customers navigate through several product categories (e.g., office, apparel, electronics), click and examine characteristic of several individual products, add some of these products to their shopping cart, and check out a "shopping basket" composed of several products in different product categories. Understanding consumers' search and purchase behavior across different categories is vital for retailers and their marketing managers. Despite the prevalence of such cross-category patterns, most previous research has focused on consumer behavior in a single category. Moreover, a few number of papers that investigate the consumer multi-category behavior consider only the "purchase" aspect, overlooking "search" aspect of consumer behavior across these categories. In this research, we incorporate a new aspect, namely the search aspect, of the consumers' multi-category behavior. We develop a Multivariate Probit (MVP) model with heterogeneous consumer consideration sets. Consumers make purchase decisions among several product categories in their consideration sets. We adopt a Bayesian approach with MCMC sampling to estimate model parameters. Our results shed light on the importance of accounting for consumer search across categories. First, we find that failing to account for heterogeneity in consumer consideration sets can generally introduce an upward bias in the magnitude of the own and cross price elasticities. Second, comparing to null model with homogeneous consumer consideration sets, the cross-category correlations can have different magnitudes and rankings. This implies that not incorporating the consumer search behavior can result in wrong interference regarding the extent of complementarity/substitutability between different categories. Finally, out model results in a significant improvement in predicting consumer choices in the holdout sample.

3 - Bridging Between Hypothetical and Incentivized Choice

Arash Laghaie, Goethe University Frankfurt, Frankfurt am Main, Germany, Thomas Otter

The hypothetical nature of choices collected in typical discrete choice experiments (DCEs) for market research has been a source of concern for both researchers in academia and industry. To the extent that processing the information in choice sets requires effort, classical economic theory questions the external validity of inferences from standard hypothetical (HYP) choices as elicited in market research. Recent studies in marketing indeed demonstrate increased external validity of inferences from choices that are properly incentivized (ICA). However, these studies model the difference between HYP and ICA data collected from the same population as if preferences change. Together, the classical economists' critique of inference from HYP-DCEs and the notion of changing preferences has led to ignoring the information in HYP data when ICA data are available. In this paper we propose a model that links the information in HYP and ICA data collected in the same population. The model we propose is in the class of sequential-sampling models of choice and assumes that ICA leads respondents to increase their decision effort relative to the standard HYP market research setting, but subject to the same set of "deep" preference parameters. We show that increased amounts of cognitive processing under incentive-alignment materially and plausibly change choice probabilities and outcomes in our model, even if underlying, deep preference parameters are invariant. Our model yields a framework that parsimoniously bridges between data from HYP-DCEs and data from ICA-DCEs that potentially decreases data collection cost at the same level of external predictive validity.

■ SB11

Virtual Room 11

Online/Digital Healthcare

General Session

Chair: Chuhan Liu, Johns Hopkins University, Baltimore, MD, United States

Co-Chair: Jian Ni, Johns Hopkins University, Baltimore, MD, 21202-4673, United States

Co-Chair: Manuel Ignacio Hermosilla, Johns Hopkins University, Baltimore, MD, 21202, United States

1 - Online Care Expansion and Patient Access: Evidence from Talk Therapists

Daniel Goetz, University of Toronto, Toronto, ON, Canada

Using data from a search portal for mental health care services, we evaluate how an exogenous expansion in the number of online competitors in a market affects local providers of psychotherapy. We find a significant, positive effect of the supply expansion on local incumbent providers' propensity to exit from the portal but a limited effect on prices. We argue that online care expansion may reduce access for patients who prefer locally-provided care.

2 - Consumption Variety in Food Recommendation

Nathan Yang, Cornell University, New York, NY, United States, Daiva Nielsen, Laurette Dube, Bärbel Knäuper, Yabo Ling, Jian-Yun Nie

This research explores the justification and implications of incorporating consumption variety into mobile-based food recommendation systems. Our study makes use of data from a popular mobile fitness app, in which we are able to observe large volumes of daily food logs of thousands of users. We first confirm that consumption variety is associated with potential health benefits, such as lower overall calories consumed, higher vegetable consumption, and lower snack consumption. In light of these suggestive health benefits from consumption variety, we seek out to design a novel multi-criteria food recommendation system (FOODVAR) that can accommodate for variety in recommended foods. We then assess the impact of including this additional variety criterion in recommendation system performance, where we show that the incorporation of variety improves the algorithm's evaluation metrics.

3 - Design of Online Health Care Platforms: Motivating Doctors and Benefiting Patients

Qiyuan Wang, University of British Columbia, Vancouver, BC, V6T 1Z4, Canada, Charles B. Weinberg, Chunhua Wu

Online health has emerged as a key component of the healthcare system by providing healthcare services distantly. In this paper, we empirically investigate the market design of online health platforms to understand how to effectively motivate doctors' participation and simultaneously improve patients' accessibility to healthcare resources and welfare. We develop a structural demand and supply model for an online health market that is characterized by patients' tradeoff between service price and quality as well as doctors' endogenous decision, driven by both their prosocial and financial incentives, about service price and quality. Applying the proposed model to a large dataset from a leading Chinese online health consultation platform, we empirically estimate doctors' prosocial as compared to financial incentives. To the best of our knowledge, we are the first to provide such estimates in a field setting. As expected, we show that patients value service quality, and doctors find it costly to provide high-quality service, but we also demonstrate considerable heterogeneity in patients' valuation for service and in doctors' cost to provide high-quality service and their prosocial intensity. Counterfactual analysis of a uniform low pricing policy suggests that it can significantly improve patients' accessibility. However, a two-point uniform pricing policy that allows high-quality doctors to charge a higher price can improve patients' accessibility and increase consumer welfare as compared to a one-point policy.

4 - Public-Private Spillovers in Healthcare: The Case of Online Drug Retailing

Chuhan Liu, Johns Hopkins University, Johns Hopkins University, Baltimore, MD, United States, Manuel Hermosilla, Jian Ni

Despite the fact that a growing number of patients around the world obtain their medications from online pharmacies, there exists little systematic evidence for how this online channel interacts with the public system. We address this gap by examining the impacts that a public policy aimed at lowering drug prices in the Chinese public health system had on the prices charged by the country's leading online drug retailer. Our key finding is that, whereas the public policy was localized to 11 large cities and impacted a select set of medications, online prices decreased nationwide and for a substantially larger set of medications. Whereas the former effect is attributable to geographically uniform pricing, the latter follows from intensified competition. Overall, our results portray the online channel as an amplifier for the impacts of locally targeted public policies.

■ SB12

Virtual Room 12

Corporate Social Responsibility II

Contributed Session

Chair: Gal Gutman, Ben Gurion University, Beer-Sheva, Israel

1 - When Retailers' Ask US to do Things: The Impact of Requesting Consumers Co-participation on CSR Initiatives

Rita Coelho do Vale, Associate Professor, Universidade Católica Portuguesa, Católica Lisbon School of Business and Economics, Portugal, LISBOA, Portugal, Pedro Verga Matos

The aim of the present research is to examine the extent to which the request for consumer co-participation in CSR programs has an impact on consumers' evaluation of retailers and its products, studying this phenomenon across different types of CSR. Most of prior studies highlighted a positive impact of CSR initiatives on consumer's attitudes toward the brands and its products (Chen, & Huang, 2018), on purchasing behaviors (Oberseder et al., 2014), and on consumers' beliefs about a company (Becker-Olsen, Cudmore, & Hill, 2006). However, more recently, anedoctal evidence also indicates a market tendency for retail companies to start requesting for consumers' involvement in their CSR programs. Despite this apparent growing adoption of co-participative CSR activities, little is known about its effects on retailers and their products evaluations. While some prior research suggests that consumers' cooperation with CSR initiatives may help building relationships with associated brands (Cha, Yi, & Bagozzi, 2016), other studies indicate that consumers may respond negatively when demanded to put some effort into a specific cause (Howie et al., 2018). We study this phenomenon across four studies, three of experimental nature and one qualitative, examining the moderating role of consumer co-participation on the relationship between CSR initiatives and consumers' valuations of retailers and their products. Our results show that inviting consumers to co-participate in CSR seems to be most of the times detrimental. Consumers appear to evaluate the retailers' CSR involvement in a less favorable manner across a variety of variables, being this effect more pronounced for environmental initiative types. In particular, consumers seem to hold stronger attitudes and willingness to participate in CSR initiatives, when the CSR activity did not request their direct involvement. To our knowledge this is an important topic of analysis that will allow managers to decide on which CSR approach to invest, and if it is worth or not to request consumers' participation and involvement in their CSR activities.

2 - Does Ethics in Marketing Matter More Than Ethics in Other Functional Areas? Comparison of the Effects of Ethical Leadership on Employee Performance

MyeongJung Kim, Ulsan National Institute of Science and Technology, Ulsan, Korea, Republic of, MinChung Kim, Yeolib Kim

As business ethics become more important than ever, firms spend considerable resources to improve employee job ethicality (i.e., ethics in workplace) through ethics training programs and appraisal systems. Marketers and marketing educators believe that improving work ethics in marketing is critical for a firm's sustainability. However, there is a lack of insight into the accountability of resources spent on improving job ethicality in the marketing function compared to those spent in others. This study attempts to fill this gap by investigating the comparative effects of job ethicality in marketing and other functions of a firm. More specifically, building on the 'ethical leadership' literature in human resources management, this study examines the differential effects of supervisor's job ethicality on subordinate's job performance in three major business functions, namely marketing, finance, and operation. We hypothesize that the positive effects of supervisor's job ethicality on his/her subordinate's job performance is stronger in marketing function whose main goal is to build sustainable relationship with external stakeholders (e.g., customers, channel members), as suggested by social exchange theory and person perception theory. Furthermore, we hypothesize that the 'ethical leadership' effect is amplified for shorter-tenured subordinates since new marketing entrants have less knowledge on their firm's tacit ethical values relative to incumbents. Using data on 1,672 employees from an IT/engineering firm, we tested the hypotheses using a multi-level analysis and found results supporting the hypotheses. The findings reiterate the importance of nurturing ethical marketing leaders and can guide firms in using resources for improving employee job ethicality.

3 - Conceptualization and Evaluation of Pro-sustainability Orientation of the Business Enterprises: A Formative Measurement Approach

Bipul Kumar, Indian Institute of Management Indore, Indore, India

Pro-sustainability orientation, primarily defined from the environmental perspective, is considered as the actions of the firms towards betterment of the natural environment and integration of the same in their business activities. This study conceptualizes pro-sustainability orientation of the business enterprises and develops a second-order formative measure for the same. Following literature in marketing and strategy, we first conceptualize pro-sustainability orientation of the business enterprises and then develop a measure to evaluate the same. As suggested by Diamantopoulos and Winklhofer (2001), we follow the guidelines for formative index construction, which comprises of steps like content specification, indicator specification, assessment of indicator collinearity, and assessment of external validity. We conducted 15 interviews with different stakeholders dealing with issues related to sustainability as part of the qualitative study. It served the purpose of confirming conceptualization of pro-sustainability orientation, as well as identifying its five dimensions namely; innovativeness, aggressiveness, futurity, proactiveness and riskiness. Additionally, it also helped in identifying specific indicators belonging to the respective dimensions of pro-sustainability orientation. Next, we collected data from 163 key-informants in the firms to develop the formative second-order measure for pro-sustainability orientation of the business enterprises that include assessment of indicator collinearity and external validity. This study adds to the stock of knowledge on pro-sustainability orientation and contributes to the literature by providing a second-order formative measure for the same. It also provides important guidance for the managers and policy makers.

4 - Understanding Social Value Through the Customer's Perspective

Gal Gutman, Ben Gurion University, Beer-Sheva, Israel, Oded Lowengart

Background: The underlying assumption is that integrating social value into business organizations creates a double bottom line - on both social and business levels. Nonetheless, it is unclear whether individuals' perceptions and decisions can accommodate this integration. To explore this, we designed a series of studies examining the perceptual tradeoff between business and social considerations in customers' decision-making processes. Namely, we examined (1) how customers perceive different types of social values provided by businesses and (2) how they incorporate business and social considerations into their decision-making process. Findings: We found that in such decision-making processes, the business component actually comprises two types of independent considerations, which operate distinctively: quality and price. Interestingly, the quality consideration was negatively associated with the social consideration; this association was not found between price and social considerations. Examination of the three considerations (social value, quality, and price) in predicting respondents' preference and choice, suggests that all three significantly predict preference, whereas in the choice process the only significant consideration was quality. Hierarchical Bayes analysis revealed that customers were willing to pay a higher price for social value but were unwilling to sacrifice the product's quality to ensure social value. Contribution: This study further explores the costs and benefits involved in the creation of social value in customers' perspective. By shedding light on the personal mechanisms that allow potential customers to integrate contradicting social and business considerations, we may better understand individuals' ability to navigate and manage tradeoffs.

■ SB13

Virtual Room 13

Emotions

Contributed Session

Chair: Subimal Chatterjee, Binghamton University, School of Management, Binghamton, NY, 13902-6000, United States

1 - How Affect Works: Incidental and Integral Pathways to Customer Satisfaction

Mariya Topchy, University of Connecticut, Storrs, CT, United States, Debanjan Mitra, Peter N. Golder

Traditionally, satisfaction research views affect as a unitary event—an instantaneous reaction to an eliciting stimulus—and examines how the incidence and intensity of experienced affect influence customer satisfaction. Yet, psychologists increasingly question this discrete and static view of affect and suggest a process perspective. The latter views affect as a continuous process such that a customer's affect towards a service encounter, say, would be dynamic—there would be a certain level of affect with which customers begin an encounter, this level could change during an encounter, and result in a certain level of affect at the encounter's completion. It remains unclear whether and how this dynamic nature of affect contributes to customer satisfaction evaluations. In this paper, the authors examine how the dynamics of positive and negative affect experienced by customers influence their satisfaction with a service encounter using data collected from a customer panel of a large US bank. Results indicate that positive and negative affect work differently. Specifically, positive affect influences customer satisfaction through an integral pathway: the change in positive affect elicited by an encounter determines satisfaction. In contrast, negative affect influences satisfaction through an incidental pathway: negative affect elicited prior to an encounter influences satisfaction above and beyond encounter-elicited affect. These findings indicate that negative affect, even if unrelated to the encounter, could adversely influence customer satisfaction, but not so for positive affect. The authors examine why this happens.

2 - Gracefully Yours: Would Snap Judgments of One's Subtle Graceful Movements Lead to Inferences About Their Emotional Intelligence?

Andy H. Ng, Cardiff Business School, Cardiff, United Kingdom, Kıvılcım Dö erlio lu Demir, Cenk Koça

In this paper, we argue that graceful body movements (defined as smooth, elegant, and controlled body movements) might serve as important cues to a person's emotional intelligence (i.e., the ability to regulate one's own emotions, and understand and experience others' emotions; Salovey & Mayer, 1990). Moreover, we propose a parallel effect in brand perception - perceived "emotional intelligence" of brands (i.e., customer orientation and service quality) can be enhanced by using graceful motion in a brand's animated logo. Results of three studies support these propositions. In Study 1 (N = 253), participants judged a confederate who moved gracefully (vs. non-gracefully) as more emotionally intelligent. In Study 2 (N = 82), participants who moved more gracefully when completing some everyday tasks (as judged by independent raters) were more emotionally intelligent (as reported by the participants themselves). These two studies support the notion that a person's graceful movement is a valid signal of his or her emotional intelligence that observers pick up accurately. Furthermore, in Study 3 (N = 201), participants judged a brand as having a higher ability to adapt to customer-specific needs and new environments, and provide service of higher quality (as assessed by SERVQUAL; Parasuraman et al., 1991) when the brand used an animated logo that moved gracefully (vs. non-gracefully). Overall, this research contributes theoretically to research on the relationship between body movements and emotional intelligence and documents a consequential impact of such cues on brand perception. Practical implications for marketers are discussed.

3 - Drivers of Consumers' Willingness to Buy Nostalgic Products

Paraskevas C. Argouslidis, Associate Professor of Marketing, Athens University of Economics and Business, Athens, Greece, Eirini-Anna Kollia, George Baltas

In an era where firms strive for differentiation through high-technology products, consumers tend to remember the classic product generations of the past. Given its impact on consumers' life and choice decisions, product nostalgia remains under-researched. Drawing on the received nostalgia literature and broader consumer research, this paper proposes a framework for determinants of consumers' willingness to buy (WTB) nostalgic products. The psychographic variables of interest were captured through established constructs, while product-nostalgia related factors were measured with stimuli exposing respondents to a) new and past generations of classic nostalgic brands (e.g. Vespa) and b) contemporary brands that are unlikely to trigger feelings of nostalgia (e.g. the Smart automobile). The empirical implementation involved a survey to a sample of 505 European Millennials, which is a prominent age group for empirical investigations into product nostalgia. Among others, the findings showed that WTB nostalgic products is a) positively associated with trait proneness to nostalgia, beliefs that product quality declines over time, feelings of product imprinting and a need for belongingness and b) negatively associated with such factors as consumer innovativeness, need for uniqueness and high levels of perceived inter-generation changes to a nostalgic brand. The findings offer manufacturers of nostalgic brands useful implications about the psychographic profile of nostalgia-prone consumers, thus enabling them to adopt compliant product design, communication, targeting and positioning strategies and tactics.

4 - The Role of Surprise in Decision Making: How Winning/losing Moderates the Beliefs About the Chances and the Amplification of the Emotional Reactions to the Outcomes

Subimal Chatterjee, Binghamton University, Binghamton, NY, United States, M. Deniz Dalman, Sirajul Shibly

We examine how surprised people feel when they win/lose money ($10/$100) in a hypothetical lottery when the chance of winning/losing is very unlikely (5%), fifty-fifty, or very likely (95%), and if their surprise exacerbates/dampens the pleasure/pain felt with the outcome. We model a decision process wherein the chance of winning/losing indirectly affects their emotional reactions by making the outcomes more/less surprising (i.e., surprise is a mediator or the so-called "bridge" in the evaluation process). Our results implicate a moderated mediation process with two main findings. First, the less likely the chance, the more surprising is the outcome, but less so when losing rather than winning. Second, the more surprising the outcome, the more intense is the emotional reaction to it, but, once again, less so for losing than winning. Our results are important insofar they contradict the normative assumption that utility of an outcome is independent of its associated probability but they are consistent with the more descriptive interpretation that surprise is a "bridge" between the two, first as a proxy for the belief about the probability and, second, as an amplifier of the utility/emotions associated with the outcomes. However, as we find, the belief/emotional role of surprise is weaker for losses than gains, and we discuss reasons thereof, such as people are more accustomed to/less surprised by losing (when the amounts are not too large), and even if people are surprised at losing, they are quicker to rationalize why they lost and not let the surprise color their emotions.

Saturday, 11:30AM - 12:30PM

■ SC02

Virtual Room 02

New Product Design

Contributed Session

Chair: Matthew Selove, Chapman University, Orange, CA, 92866-1005, United States

1 - Product Development at Lean Startups: The Market Learning-financing Tradeoff

Onesun Steve Yoo, University College London, London, United Kingdom, K. Sudhir

In markets with high uncertainty about customer preferences, the lean startup methodology (LSM) advocates an iterative and adaptive product development and testing approach to innovation that maximizes learning about the market. But entrepreneurs with financing considerations need to consider the trade-off between optimizing new product development to learn about the market against the need to produce observable success signals to convey market potential to early-stage investors. This paper nests a Bayesian learning model of product development using LSM within a Nash bargaining game between the investor and entrepreneur, where the entrepreneur's product choices generate endogenous signals of market success for the two players. We use the model to examine when and how financing considerations distort entrepreneurs' early product development choices in equilibrium. We find that entrepreneurs with moderate bargaining positions do not distort even when there are financing considerations; they endogenously develop the minimum viable product (MVP) that maximizes learning. Those with weak and strong bargaining positions distort, though for different reasons. Entrepreneurs with weaker positions distort to increase sales at the expense of learning to generate misplaced investor optimism and obtain investments, while those with strong positions distort to improve the success potential of their funded venture to obtain better financing terms. The former distortion harms innovation efficiency, while the latter harms innovation output. We find that if entrepreneurs can choose investors based on the investors' bargaining position and value-adding capability, they will choose investors with whom they need to distort less. Such self sorting behavior by entrepreneurs can simultaneously reduce both types of distortions, leading to Pareto-efficient improvements in innovation efficiency and output.

2 - Breathing Life into Alexa: Mindfully and Mindlessly

Yegyu Han, IE Business School, Madrid, Spain, Dipankar Chakravarti

Consumers often attribute humanlike features to non-human objects. Social robotics research shows that this tendency to "anthropomorphize" also occurs for innovations rooted in AI technologies such as autonomous vehicles, robots, and smartphones. Speech and voice recognition software has enabled voice-controlled devices (e.g., Amazon's Echo, Google Assistant) that interact more naturally with consumers and can even interpret expressed affect and emotions. Technological breakthroughs are expected to enable these devices to communicate reflectively with consumers and express appropriate emotions. Although voice and voice intonation are known to evoke anthropomorphism, there is a significant lack of understanding of how people may anthropomorphize smart agents mindfully (i.e., explicitly recognizing that the interaction target is a machine) or mindlessly (e.g., applying social rules when interacting with computers). This research explores whether processes underlying anthropomorphism are explicit or implicit, i.e., occur above versus below a threshold of subjective awareness. In two experiments, we adapt the Implicit Association Test to detect this phenomenon empirically for auditory versus purely verbal stimuli. Specifically, we focus on whether people anthropomorphize on the basis of voice and whether voice intonation (rational/emotional) matters. We show that the vocal tone designed into smart agents influences not only explicit but also implicit anthropomorphism. We contribute to the literature by developing an auditory analog of the implicit association test to examine non-conscious anthropomorphism. Our experiments provide initial insights into persuasion processes mediated by both conscious and nonconscious anthropomorphism in consumption contexts.

3 - Towards a Construction of Design-driven Ecosystem: Structuralist Approach

Jesheng Huang, Assistant Professor, Chung Yuan Christian University, Taoyuan City, Taiwan

Based on the notion that there should be a driving factor to facilitate ecosystem configuration, this article presents a structuralist approach to conceptualizing the design-driven ecosystem (DDE) construct, and to identify its characterization of ecosystem structure. The research questions are (1) what's the definition of DDE and what are its necessary factors of configuration? (2) what are the interrelationships of design activities and design products among members in DDE? (3) what unique mechanisms they have for value creation and value capture? And what's the role of consumers within DDE? For research design, this article applies the four basic elements (activities, actors, positions and links) underlie a structuralist approach to ecosystems proposed by Adner, R. (2017), and adds the fifth element of modularity to the consist of analytic dimensions. Through illustrating the configuration of DDE from four cases—handbook, selfie, Graffiti and rock music, the propositions have been developed as follows. Within DDE, (1) as customers playing a role of value cocreation, this kind of ecosystem will be a closed-loop type of value net formed by the members' series of out-input combinations; (2) there is no one would always dominate the primary design activities, this actor can be played by any member within ecosystem if its design product just inspiring customers' initial motivation, no matter the member's generic position locating at upstream, focal producer or downstream in the flow of design activities; (3) the endogenous boundary of DDE is extended by the necessary amount of interconnected design activities based on the proposed value proposition and complementarity among members; (4) the innovation challenge of actor's value creation vary at actor's position in design activities flow, and the innovation value is defined by the type of complementarity. Finally, future research agenda has been suggested as well.

4 - Should You Launch a Minimum Viable Product?

Matthew Selove, Chapman University, Orange, CA, 92866-1005, United States, Cristina Nistor

Firms can launch a Minimum Viable Product (MVP) to learn about market preferences while avoiding the financial risk of a full scale product launch. We develop a game theory model in which a firm balances the information value of an MVP with the potential damage to its brand from launching an imperfect product. In some cases, a large firm proceeds directly with a full scale launch of a high stakes product, whereas a smaller firm first launches an MVP for a smaller stakes product, because the large firm is more concerned about protecting its brand. We extend the model to analyze situations in which companies can credibly reveal their low effort in developing a product, reducing the brand impact of a failed MVP, and we find that large firms in particular use MVPs more often in this case.

■ SC03

Virtual Room 03

NLP in Marketing 2

Contributed Session

Chair: Serena Pugliese, Bocconi University, Milan, Italy

1 - When Emojis Talk: Influence of Emojis in Social Media on Consumer Engagement

Eunhee (Emily) Ko, Assistant Professor, Northwestern University, Evanston, IL, United States

Emojis are an emerging marketing communication tool and have been increasingly adopted by social media users in recent years. Strategic social media communicators employ emojis with various purposes such as adding extra context to their content or helping audiences better understand their messages, expecting positive outcomes. While emojis are generally expected to function as a content promoter (Molina et al. 2019, Das et al. 2018, Riordan 2017), the literature regarding influences of emojis suggests mixed effects in marketing. The effects may be contextual dependent (Thollander and Kumar 2019, Das et al. 2018, Lu et al. 2016), or the influences are varied across different types of emojis (Hewage et al. 2020, Barbieri and Kruszewski 2016). In particular, the study regarding emojis' interactions with texts is still limited in spite of the fact that emojis function in a way that complement texts in many cases; there are some occasions where emojis are used without any words, but they are usually understood in context. Using large-scale brand-themed social media data, the author examines how emojis are effectively employed in social media context to make the social conversations more engaging or how they enrich texts by productively complementing texts. The author also looks at the boundary conditions when the emojis are effectively coupled with texts to enhance consumer engagement in social media. Lastly, the author identifies several challenges in this field and put forward recommendations for future research.

2 - Empathetic Voice Survey (EVS): Obtaining Better Customer Insights by Detecting Uncertainty Through Voice Responses

Tongyao Shen, Pennsylvania State University, State College, PA, United States, Hye-jin Kim, Min Ding

It is well known that customers who provide the same responses to marketing survey questions may have various uncertainty about their responses. However, few firms consider this issue when they analyze the customer responses data in their marketing decision making, and thus effectively treat the customers with the same responses as equal. This inconsistency in knowledge and practice is mainly due to the lack of appropriate methods that can be easily implemented in real life to differentiate customers based on the uncertainty levels in their responses. In this paper, we propose and validate the Empathetical Voice Survey (EVS), a method that infers uncertainty from voice responses and then incorporates the uncertainty to predict customer preference more accurately. Compared with the conventional methods to measure uncertainty in marketing, EVS can be done automatically without notifying the respondents and thus without imposing additional cognitive burden to the respondents. Also, EVS works in many marketing scenarios where there are voice responses (e.g., focus group, phone survey, call center). We provide three major contributions to uncertainty research and practice in marketing, linguistics, and computer science. First, we contribute to a deeper theoretical understanding of human strategies in expressing uncertainty and provide a rigorous causal examination of how people modify the shape of fundamental frequency (F0) contour to express uncertainty, which we call the human's F0 Polynomial Strategy. Second, we test and expand predictive tools that can be used to infer uncertainty from voice, including the machine-learning models, deep-learning models, and the F0 Polynomial Strategy identified in this paper. Third, with a satisfaction survey, we demonstrate how EVS can be utilized in typical marketing practice with substantial value to practitioners.

3 - Supporting Content Marketing with Natural Language Generation

Martin Reisenbichler, Vienna University of Economics and Business, Vienna, Austria, Thomas Reutterer, David A Schweidel, Daniel Dan

Advances in natural language generation (NLG) have facilitated technologies such as digital voice assistants and chatbots. In this research, we demonstrate how NLG can support content marketing by using it to draft content for search engine optimization (SEO). Traditional SEO projects rely on hand-crafted content that is both time consuming and costly to produce. To address the costs associated with producing SEO content, we propose a semi-automated methodology using state-of-the-art NLG and demonstrate that the "content writing machine" can create unique, human-like SEO content. Comparing the resulting content with human refinement to traditional human-written SEO texts, we find that the revised, machine-generated texts are virtually indistinguishable from those created by SEO experts. We conduct field experiments in two industries to demonstrate our approach and show that the resulting SEO content outperforms that created by human writers (including real SEO experts) in search engine rankings and website engagement. Additionally, we illustrate how our approach can substantially reduce the production costs associated with content marketing, increasing their return on investment.

4 - The Telephone Game: The Effect of Online Communication Similarity on Market Performance

Serena Pugliese, PhD Student, Bocconi University, Milan, Italy, Gaia Rubera, Dirk Hovy

This paper focuses on the relationship between brand-consumers online communication and market performance. Marketing literature has widely explored this relationship, but these messages have been studied almost exclusively in terms of volume and valence. This approach implicitly assumes that whenever someone mentions a brand, they repeat the brand's original message ("amplification" assumption; Kozinets et al. 2010), but often consumers do not merely report the brand message. They generally rephrase it using their own words or emphasize aspects of their experience that they find more interesting, whether or not the brand initially mentioned it. Following that, we aim to answer two main questions in this study. First, "Can we measure how much of the original message gets retained?" Drawing from the latest advancements in the computational socio-linguistics literature, we bring to marketing a novel method to measure the similarity between brand communication and consumers perceptions: semantic similarity, an information-theoretic construct to measure the similarity of meaning (Resnik 1995; Mikolov et al. 2013). This construct captures how similar the official brand communication is to consumers' perceptions, as evident in consumers' social media activity. Second, "What is the relationship between this similarity and market performance?" Since high similarity might signal consistency between how the brand wants to position itself and consumers' perceptions, we expect a brand to be talking about similar topics to its consumers to positively affect market performance. We explore this effect within the soft drinks industry.

■ SC04

Virtual Room 04

Machine Learning 1

Contributed Session

Chair: Eunsoo Kim, Nanyang Business School, Nanyang Technological University, Singapore, 639798, Singapore

1 - Corporate Crisis Prediction: A Machine Learning Approach

Lars Gemmer, University of Cologne, Cologne, Germany, Marc Fischer, Samuel Stäbler

Companies are increasingly confronted with negative media coverage of malfunctioning products or unethical behavior including environmental pollution. In the light of the profound economic impact for companies and its stakeholders, the question arises whether it is possible to predict the occurrence of crises. Previous research has thoroughly examined the consequences of corporate crises, but to the best of our knowledge no study has attempted to predict them, yet. By analyzing a unique dataset covering 11 years of detailed crises history including more than 14,000 crisis events of 3,271 international companies from various industries, we introduce a cost-sensitive machine learning-based crisis event prediction tool. We predict the weekly risk that a crisis event occurs and create a warning tool for shareholders that provides clear recommendations for action. It shows when it is profitable to sell or hold a firm's stock based on the probability of a crisis event occurring, the level of misclassification costs, and the user's subjective risk preferences. The tool incorporates various predictors, including essential marketing variables such as the firm's advertising budget, research and development expenses, customer equity, and its market share. By quantifying the importance of these variables for prediction, we show the contribution of marketing decisions improving corporate risk management.

2 - The Path to Success - How Playlist Inclusions Predict Success of Songs on Music Streaming Services

Daniel Winkler, Teaching and Research Associate, Vienna University of Economics and Business, Vienna, Austria, Jacob Goldenberg, Lev Muchnik, Nils Wloemert

On access-based online content services users are confronted with ever-increasing content libraries and content owners compete for the users limited time. One example is the music industry, where streaming services provide consumers with access to millions of songs and content owners (e.g., artists and labels) earn income according to their market share of streams. To help consumers navigate these vast content libraries, curated playlists, which feature selections of songs by different artists according to a specific context, have emerged as a new tool to influence demand. Despite their important position, the role of playlist curators in shaping demand is not well understood. On the one hand, curators base their decisions on information about new songs before they become available and may thus influence the trajectories of song. On the other hand, curators may select songs that are already successful and hence, merely react to a song's positive trajectory. In this research, we develop a methodology to determine the influence of playlist curators using network analysis techniques. By placing each playlist in a latent space, their centrality in the dynamic network of playlists at a given point in time can be determined. We show that listings on more central playlists have a positive effect on the success of a songs and this effect is stronger than the number of followers a playlist has. The results are relevant for content publishers, whose investments in new talent are both costly and risky due to the low success rate in this market. Our model can be used to identify promising talent early in their careers. In addition, artists may use the findings to design efficient seeding strategies by targeting influential curators with their content. Our findings also explain which curation decision drive the importance of a curator in the network and may thus be used to optimize curation.

3 - How to Encourage Donors to Return: Uncover Different Motivations for Donation in Crowdfunding for Nonprofit Organizations

Jiyeon Hong, PhD Student, University of Wisconsin-Madison, Madison, WI, United States, Qing Liu

Improvement in donor retention can help nonprofit organizations (NPOs) sustain their businesses considering that retaining and motivating existing donors costs less than acquiring new donors in general for NPOs. Despite its importance, previous research has primarily focused on donor acquisition and little research has focused on donor retention. To fill this void, we employ and extend extant statistical machine learning methods that leverage a network structure between donors and projects and their attribute information to uncover different drivers of donating behavior for different donor segments from a large-scale data collected from a charitable online crowdfunding platform. Based on our findings from this research, we aim to provide managerial insights on how to tailor marketing messages for each segment to achieve a higher donor return rate.

4 - The Moral Significance of Aesthetics in Nature Imagery

Eunsoo Kim, Nanyang Technological University, Singapore, Julia Lee Cunningham, Anocha Aribarg

To solicit support for nature and wildlife preservation, organizations such as National Geographic and World Wildlife Fund have harnessed the power of imagery using photos taken by professional photographers in their promotion and social media campaigns. In this paper, we aim to understand whether and why the aesthetic quality of nature imagery elevates individuals' social media engagement and charitable giving for nature and wildlife protection. We take a multi-method approach in this research. In Study 1, utilizing the archival imagery and Instagram data provided by the National Geographic Society, we perform empirical analysis to establish the link between aesthetic quality and social media engagement. To do so, we train a deep neural network where we use features extracted from images to predict their aesthetic quality. We find a significant relationship between aesthetic quality of the images and social media engagement (i.e., number of likes) after controlling for text information. We also explore which image characteristics primarily drive image aesthetics. In Study 2, we hypothesize and test the mechanism that connects aesthetic quality to both social media engagement and morality. We find the impact of aesthetic quality on both outcome variables to be mediated by self-transcendent emotions (a set of discrete positive emotions that allows people to direct their focus and attention to others rather than themselves, such as awe and inspiration) and purity judgment. Finally, to quantify the value of visual aesthetics, we run a donation campaign using different promotion materials that vary in their image aesthetics.

■ SC05

Virtual Room 05

Business-to-Business Marketing 1

Contributed Session

Chair: Mrinal Ghosh, University of Arizona, Tucson, AZ, 85721, United States

1 - Negative Turning Points in Manufacturer-supplier Worldwide Relationships: Direct and Spillover Effect

Hoorsana Damavandi, Western University, London, ON, Canada, Vivek Astvansh, Kersi Antia

As manufacturers and their suppliers forge relationships worldwide, negative turning points— events disrupting the relationships—occurring in one market may adversely impact the parties' worldwide relationships. Yet, little is known about the consequences of such turning points for manufacturer-supplier relationships. The authors investigate (1) the extent to which a negative turning point in a single market adversely affects the worldwide manufacturer-supplier relationship, (2) how such adverse effects may be mitigated, and (3) the extent to which these effects spill over to the at-fault supplier's worldwide relationships with other manufacturers. Integrating insights from the nascent research on turning points with a network theory-informed perspective, the authors examine the negative turning points manifest in 178 product recalls attributable to individual suppliers' product defects in the all-important U.S. market. They assess the effects of these turning points on 506 automotive parts suppliers' relationships with 18 automotive manufacturers over 4 years across 30 markets worldwide, and estimate that a single recall results in an average decline of 2.68 trillion dollars (83%) in the monetary value of the at-fault supplier's worldwide relationship with the recall-issuing manufacturer. Although the at-fault supplier's position in its own network and in the network comprising all suppliers and manufacturers can help mitigate this adverse effect by 1.23 trillion dollars (38%), the average value of its worldwide relationships with other non-recall-issuing manufacturers also declines by 1.42 trillion dollars (51%). These findings contribute to the emerging literature on turning points in marketing relationships and the network theory.

2 - The Effects of Losing a Business Customer on Supplier's Performance

Henson Mendonca, Academic Associate, Indian School of Business, Hyderabad, India, Ahaana Mahanti, Kiran Pedada

In business markets, building long-term customer relationships is very important because unlike consumer markets, business markets have fewer customers and transactions in business markets tend to be larger. Moreover, losing and regaining customers is much more expensive than retaining them. Despite the importance of customer retention in business markets, not much is known about the impact of losing a business customer on the performance of the supplier. To fill this gap, we use a uniquely compiled data on the loss of customers to address two important questions: (1) what is the impact of losing a business customer on the supplier's short-term abnormal returns?; (2) under what conditions, the relationship between loss of a business customer and the supplier's short-term abnormal returns is reinforced or undermined. The results of the study offer important implications for business marketers.

3 - Dark and Cold Appeals to Business Customers? The Role of Color Features in Boosting Word-of-mouth for B2B vs. B2C FGC (Firm-Generated-Content) on Social Media

William Gu, PhD Student, The University of New South Wales, Sydney, Australia, Junbum Kwon, Ka Wing Chan, Felix Septianto

Word-of-mouth on social media is increasingly important in the business market. While pictures are often more important than words on many social media platforms, effective color features in B2B firm-generated content have been rarely studied. By analyzing 7,270 pictures across both B2B and B2C FGC (Firm-Generated-Content) on Instagram, we compare effective color features between B2B and B2C posts. We find that dark and cold colors are appealing in B2B FGC, while warm, saturated, and contrasting colors are effective in B2C FGC. We also compare current practice in using color features between B2B and B2C FGC and recommend effective color strategies.

4 - Price Formats as Governance Devices: The Role of Leasing in Industrial Markets

Mrinal Ghosh, Professor of Marketing, University of Arizona, Tucson, AZ, United States

"Operating leases" - where the ownership of the asset/product is retained by the seller - are commonly employed in the marketing of industrial systems alongside alternative forms where ownership rights are transferred to the customer through say outright sales. Despite their prominence, there is little systematic empirical work on when might contracting parties choose to employ operating leases (as opposed to outright selling). In this research it is argued that operating leases serve as a governance device to mitigate problems arising from the non-contractibility of the industrial system's quality as well as tacitness of the knowledge transfer necessary for the productive use of the system by the customer. Refutable hypotheses are tested using dyadic, primary data on 160 procurement contracts between industrial vendors and customers.

■ SC07

Virtual Room 07

AI-Methods

Contributed Session

Chair: Sharmistha Sikdar, Dartmouth College, Hanover, NH, United States

1 - Predicting Customer Transactions with Recurrent Neural Networks: Who is at Risk, Where is the Opportunity?

Jan Valendin, Research and Teaching Associate, Vienna School of Economics and Business, Wien, Austria

A recurrent neural network model can forecast individual customer transaction activity many time steps into the future, capturing dynamic behavior of single customers as well as their groups, improving on established models in terms of individual-level accuracy, overall population-level bias, capturing seasonal trends, and identifying important customer groups that help the manager protect valuable customer-firm relationship, unlock additional business opportunity, and increase customer satisfaction: i) individuals who are "at risk" of churning, and ii) those customers who are likely to boost transaction frequency in the future. The model performance is tested extensively in a number of real-life settings which vary broadly in transaction frequency, regularity, customer attrition, "clumpiness", availability of contextual information, length of observed history, prediction length, seasonal variance, and cohort size. The model can easily be extended and benefit further from accounting for time-varying or time-invariant context factors, to improve prediction accuracy and enable simple generation of what-if hypothetical future scenarios.

2 - Compromises in the Adoption of Autonomous Artificial Intelligence Products

Mehrnoosh Reshadi, Texas Tech University, Lubbock, TX, United States, Mayukh Dass

Advancements in the fields of Artificial Intelligence (AI), robotics, and IoT have resulted in the development of a new class of autonomous intelligent products (AIPs) that possess high machine intelligence and perform autonomously without human intervention (e.g., robotic vacuum cleaners, autonomous lawnmowers, and smart thermostats). Organizations are spending vast amounts of resources on developing and advertising these products hoping to gain some share of the $135 Billion dollar market that is expected for these products by 2025. Despite their benefits, the current rate of adoption of these products is very low. It is not clear for managers what is keeping consumers from adopting autonomous products. Our research focuses on answering this question by considering the internal and external factors and compromises consumers make in the adoption of AIPs. Building on transformation expectations theory and theories of control, through a set of lab experiments, we suggest that consumers' adoption of AIPs is dependent on the degree of product autonomy, consumers' transformation expectations, perceptions of control over the product, and consumers' desire for control. Our results show that consumers have positive evaluations of AIPs. However, in their evaluations, consumers have to make compromises. Two parallel processes based on perceptions of control and expectations of life-transformations compete against each other to convince consumers to adopt AIPs. We show that transformation expectations have a stronger effect on AIPs' purchase intentions than perceptions of control. In addition, consumers' desire for control impacts perceptions of control and intentions to purchase AIPs. Product managers and marketers can reach their goals and increase the adoption of autonomous intelligent products by highlighting the life transformations that arise from the use of these products in their marketing communications and advertisements.

3 - Marketing Science Meets Epidemiology: Forecasting Covid-19 Mortality Using Bass Model

Gurumurthy Kalyanaram, City University of New York; Tata Institute, Forest Hills, NY, United States, Avinandan Mukherjee

Here, we present the Bass Model and compare it with several alternative existing models for forecasting the spread of COVID-19. The Bass Model offers effective forecasting of mortality resulting from COVID-19 to help understand how the curve can be flattened. We calibrate the model for deaths in the United States as a whole, and the U.S. States of New York, and States of California and West Virginia. We use the daily data from the COVID-19 Tracking Project, which is a volunteer organization launched from The Atlantic. Every day, data is collected on testing and patient outcomes from all the 50 states, 5 territories, and the District of Columbia. This dataset is widely used by policy makers and scholars. We examine the fit of the model (F-value and its significance, R-Square value) and the statistical significance of the variables (t-values) for each one of the four estimates. We also examine the forecast of deaths for a 3-days period, for each one of the four estimates - US, and States of New York, California and West Virginia. Based on these metrics, we assess the viability of the Bass Model. The findings of this paper show that compared to other forecasting methods, the Bass Model performs remarkably well. In fact, it may even be argued that the Bass Model does better with its forecast. The calibration of models for deaths in the US, and States of New York, California and West Virginia are all found to be significant. The F values are large and the significance of the F values is low, that is the probability that the model is wrong is very miniscule. The fit as measured by R-Squared is also robust. Further, each of the two independent variables is highly significant in each of the four model calibrations. Our forecasts also approximate the actual numbers reasonably well. This paper demonstrates the efficacy of the Bass Model as a parsimonious, accessible and theory-based approach that can predict the mortality rates of COVID-19 with minimal data requirements, simple calibration and accessible decision calculus.

4 - Variable Importance Measures for Variable Selection and Statistical Inference in Multivariate Random Forests

Sharmistha Sikdar, Assistant Professor, Dartmouth College, Hanover, NH, United States, Giles Hooker, Vrinda Kadiyali

Several marketing scholars have used tree-based ensembles like random forests and gradient boosted trees for univariate prediction tasks (Lemmens and Croux 2006, Neslin et al. 2006, Rafieian and Yoganarasimhan 2020). For research problems that examine multivariate responses, the multivariate extension of tree-based ensembles, e.g., multivariate random forests (MVRF) is likely to prove useful. A potential issue with multivariate tree-based algorithms in existing software is in the default variable selection measures. Tree-based algorithms select features using variable importance measures (VIMs) that score each covariate based on the strength of dependence of the model on that variable. Existing softwares compute naïve VIMs based on frequency of variable usage in node splitting. However, for several applications, e.g., sparse outcomes, these measures may not be robust. In this paper, we develop and propose VIMs for MVRFs. Specifically, we focus on the variable's ability to achieve split improvement, i.e., the difference in the responses between the left and right nodes obtained after splitting the parent node, for a multivariate response. Our simulation studies show that for both sparse and non-sparse outcomes, our proposed VIM recovers the true predictors better than naïve measures. We demonstrate usage of the proposed VIMs for variable selection in two empirical applications; the first is on Amazon Marketplace data to predict Buy Box prices of multiple brands in a category, and the second is on ecology data to predict co-occurrence of multiple, rare bird species. In both cases, the proposed VIMs when used for variable screening give superior predictive accuracy over naïve measures.

■ SC08

Virtual Room 08

Treatment Effect Estimation and Applications (Session II)

General Session

Chair: Song Yao, Washington University in St. Louis, St. Louis, MO, 63130, United States

1 - Algorithmic Messages

Sanjog Misra, University of Chicago Booth School of Business, Chicago, IL, 60637-1610, United States

A large part of the social sciences focuses on the actions taken by one agent in response to a message received from another. In marketing firms often send messages to consumers with the idea of altering their behavior. These messages may be persuasive, informative or simply nudges. While there is a vast literature in marketing, economics and psychology that examine the decoding of such messages by the receiving agent, limited attention has been spent on the construction of these messages and whether this construction is (near) optimal. In this project I focus on a scalable algorithmic approach to the construction of personalized messages. I outline a framework that provides the conceptual and econometric underpinnings of this approach. The framework combines novel ideas on the use of deep learning to estimate heterogeneity with recent causal inference and optimization ideas to deliver messaging strategies that maximize welfare (or profits). I present evidence from a series of experiments relating to reminder nudges in the SNAP program and document the performance of the proposed approach. Finally, I discuss the implications of the algorithmic approach for marketing, welfare, fairness, privacy and theory testing.

2 - The Design and Targeting of Reward Programs

Jason M. Roos, Rotterdam School of Management, Erasmus University, Rotterdam, Netherlands, Song Yao, Carl F. Mela, Oeystein Daljord, Jim Sprigg

This paper considers a scalable approach for the optimal design and targeting of loyalty reward promotions. Specifically, we consider reward programs characterized by two parameters: a purchase threshold (called a hurdle), above which customers receive an incentive (reward). Our approach involves three components: i) an experiment to exogenously vary the parameters of the reward program, ii) an approach to extrapolate marginal treatment effects beyond the experimental design parameters, and iii) an optimization over the design parameters and conditioned on the extrapolation. The extrapolation approach is easily to estimate, accommodates unobserved heterogeneity, and establishes partial identification bounds when such extrapolations are non-parametric. More generally, the approach applies to many similar experimental contexts in marketing wherein consumers' unobserved heterogeneity affects our inference about the treatment effects.

3 - Optimal Price Targeting

Adam Smith, University College London, London, United Kingdom, Stephan Seiler, Ishant Aggarwal

We examine the profitability of personalized pricing policies that are derived using different specifications of demand and preference heterogeneity using widely available household-level supermarket scanner data. To compare different pricing policies, we employ an inverse probability weighted estimator of profits that uses only observed profits in the data and explicitly takes into account non-random price variation. We generate pricing policies from a variety of models, including hierarchical choice models, nearest neighbor classifiers, regularized regression, classification trees, and neural networks and investigate the value of different data inputs. We find that the hierarchical choice model performs best and performance across model specifications is very heterogeneous with many models generating policies that lead to worse profits than a blanket couponing strategy. Demographic information has only a modest impact on performance, whereas purchase histories can lead to large improvements across all models. We also show that the out-of-sample hit probabilities, a standard measure of model performance, is uncorrelated with our profit estimator and provides poor guidance towards model selection.

■ SC09

Virtual Room 09

Bayesian Methods

Contributed Session

Chair: Ty Henderson, University of Texas at Austin, Austin, TX, 78731-6512, United States

1 - Distributed Markov Chain Monte Carlo for Hierarchical Models: Characterizing the Distribution of Heterogeneity

Federico (Rico) Bumbaca, Assistant Professor, University of Colorado Boulder, Boulder, CO, United States

This presentation proposes a distributed Markov Chain Monte Carlo (MCMC) algorithm for estimating Bayesian hierarchical models when the panel size is extremely large and the object of interest is the distribution of heterogeneity. Extant distributed MCMC methods are inherently inefficient, statistically and computationally, because they require the estimation of both the consumer-level parameters and the distribution of heterogeneity. The approach we present bypasses the estimation of the consumer-level parameters. The two-stage algorithm is asymptotically exact, has excellent variance properties, retains the flexibility of a standard MCMC algorithm, and is easy to implement. The first stage constructs an estimator of the posterior predictive distribution of the consumer-level parameters from which auxiliary variables are drawn for the second stage. The second stage uses the first stage draws for directly drawing the parameters that characterize the distribution of heterogeneity. Both stages are embarrassingly parallel. The method works with any hierarchical model and any prior for the distribution of heterogeneity. An exponential family prior has a particular computational advantage over nonexponential priors such as mixtures and nonparameteric models. The algorithm runs equally well on a single multicore workstation and a computing cluster with a distributed file system. Several hierarchical models are estimated with priors that are in the exponential family, mixtures, and nonparametric. The proposed algorithm is compared to the single machine benchmark with simulated data. By avoiding the extensive computational, memory and network resources related to drawing, storing and communicating consumer-level parameters, the algorithm dominates the benchmark and extant distributed methods in accuracy, and speed, and statistical efficiency (by up to several orders of magnitude).

2 - Analyzing Consumer Choice of Hybrid Cars: A New Multinomial Probit Model with Spatially Correlated Preference and Response Coefficients

Sivaramakrishnan Siddarth, University of Southern California, Los Angeles, CA, United States, Bikram Karmakar, Ohjin Kwon, Gourab Mukherjee, Jorge Silva-Risso

Unlike previous applications of spatial models in marketing, which have focused only on preference correlation, we propose a new spatial multinomial probit model in which a consumer's network connectedness, impacts both preferences and marketing mix responsiveness. Further, the model also allows for different subsets of the preference and choice coefficients to be spatially correlated with unique spatial structures for each subset. For example, some coefficients may be correlated due to the geographical closeness between consumers while others may depend upon different contiguity dimensions, such as demographics or purchase history. We propose a new approach to parameter estimation, which requires augmenting the computationally expensive E-step in the classical Expectation-Maximization algorithm with a fast Gibbs sampling method, dividing the M-step into two sub-steps for estimating the coefficients and variances, respectively, and the use of a fast back-fitting method involving a sequence of weighted regressions for each subset of the other coefficients. We prove the convergence of the algorithm to a local maximum and provide consistent estimators of the standard errors of the coefficients. We apply the model on transaction data from the hybrid car category in a few different geographical markets in California. The results support the existence of preference and response correlation in each market and across markets. We show how the parameters of the model can be used to improve the effectiveness of marketing programs designed to accelerate the adoption of hybrid cars among consumers.

3 - Targeting with Limited Information: Efficient Analysis of Multivariate Binary Data with Polya-gamma Auxiliary Variables

Ty Henderson, University of Texas at Austin, Austin, TX, United States, Qing Liu

Marketing practice often encounters multivariate data representing highly correlated but low incidence binary events at the individual decision-unit level. This paper extends to the multivariate context an approach to modeling binary data using Pólya-Gamma auxiliary variables that enables efficient inference via Gibbs sampling in the logit framework. The proposed model provides a direct representation of the binomial likelihood by conditioning on only a single layer of auxiliary variables and gives rise to a random effects specification of individual-level heterogeneity. Because the logit likelihood has thicker tails than a Gaussian distribution for equivalent data, when compared to the reference multivariate binary Probit model, the proposed Pólya-Gamma data augmentation strategy offers greater flexibility to characterize highly correlated binary outcomes and results in a more accurate representation of the multivariate correlation structure. The marketing implication of this result is better targeting decisions. Via simulation and through four different stated and observed binary data contexts, the results show significant improvement in out-of-sample behavioral targeting using limited information from a single binary observation.

■ SC10

Virtual Room 10

Consumer Search 1

Contributed Session

Chair: Bradley Larsen, Stanford University Department of Economics, Stanford, CA, United States

1 - Role of Memory and Search Order in Purchase Outcomes

Aruna D. Tatavarthy, Indian Institute of Management, Nagpur, India, Andre Bonfrer, Bhoomija Ranjan

Prior research on consumer search has largely centered around exploring search activity leading to subsequent purchases (conversion). However, in many online retail categories (eg- apparel), nearly 73.6% of searched products end up ‘in the cart’ (unconverted searches). In this paper, we characterize the search paths that lead to purchase. We present initial descriptive analysis of search-characteristics using clickstream data with 17.9M clicks from 2.56M individuals for an online retailer. Comparing converted and unconverted search paths point that more engaging (i.e. longer duration), intense (number of clicks, product revisits) and more frequent (lower inter-session gaps) predict higher probability of purchase. We also document the effect of early vs. delayed incidence of a specific listing within the overall search sequence on the purchase probability. We observe a positive effect of occurrence-order on the purchase probability. Finally, we document heterogeneity in conversion paths across individuals based on search metrics. These identify “serious” vs “casual” searchers in terms of conversion probabilities, and have targeting implications for the retailer.

2 - A New Lens on Online Search: Discovering Customer Needs and Their Expressions in Search Queries

Maximilian Matthe, Goethe University, Frankfurt am Main, Germany, Daniel M. Ringel, Bernd Skiera

Search engine marketing aims to attract customers with website content and ad copies that speak to customers’ needs. Thereby, identifying these customer needs and their expressions in search queries is crucial, as it forms the basis for targeting and designing ad copies or website content accordingly. Yet, all data on how customers search online are owned by the search engine (e.g., Google, Amazon, AirBnb or Booking.com), which only partly reveal such data to firms. If they do, such data are often limited to a small set of the most popular search queries and information about the customers using these search queries (such as his/her age or gender) is lost. We address this lack of data by proposing a new market research approach that monitors online searches of customers when searching for products. We demonstrate and validate our approach in a market research study for a leading international financial service provider. Our approach discovers a rich set of customer needs and their expressions in search queries. Moreover, our approach links the discovered search queries to customer characteristics, which is the basis for segmenting and targeting customers.

3 - Price and Assortment Competition Under Consideration Set Formation: The Role of Anticipated Regret

Mengyan Zhu, Zhejiang University, Hangzhou, China

Consumers normally form consideration set before purchase by rationally balancing the relevant benefit and cost. Moreover, there are numerous evidence showing that consumers usually experience emotional dissonance (e.g. purchase regret) and anticipate it in consideration set formation process. Our paper investigates how anticipated regret affects consumers' consideration set formation and the relevant implications on sellers' price and assortment competition. Although anticipated regret has been considered in a few studies regarding the product design and assortment planning for a single firm, our paper is the first to incorporate anticipated regret to the formation of consideration set under competing environment. We adopt a parallel search paradigm to explore how consumers form their consideration sets and use search depth and search breadth to alleviate anticipated regret, and to check how sellers optimally choose their prices and assortment sizes accordingly. Intuitively, regret not only lowers consumer surplus but also intensifies sellers' competition as consumers have incentive to include more competitive alternatives in consideration set to alleviate regret. However, we show that sellers may benefit from anticipated regret as it encourages consumers 1) to evaluate more product attributes (i.e., a deeper search depth) to alleviate regret (which increases consumers' willingness to pay); 2) to include less sellers to save search costs (which soften sellers' competition). We further explore sellers' assortment and price competition in reaction to anticipated regret, and demonstrate that sellers engage in assortment competition when regret intensity is low but price competition when it is high. Surprisingly, we also show that both search cost and assortment may amplify the benefits of anticipated regret. Lastly, our results show that anticipated regret can achieve a ``win-win-win" situation for consumers, sellers and social planner.

4 - Discounts and Deadlines in Consumer Search

Bradley Larsen, Stanford University Department of Economics, Stanford, CA, United States, Dominic Coey, Brennan Platt

We present a new equilibrium search model where consumers initially search among discount opportunities, but are willing to pay more as a deadline approaches, eventually turning to full-price sellers. The model predicts equilibrium price dispersion and rationalizes discount and full-price sellers coexisting without relying on ex-ante heterogeneity. We apply the model to online retail sales via auctions and posted prices, where failed attempts to purchase reveal consumers' reservation prices. We find robust evidence supporting the theory. We quantify dynamic search frictions arising from deadlines and show how, with deadline-constrained buyers, seemingly neutral platform fee increases can cause large market shifts.

■ SC11

Virtual Room 11

Health Care

Contributed Session

Chair: Anthony Dukes, University of Southern California, Marshall School of Business, ACC 306E, Los Angeles, CA, 90089, United States

1 - Can the US Healthcare Physician Ownership Change Affect Pharmaceutical Prescriptions?

Tongil (Ti) Kim, University of Texas, Dallas, Richardson, TX, United States, Taewook Lim

The US healthcare physician market, once predominantly owned by individual physicians, is experiencing a major transformation as hospitals have acquired them at an unprecedented rate, reducing proprietorship in recent years. Would hospital acquisition influence physician’s prescription behavior? We examine Medicare Part D Drug prescription data in Minnesota and Wisconsin over 4 years to answer this question. Using the differing Medicaid expansion as an instrumental variable, we find that physicians acquired by hospitals increase the number of prescriptions per beneficiary. We observe the effect to be greater among female, less experienced physicians, and physicians facing higher patient volumes. We also observe the effect for branded drugs to be approximately twice the effect for generic drugs, although the difference is not statistically significant. However, we do not find any significant heterogeneity with regards to detailing or the number of physicians at the site. These results have substantial implications for the pharmaceutical industry as physicians--- the intermediary between the industry and customers---undergo rapid ownership transformation.

2 - Digital Therapeutics and its Mechanism in Daily Life Scenario

Jidong Han, Renmin University of China, Beijing, China, Dong Cheng

Digital health devices, software and mobile applications are collectively known as digital therapeutics (DT). DT offers some news solutions either in a complement or a replacement way to healthcare quality and cost in chronic disease such as diabetes and depression. DT can provide either customized behavior changing suggestion or healthy product recommendation. Studies have shown some clinical evidences of the effectiveness of DT in hospital scenario. Although self-management is a potential explanation, the mechanism of why DT works is still not clear. This research used continuous glucose monitoring system (CGMS) as wearable device plus app and found DT do have effect to some users. How many times a day a user synchronizing data and the time period of sync play important roles in controlling the fluctuation of glucose and lowering the value. The constant and accumulative days of using DT have nonlinear effects. Different from clinical study, our users are consumers who bought CGMS plus app from e-commercial platform and used them in their daily life. This study sheds some light on DT application in daily life scenario and contributes to the literature both in consumer behavior change and digital health.

3 - Fight or Surrender to Counterfeiters: Litigation as a Response to Trademark Infringement

Anthony Dukes, University of Southern California, Los Angeles, CA, United States, Shreekanth Mahendiran, Chirantan Chatterjee, Daniel Sokol

This research explores the role of trademark litigation as a deterrent strategy against counterfeiters in markets where government trademark enforcement is weak. Litigation can convey to would-be counterfeiters that a trademark holding firm would sue upon entry. We explore this idea empirically in the context of pharmaceutical trademarks in India using the framework of a stylized theoretical model. We construct a database of trademarks and examine litigation activity by some of the trademark holders. Our findings indicate that litigation reduces subsequent counterfeiting. Because litigation can be extremely costly for a trademark holding firm, it is worthwhile only when it has legal advantages in pursing cases. Not all trademark holding firms have such legal advantages and are, therefore, better off surrendering to infringers and incurring a cycle of settlements with future counterfeiters.

4 - Empathy/impassivity in Physician Communication Styles: Do Patients Respond Differently to Human Physicians Versus Their Avatars?

Hari Ravella , Virginia Tech, Reston, VA, United States, Dipankar Chakravarti

Healthcare professionals often have the difficult task of breaking bad news to patients. Research shows that physicians are often insufficiently skilled in sensitively communicating the diagnosis and treatment options. The IoT literature suggests that new human-centered smart devices may be used to support physician-patient interactions. However, it is unclear that patient interactions with smart agents representing physicians will be similarly mediated as in-person interactions. We examined these issues in the context of early-stage breast cancer treatment. In study 1, we developed a benchmark human physician interaction manipulating the oncologist's communication style to be empathetic/impassive as well as analogous smart-agent physician interactions using a software-generated avatar. A sample of adult female participants evaluated the videos. We compared participants' evaluations of the physician (avatar) on liking, trust, satisfaction and persuasion (i.e., likelihood of compliance). In Study 2 we used a second version of the avatar physician that more closely resembled the human physician. We also provided the participant with information that primed either a hopeful or fearful mindset regarding the prognosis of the disease. Both avatar similarity and evaluator mindset were manipulated between-subjects. In both studies, the empathetic (vs impassive) communication style elicited more positive responses whether the physician was a human or an avatar. Neither evaluator mindset, nor the avatars' resemblance to the human physician affected persuasion, although the dissimilar avatar was liked better. The relationship between communication style and persuasion style was serially (and fully) mediated by anthropomorphism, liking, trust, and satisfaction, in that order.

■ SC12

Virtual Room 12

Information and Disclosure

Contributed Session

Chair: Ratnalekha Viswanadham, INSEAD, Boulevard de Constance, INSEAD, Fontainebleau, 77305, France

1 - A Machine Learning Perspective Linking Climate-change Disclosures, IPO Outcomes, and Future Environmental Performances

Ankit Anand, Texas Tech University, Lubbock, TX, United States

Regulatory changes, shareholder activism, changing consumer preferences have increased the pressure on companies to disclose their impact on the global warming. To understand the true effect a firm's impact on climate change, one needs to track a firm's climate-change related disclosure since its inception or, at the earliest; it's appearance at the public stage. Therefore, in this study, we try to understand the climate change related disclosure of companies from the beginning of their public lifecycle i.e., from the Initial Public Offering (IPO) and the typology of such disclosures. We also assess the impact of different types of climate-change related disclosures on a firm's market value at the time of IPO and trace the long-term environmental performances of such firms. In terms of boundary conditions for the effects of climate-related disclosures on different financial and environmental outcomes, we incorporate three sets of moderators that are built on the firm (institutional investment)-, industry (clean vs. dirty) -, and disclosure (optimism, obfuscation, and temporal focus) - specific factors. To answer our research questions, we use a sample of 1609 IPO firms that went public from 1999 to 2019. We use a state-of-the-art machine learning model in text classification - Bidirectional Encoder Representations from Transformers (BERT) to identify different types of climate-related disclosures in the IPO prospectuses. Our research contributes to the voluntary information disclosure literature, uses BERT to identify context-specific climate disclosures, and has implications for multiple stakeholders.

2 - Role of Information at Online Platform-based Market and its Effects on Sales

Da Yeon Kim, PhD Candidate of Marketing, Korea University, Seoul, Korea, Republic of, Sang Yong Kim

In this study, we conceptually define the information as an important source to increase sales at online platform-based market. We then classify information into two types: attribute-based information and context-based information. Furthermore, the latter is also grouped into two types by information source: customer and seller. By analyzing data of a U.S. online shopping platform we propose and empirically test a research model where both attribute-based information and context-based information affect sales. Our research model uses the Latent Dirichlet Allocation (LDA) topic modeling and deals with the quality aspects of information. We find that the information generated by both sellers and experienced customers has a significant impact on performance. Specifically, we find that experienced customer-generated information has a positive influence on sales. We also demonstrated that the review containing customer experience in specific situations significantly affects sales. Findings not only contribute to the knowledge of how different types of information impact sales, but also suggest the guideline of how the seller constructs information about their products to drive sales.

3 - Fact or Opinion: Investigating the Effect of Headlines on News Engagement

MengQi (Annie) Ding, Western University Ivey Business School, London, ON, Canada, Xin (Shane) Wang

Newspaper headlines play an important role in disseminating information to the public. The persuasive function of news headlines is to cut through the clutter and grab the attention of the readers. The informative function of news headlines is to act as "the summary" of the news report and help the readers grasp the meaning of the text. Opinion-based headline has greater persuasive function and fact-based headline has greater informative function. In this paper, we empirically investigate the effect of headline on reader engagement and approval under different social contexts, particularly we control for the content of the news articles. We find that in the context of public health crisis, opinion-based headline increases reader engagement by 13.6% of a standard deviation but decreases the reader approval by 7.0% of a standard deviation. In the context of social movement, opinion-based headline increases reader engagement by 15.2% of a standard deviation but decreases the reader approval by 11.8% of a standard deviation. Causal forest model demonstrates the heterogeneity in treatment effect - authors' experience, the age of the post, title length and headline length increase the effect of opinion-based headline on engagement, while article length and negative sentiment in headline decrease the effect of opinion-based headline on engagement. Our paper highlights the trade-off between the persuasive and informative roles of news headlines and showcases the importance of headline in attaining engagement and approval.

4 - Measuring the Heterogeneity in Effects of Front-of-Pack Labels on the Nutritional Quality of Supermarket Food Purchases

Ratnalekha Viswanadham, PhD Candidate, INSEAD, Fontainebleau, France, Paulo Albuquerque

We measure the heterogeneity in the effects of two pre-selected front-of-package (FOP) nutrition labels on food product choices in real-life grocery shopping settings. Though previous literature measuring the average effect of FOP nutrition labels on consumer purchases has shown small but significant effects on encouraging healthy purchases, their results do not necessarily explain in what conditions these labels work better or worse. Using a large data set of more than 1.1 million purchases resulting from over 200,000 labels placed in two food categories, we quantify how the effect of FOP labels varies with (1) consumer basket characteristics; (2) store characteristics; and (3) product characteristics. To do so, we use the causal forest method in a difference-in-difference approach to generate individual treatment effects for the thousands of customers in the data set and to determine which covariates are most important in identifying heterogeneity in treatment effects. We find that FOP labels have the strongest response by consumers that buy the most expensive products, who are very likely the higher-income consumers, creating even more inequality in terms of the healthiness of food choices between rich and poor consumers. We also show evidence that retailers, with their assortment and pricing choices, have a strong impact on the effectiveness of the FOP labels.

Saturday, 12:45PM - 1:45PM

■ SD03

Virtual Room 03

Image Analytics

Contributed Session

Chair: Xiaohang Feng, Carnegie Mellon University, Pittsburgh, PA, United States

1 - When Are Images Not Enough? A Machine-learning Approach to Understand the Effect of Multimedia Stimulus

Xiaolin Li, London School of Economics and Political Science, London, United Kingdom, Jingcun Cao, Lingling Zhang

Nowadays firms increasingly use a combination of images and text to engage with consumers and display product information. Examples include brands sending out multimedia messages on Twitter and apps such as Netflix present product assortments using pictures and text descriptions. Extant research has largely focused on understanding the effects of text and image stimulus separately. In this research, we jointly examine the relationship between image-based and text-based product representation and answer the following research questions: First, how does the relationship between image and text description affect consumer choice and engagement? Does it help product choice and engagement if multiple formats of product representations convey congruent/significantly different information? Second, how does the above relationship vary by product category and consumer characteristic? What are the underlying mechanisms? We answer these questions using individual consumption data from an online platform specializing in eBooks and audio materials. We propose an innovative index that captures the level of congruency between image and text stimulus about products. We employ a state-of-art technique in machine learning: two-branch Neural Networks for image-text congruence incorporating Wide-ResNet-50-2 (WRN) and BERT (Bidirectional Encoder Representations from Transformers). We specify a hierarchical Bayesian model to estimate the heterogeneous effects of this new metric on consumer choice and engagement. We further analyze the behavioral pattern on how consumers pay attention to the image and text stimuli and propose underlying mechanisms. Our results indicate that image-text congruence plays an important role in consumer choice, but the effect does not extend to the engagement decision. This effect varies across consumers and product categories. Our study provides managerial implications on how consumers respond to image and text product stimulus and how firms can design and coordinate product information across media formats and product categories.

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

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

In less than two years, TikTok has grown into one of the largest social media platforms in the world for short-video posting and sharing, which caught the attention of marketers as an increasingly attractive channel for influencer marketing. This paper develops a 2-step procedure that not only predicts the video popularity in terms of attention growth on TikTok but also traces the evolution of user-generated content cross hashtag categories and time. In the first step, we show that the pattern of attention growth for individual videos is represented well by the logarithmic growth function and establish a Bayesian Hierarchical model to estimate the growth parameters with just social context covariates unrelated to the video content. In the second step, we propose an end-to-end network, Multimodal Variational Autoencoder (MVAE) coupled with a numeric estimator of the growth residuals unexplained in the previous Bayesian model, to improve the prediction. Moreover, the multiview representation learning framework outputs a deep representation of the video content on a lower-dimensional latent space, based on which we compare the dynamic content diversification and convergence pattern at the hashtag level. On the one hand, the results would provide managerial implications on how firms should better structure their campaign hashtags on TikTok and choose seeding videos for the sake of gaining attention and expanding social reach. On the other hand, they draw insights into the popularity drivers of user-generated content on TikTok and help understand people's content consumption behavior on social media to a certain degree.

3 - Reading Faces in Images: Decoding the Effects of Face and Gaze in the Purchase Funnel

Eugene Pavlov, University of Miami, Miami, FL, United States, Zhuping Liu, Shuai Yang, Chunmian Ge

Human faces are used extensively in images for online advertising and retailing. Marketing researchers have studied the face effects in print advertising, but the effects of both face presence and gaze directions have not been addressed. In this paper, we first apply deep learning methods to detect faces and gaze directions in online images from a large e-commerce company. We then conduct an empirical analysis to answer the following important questions: (1) Does the presence of a face in product images influence consumer clicks and subsequent conversions? (2) When face is present, how do gaze directions (i.e., direct, left, right, downward) affect clicks and conversions? (3) How does product price moderate the effect of face? Our results show that face presence increases product clicks on average, and the increase is mostly driven by the gazes directed to the right. Images with direct gazes and downwards gazes have an insignificant impact on clicks. We also find strong positive moderation effects of price on the effects of face presence in the browsing stage but not in the conversion stage. Our findings reveal new insights into the role of face and gaze in consumer decision making in the purchase funnel and provide important implications for marketers.

4 - AI Method to Score Charisma

Xiaohang Feng, Carnegie Mellon University, Pittsburgh, PA, United States, Shunyuan Zhang, Xiao Liu, Kannan Srinivasan

Research has shown human faces being important social cues for interpersonal personality traits, a combination of which influences the perceptions of the perceived charisma. Despite the crucial role of charisma in different contexts particularly in business, little is known about how charisma can be perceived from facial features. This study fills the gap and proposes a Charisma Formula as a function of key facial features. We draw upon literature on psychology, economics, and behavioral marketing to propose eleven key dimensions in facial features, such as facial width-to-height ratio, sexual dimorphism, eye size, etc. We theorize how these facial features explain the variance in charisma, through six critical mediating personality traits—namely dominance, warmth, competence, trustworthiness, generosity, and aggressiveness. To empirically test the relationships, we optimize a ResNet-50 deep learning model on a large dataset consisting of 6,000 celebrity images and 6,000 non-celebrity images. The model achieves 95.9% accuracy on a hold-out test set consisting of 10,000 images in discriminating a celebrity face versus a non-celebrity face. We establish the connections between facial features and 50 nodes at the second last layer and propose a charisma formula that calculates a Charisma Score for each face. Our findings verify and resolve some existing tensions in the theoretical predictions. Next, we employ the SHAP algorithm for model interpretation. Combining the SHAP values with the node-feature connections, we rank the facial feature contribution to perceived charisma and find that the top five are facial width-to-height ratio, high cheekbones, color, thin jaw, and mouth-nose distance. We also explore the heterogeneity in the feature contribution at the individual face level. Finally, we validate our model and formula using an influencer dataset. Our research provides insights for selecting photos, adjusting appearance, and interpreting results in various contexts such as advertising, entertainment, political election, influencer economy, etc.

■ SD04

Virtual Room 04

Machine Learning 2

Contributed Session

Chair: Fangzhu Yang, Johns Hopkins University, Baltimore, MD, United States

1 - Unlocking Logistic Matrix Factorization for Marketing Applications

Christian Hotz-Behofsits, WU Vienna, Vienna, Austria, Daniel Winkler, Nadia Abou Nabout, Nils Wloemert

Inferring consumer preferences from implicit feedback data, such as likes, clicks, or past consumption data is crucial in many marketing applications, especially in the absence of revealed preference data. A common use case are recommender systems, which frequently use matrix factorisation (MF) to predict product preferences for a specific customer. Conceptually, this approach decomposes implicit feedback data into latent product and customer characteristics. The resulting latent factors provide insights about the assortment, the customer base, and their fit, even for previously unobserved product-customer combinations. As implicit feedback data is often binary in nature (e.g., click or like), using a logistic function to make predictions is an obvious modelling choice. This method is known as logistic matrix factorization. However, its practicability is limited for several reasons. First, due to the usage of the logistic function, inference for previously unseen products or customers requires non-convex optimization. Second, there is a lack of fast and scalable implementations that support crucial capabilities (e.g., early stopping, adaptive learning rates). Nevertheless, these capabilities are essential for use of today's large data sets. Third, hardly any empirical comparisons of common MF-methods exist for typical marketing applications (e.g., purchase histories, social media engagement, music listening sessions, playlist curation) that provide researchers with guidance on which method to use in which setting.To address all these issues, we propose a fast nearest neighbours based approximation for the latent factors. Furthermore, we provide an open implementation and benchmark the performance of several MF-approaches across a wide set of different marketing applications to show in which settings logistic matrix factorization is superior.

2 - The Impact of Auction Houses on Art Valuation

Malek Ben Sliman, Columbia University Graduate School of Business, New York, NY, United States, Rajeev Kohli, Kamel Jedidi

Auction houses hold auctions regularly throughout the year. However, once or twice a year, art investors and wealthy consumers attend highly selective marquee events: day and evening sales. Those carefully designed and highly marketed events often generate a lot of excitement for connoisseurs as most paintings get sold for tremendous amounts of money. But what makes those paintings special? We investigate how art is evaluated regular, day and evening sales. Specifically, we build a deep learning model to summarize the paintings into a low dimensional representation space where each factor encodes a specific feature of the paintings' aesthetics and further utilize those components to create network variables that will determine how influential and creative a painting is. We use those predictors in hedonic regression models to study how art returns differs across the three types of sales and subsequently analyze whether the paintings are evaluated differently. In particular, we find that paintings sold in evening sales generated an annualized return of 14.33% in the period 1999-2018 - more than three times the returns of paintings sold in regular or day auctions. Finally, we adopt a propensity score matching approach to create a homogeneous population of paintings - based on their likelihood to be auctioned in an evening sale - to assess the causal impact of being featured in an evening sale and find that such highlight increases a painting's price by almost $6 million.

3 - Redefining Market Research Analytics

Tanya Kolosova, Chief Analytics Officer, Associates In Analytics Inc, Boca Raton, FL, United States

Consumer and Product Profiles outline attributes of products that are critical to ensure consumers satisfaction now and in the future. The development of Consumer and Product Profile starts from gathering data via surveys about consumer opinion about product attributes. However, such survey data is often inappropriately analyzed, and it leads to incorrect inferences about a consumer preferences, and misleading recommendations on how to improve the product and its advertising. This paper describes innovative statistical and machine-learning methods that provide accurate and reliable inferences about the preferences of an individual consumer, and build quantitative estimations of components of Consumer and Product Profiles.

4 - Product Design Using Generative Adversarial Network: An Application in Artistic Template Design

Fangzhu Yang, Johns Hopkins University, Baltimore, MD, United States, Hui Li, Jian Ni

Product developers nowadays are able to automate product and service design in a large scale without consumer preference data. However, such design may not meet the needs of heterogeneous consumers with dynamically evolving preferences. Leveraging a unique unmanned photo gallery setting (similar to selfie social media app) where consumers choose the templates to self-take photos, we study how the design templates can be automated efficiently in large scale to mitigate the design mismatch, while incorporating consumer heterogeneity and tastes dynamics. Our approach can improve the product design when facing "cold-start" problem and customize the choice set based on personalized predictions. We obtain vector representations of consumer appearance and templates using convolutional neural network (CNN) following OpenFace project. This allows us to estimate a "deep" choice model using deep neural network. Image inpainting techniques allow us to remove human subjects and create background that are similar to the photo-templates offered by the firm. We then leverage both internal and external data to generate artificial templates using both generative adversarial network (GAN) without incorporating consumer preferences and advanced generative models, conditional-DCGAN, with preference information. We show how incorporating preference information can improve the quality of generated templates.

■ SD07

Virtual Room 07

Recommendation Systems 1

Contributed Session

Chair: Avi Goldfarb, University of Toronto, Rotman School Of Management, Toronto, ON, M5S 3E6, Canada

1 - Towards an Ethical Clearing House: Scalable Ranking Under Ethical Constraints

Yegor Tkachenko, PhD Student, Columbia University, New York, NY, United States, Kamel Jedidi, Wassim Dhaouadi

Many important decision tasks - from student admissions to movie and news recommendations - can be cast within a framework of ranking, where a decision maker sorts items in a decreasing order of utility. While such ranking maximizes decision maker's utility under a particular objective, it may be desirable to adjust such ranking to accommodate alternative requirements, such as diversity and ethicality of ranking. This problem can be cast as an optimization problem, where a decision maker maximizes utility under constraints, and is known in the literature as ranking under ethical constraints. Two issues arise though. First, algorithms that have been proposed so far for optimal ranking under ethical constraints tend to be computationally inefficient in large-scale real life decision problems, which limits their usefulness. Second, in practice, the way a decision maker determines the final ranking is not observed, which opens up such ranking to suspicion and ethical/legal challenges. In this work, we address these two issues. First, we propose a scalable algorithm for solving the ranking under ethical constraints problem, based on a dual formulation of the weighted bipartite graph matching program. This formulation allows for an approximate solution to the ranking problem based on statistical sampling, leading to substantial reduction in required computing resources. Second, we propose that, as a matter of transparency, a third party - an ethical clearing house - should perform the ethical adjustments to the ranking that a decision maker specifies, based on accepted fairness and diversity criteria. Under some assumptions, this mechanism should shield the decision maker from ethical and legal claims about the decision quality, while ensuring that ethical considerations are taken into account. We demonstrate the performance of the proposed optimization framework in application to content recommendations and student admissions.

2 - Recommending Bundles for Experiential Products: Application to Performing Arts Subscriptions

Gwen Ahn, University of Michigan, Ann Arbor, MI, United States, Eric Schwartz, Fred M. Feinberg

Customizable bundles of experiential products – books, performances, movies, wines, and many others – typify subscription-based business. Yet firms modeling such bundle choices face several challenges. First, unlike choosing 1 from n pre-specified assortments (for n "manageable"), fully customizable bundles can entail millions of possibilities, making it difficult to model consumers' choices at the bundle level, a problem exacerbated by observational data containing but a handful of bundle purchases for each user. Second, while it is important to account for "variety" in bundle choice, this is especially challenging for experiential products, whose typical attributes and metrics may not properly capture the underlying dimensions. Consider a set of three dance performances: while there is just one "genre", actual (perceived) variety can differ wildly depending on composition, with {ballet, ballet, ballet} providing low variety and {ballet, contemporary, Africana} far higher, despite both sets being composed solely of dance performances. We fill this gap by modeling the evaluation of bundles from observed choices of performance subscriptions, where consumers are allowed to form a bundle of five or more performances for the season. We start by using text models to capture contextualized latent dimensions of performances beyond verbal category (or genre) descriptions, using these results to construct multiple measures of variety. We then build Bayesian models of conditional bundle choices that include measures of variety, over which individual users have varying degrees of preference, to customize performance bundle recommendations. We conclude by considering the firm's problem of offering a set of "standardized" bundles that provide high utility to the majority of users.

3 - How Do Personalized Recommendations Affect Consumer Exploration: A Field Experiment

Michelle Song, Stanford Graduate School of Business, Stanford, CA, United States

Personalized recommendations are known for their ability to navigate shoppers to the most relevant products first, saving their time. However, the hidden cost is that shoppers are less likely to find other desirable products through active exploration. Such a potential cost casts doubts on whether websites should adopt personalized recommendations. I suggest a positive spillover effect of gained efficiency from personalized recommendations: consumers explore more because increased search efficiency countervails an increasing opportunity cost of time. In addition, total shopping time is expected to decrease because the new equilibrium marginal benefit of exploration is lower. I examine these hypotheses empirically using field experiment data from one of China's biggest grocery delivery platforms. My findings are consistent with these hypotheses: consumers reduce search, spend more time exploring other categories and make more purchases while lowering their total shopping time. These findings are important because they show consumers' active explorations under time pressure and they demonstrate a demand increasing mechanism of increasing search efficiency through personalized recommendations.

4 - He Adoption of Artificial Intelligence at the System Level

Avi Goldfarb, University of Toronto, Toronto, ON, Canada

To date, our conception of AI adoption has mainly operated at the unit of a task or decision. Some of questioned whether this task-level approach is suitable. We formalize a systems-based approach in which a firm considers two decisions. We model AI as prediction. AI is useful because it helps the decision-makers within the firm determine the optimal decision.

■ SD09

Virtual Room 09

Conjoint

Contributed Session

Chair: Sven Beisecker, WHU - Otto Beisheim School of Management, Vallendar, Germany

1 - Product Design Decisions for Retaining Consumers in a Subsistence Market by Combining Choice Experiment, Field Experiment, Prospect Theory

Atul Parvatiyar, Texas Tech University, Lubbock, TX, United States, Janakiraman Moorthy, Alexander Chaudhry

This study was conducted in a mobile services market that is far different from the developed markets. More than 80 percent of the consumers are prepaid mobile service users. There were no long-term contractual agreements and consumers are free to switch from one service provider to another without cost due to free number portability. Consumers top-up talk time or data services several times a week/month. The primary question is, do customers trade up for exponentially greater upside value for small incremental prices or they consider higher prices and monthly plan commitment a greater risk in subscribing to higher-level plans. Research method and analysis: Nine different mobile service offers were created using orthogonal design for each of the five target segments. Real offers were launched to the experimental groups using randomized block design with switch replications. Three marketing promotion channels were used, namely Telemarketing, Text Messaging, and Direct mailers. The experiment was conducted for three months and responses were collected from the company ERP system. Consumer attitudes were collected using a survey at the end of the experimental period. The response variables are choice of the new plans, upgrades or downgrades of the existing plans, reversals, usage behavior of the selected mobile plan, and ARPU. A multinomial Logit model was used for analyzing the consumer choice behavior, incorporating a value function to account for value-risk tradeoffs based on Prospect theory. Contributions: We contribute to the marketing literature on three fronts. First, the consumers from subsistence markets are not mere value seekers, they use multiple criteria immediate value outflow (price denominations), risk of losing the value and value gain that differs from developed markets. Secondly, we contribute to the practice by implementing a large-scale field experiment in collaboration with the service provider. And thirdly, we attempt to integrate the consumer choice model with Cumulative Prospect Theory and accounting for consumer dependencies.

2 - A Low-dimension Shrinkage Approach to Choice-based Conjoint Estimation

Yupeng Chen, Assistant Professor of Marketing, Nanyang Technological University, Singapore, Qi Yu, Raghuram Iyengar

Estimating consumers' heterogeneous preferences using choice-based conjoint (CBC) data poses a considerable modeling challenge, as the amount of information elicited from each consumer is often limited. Given the lack of individual-level information, effective information pooling across consumers becomes critical for accurate CBC estimation. In this paper, we propose an innovative low-dimension shrinkage approach to pooling information and modeling preference heterogeneity, in which we learn a low-dimensional affine subspace approximation of the heterogeneity distribution and shrink the individual-level partworth estimates toward this affine subspace. Drawing on recent modeling techniques for low-rank matrix recovery, we develop a computationally tractable machine learning model for implementing this low-dimension shrinkage and apply it to CBC estimation. We use an extensive simulation experiment and multiple field data sets to demonstrate the superior performance of our low-dimension shrinkage approach as compared to alternative benchmark models.

3 - Threshold Determination Using Extensions of Best-Worst Scaling

Sven Beisecker, WHU - Otto Beisheim School of Management, Vallendar, Germany, Christian Schlereth, Felix Eggers

Best-worst scaling (BWS) is a popular method to measure preferences for multiple items on a continuous scale between two extremes (e.g., “best” and “worst”). Yet, BWS suffers from the threshold identification problem: Estimated preferences are relative in nature, i.e., interval scaled, and cannot separate acceptable from unacceptable items. For example, firms applying BWS to score different slogans will not know which of these, if any, are acceptable. Similarly, firms applying BWS in an automotive market segmentation study can obtain the individual ranking of a respondent’s preferred car brands but will not know how many and which of them are in the respondent’s consideration set. While threshold identification has been studied in discrete choice experiments (DCE), it has received relatively little attention in BWS from a modelling perspective. This paper (i) proposes different threshold identification approaches in BWS and (ii) develops models for the corresponding multinomial Hierarchical Bayes (HB) estimation. We also introduce a scale parameter to capture choice certainty, which leads to improvements in the validity of threshold estimation results. In two empirical studies, one incentive-compatible, we compare the approaches’ choice consistency, response time, perceived complexity, and resulting parameter estimates. Although simulation results advocate the elicitation of more information, our empirical evidence shows that results are robust across approaches and that the simplest threshold identification approach is on par. The results for BWS are in contrast to those of existing studies in traditional DCEs, which find that the way of including threshold identification questions can substantially affect the measured threshold.

■ SD10

Virtual Room 10

Search, Sampling & Consideration

Contributed Session

Chair: K. Pallavi Jha, University of Pittsburgh, Pittsburgh, PA, United States

1 - Online Brand Communities and Their Time-varying Impact on Digital Sampling

Navid Bahmani, University of Wisconsin-Milwaukee, Milwaukee, WI, United States

Sampling is critical to the success of digital goods (e.g., music) offered by human brands (e.g., musicians). A two-part strategy to encourage sampling on the Internet is to build and grow an online brand community to aggregate consumers loyal to the brand, and then have these community members share brand content with others. Using time series data from twenty musical artists, I evaluate the effectiveness of this strategy by examining how the sampling of YouTube music videos is affected by (a) the growth of online brand community and (b) the extent of content sharing. My unique econometric approach (non-linear ARDL) assesses not only short-run and long-run effects, but also potential asymmetric ones. The results show that while most musical artists succeed in using this strategy to encourage sampling in the short-run, only half the artists succeed in the long-run. Additionally, several instances of both short-run and long-run asymmetry are found, indicating differential impacts of the independent variables during times when their values are increasing versus decreasing. My findings have important managerial implications, as music video sampling is an important precursor to album sales and also generates advertising revenue for artists.

2 - How Online Text-image Product Presentation and Celebrity Endorsements Affect Sales

Lei Liu, Central University of Economics and Finance, Beijing, China

Product presentation plays a critical role in influencing purchasing decisions in online shopping settings. However, firms are quite uncertain about appropriate strategies to present products with persuasiveness. As can be seen from online shopping websites, different firms employ distinct strategies on the formats, forms, sequence as well as content of product presentation. In academics, despite of wide attention of text-image information in online product presentations, some important questions remain unexplored. This article aims to answer the following research questions: (1) How do word count and image quantity of book introduction affect online book sales; (2) How do celebrity endorsements appearing in product presentation influence sales? (3) Are there potential moderating effects of celebrity endorsements on the relationships between word counts/image quantity and sales rank?Using a data set from the largest online book retailer Dangdang.com, the authors examine the effects of text-image information and celebrity endorsements on online product presentation pages on sales. The authors find that there exists an inverse U-shape relationship between word counts and book sales. In contrast, image quantity has a positive linear effect on book sales. The number of celebrity endorsers exerts a significantly positive effect on sales. Furthermore, celebrity endorsements moderate the relationship between word counts and sales. As the number of celebrity endorsement increases, word count has a stronger effect on sales rank. By contrast, the number of endorsers does not moderate the effects of image quantity on sales rank. In other words, as the number of celebrity endorsers increases, it does not simplify consumer decision through leading to purchase directly, instead it is more likely to promote consumers to process verbal information more deliberately through enhancing cognitive attention.Based on the research results, online retailers can optimize their product introductory information strategy to improve sales.

3 - The Customer Journey as a Source of Information

Nicolas Padilla, Assistant Professor, London Business School, London, United Kingdom, Eva Ascarza, Oded Netzer

In high involvement purchases such as flights, insurance, and hotel stays, firms often observe at most only a handful of purchases during a customer lifetime. The lack of multiple past purchases presents a challenge for firms to infer individual preferences. Moreover, customers in these industries often look for products that satisfy different needs depending on the context of the purchase (e.g., flights for a family vacation vs. flights for a business trip), further complicating the task to understand what a customer might prefer in the next purchase occasion. Fortunately, in such high involvement purchases, these settings also collect other pieces of information; prior to a purchase, firms often have access to rich information on the customer journey, over the course of which, customers reveal their journey-specific preferences as they search and click on products prior to making a purchase. The objective of this paper is to study how firms can combine the information collected through the customer journey—search queries, clicks and purchases; both within-journeys and across journeys—to infer the customer's preferences and likelihood of buying, in settings in which there is thin purchase history and where preferences might change from one purchase journey to another. We build a non-parametric Bayesian model that links the customer clicks over the course of a journey, and across journeys, with the customer's history of purchases. The model accounts for what we call context heterogeneity, which are journey-specific preferences that depend on the context in which the journey is undertaken. We apply our model in the context of airline ticket purchases using data from one of the largest travel search websites. We show that our model is able to accurately infer preferences and predict choice in an environment characterized by very thin historical data. We find strong context heterogeneity across journeys, reinforcing the idea that treating historical journeys as reflecting the same set of preferences may lead to erroneous inferences.

4 - Impact of Product Distinctiveness, Purchase Timing, and Consumer Characteristics on Consumer Search and Choice: Insights From a Travel Website

K. Pallavi Jha, University of Pittsburgh, Pittsburgh, PA, United States, R Venkatesh, Rabikar Chatterjee

Our research focuses on the impact on consumer search behavior and choice of the assortment and distinctiveness of options presented to consumers on eCommerce search pages. We address three research questions in the context of the hospitality industry, with hotels being the object of consumer search: Are consumer search and choice facilitated when the set of hotels presented to the consumer is more versus less heterogenous in their attributes? How does a hotel's distinctiveness - hedonic versus functional - influence whether it is seriously considered and/or eventually chosen? How are these effects moderated by consumers' prior experience with the destination, the time gap between booking and actual stay, and size of the traveling party? Our analysis utilizes a large dataset from a major travel website comprising clickstream data for hotel bookings in popular destinations across Europe and North America. We augment the clickstream data with information from travel portals and travel experts. Our two-stage econometric model of consideration and choice, estimated with the above dataset, yields several interesting results. For example, heterogeneity in average user ratings reduces the likelihood of booking a hotel, but this effect is weaker for consumers who book in advance of their travel dates. On the other hand, in the case of consideration, the same effect is stronger for consumers looking to book in advance. We find more generally that the impact of attribute distinctiveness along different attributes varies over the stages of purchase. Our findings contribute to our understanding of key aspects of the consumer's online decision journey, on which we draw to guide how travel websites should structure their search results and target specific customer types.

■ SD11

Virtual Room 11

Entertainment Marketing

Contributed Session

Chair: Nikhil George, Carnegie Mellon University, Pittsburgh, PA, United States

1 - Light in Darkness – Quantifying the Impact of Service Blackouts in the US Television Industry

Evgeniya Victorova, University of North Carolina at Chapel Hill, Chapel Hill, NC, United States

This paper studies the impact of service disruptions induced by failed bilateral negotiations between TV channels (content creators) and TV providers (content distributors). When negotiations fail, the associated TV channel goes dark (is unavailable) to subscribers of the impacted TV provider in that market. Such a disruption to TV programming triggers the direct effect of decreasing the viewership of the disrupted channel in that market (the content is still available to subscribers of competing providers in that market). But such a disruption can also have the indirect effect of potentially increasing the viewership of competing channels that the affected provider continues to offer to its subscribers in that market. This study leverages institutional features of the U.S. television industry to construct a pseudo-natural experiment. The modeling framework proposed quantifies how many advertising eyeballs were lost by the impacted TV channel as well as the unintended positive spillover effects to competing channels during the spell of the service disruption.

2 - The Effect of Communication Channels on Consumer Engagement: Evidence From a Natural Experiment

Xindi Zhao, University of Maryland, College Park, MD, United States, Michael Trusov

Platforms are designed to stimulate consumer engagement by adding features allowing for different communication modalities. In addition to the asynchronous communication like conventional comments on YouTube, a unique pseudo-synchronous communication has emerged in various online video platforms and becomes increasingly popular since ever introduction. Consumers can either choose to generate and consume the time-sync moment-to-moment comments at the same time as they watch the video or engage in conventional commenting behavior after watching the video. We study the effect of different communication channels on consumer perception and behavior including consumer's enjoyment, engagement, and e-WOM creation and consumption behavior in online video platforms. We provide insights by leveraging a natural experiment when the pseudo-synchronous communication was platform-wide prohibited for eight days, and consumers can only post conventional comments during the ban period. Our results show that consumers reduced their engagements during the ban in terms of subscriptions, viewership, and overall UGC generating behavior. Not surprisingly, when one communication channel is prohibited, users turned to express themselves through the other communication channel. However, our results suggest that the ban not only forced consumers to change their behavior during the ban but also have impacts on consumer's e-WOM creation behavior in the post-ban period. Based on our results, we offer prescriptions for platform designers and video creators on how they can leverage different communication channels to engage with different types of customers.

3 - Netflix and Blockbusters; Streaming's Disparate Impact on the Box Office

Nikhil George, Carnegie Mellon University, Pittsburgh, PA, United States, Siddhartha Sharma, Rahul Telang

While the decline in pay TV subscribers is attributed to the surge in exclusive content available on streaming platforms like Netflix, it is unclear whether (and how) this rise in streaming content has affected the demand for motion pictures in theaters. Using movie-level box office revenue data from several countries from 2006-19 and a difference-in-differences strategy that exploits a wide variation in Netflix penetration across countries, we find no conclusive evidence suggesting any effect on the total box office sales. However, we find a significant positive impact on the box office share of top movies (blockbusters) and a negative impact on the share of tail movies. Further, we find (i) no evidence indicating any budgetary or genre-related changes in the production of top movies, and (ii) a significant overlap between the genres of the tail movies and streaming content. The results suggest that while streaming content cannibalizes box office for similar-genre movies, it does not seem to cannibalize the overall box office, creating important implications for movie production and distribution.

4 - Goodbye My Friends and Goodbye My Career: Evidence from the Movie Industry

Andrew Ching, Johns Hopkins University, Baltimore, MD, United States, Xinlong Li

By analyzing over 180,000 professionals (actors, directors, and producers) in the motion picture industry spanning 20 years, this research shows evidence that network connections plays a potentially important role in affecting an actor's career development. We focus on the impact of the connections with producers and directors on an actor's career. The identification strategy isolates the network effects related to producers and directors by examining the death of a producer or director. Following the death of a producer/director, we find that, on average, actors/actresses who have worked with him/her before have a 13.28% decline in their future acting opportunities. Similar results are found by using quality-adjusted movie numbers. By exploring interactions of the treatment effect with a variety of actor, producer and director characteristics, we disentangle between plausible mechanisms that might explain this finding and find referral/information spillover tends to be the driving force of our findings. In summary, our results suggest that connections with producers and directors can help actors to more quickly receive industry information, and thus get more opportunities. We also find that more experienced actors are less affected by the loss of connections.

■ SD12

Virtual Room 12

Improving Welfare in Education, Health, Financial Markets

Contributed Session

Chair: Eric Greenleaf, New York University, Stern School of Business, New York, NY, 10012-1126, United States

1 - Using Interpretable Machine Learning to Understand Consumer Credit Scores

Seung-Wook Kim, University of Iowa, Iowa City, IA, United States, Thomas S. Gruca, Hyeong-Tak Lee

Of the many credit scores used in the U.S., by far the most widely used is the FICO score. Although FICO scores are a vital determinant of a consumer's creditworthiness, how these scores are calculated remains confidential. This lack of transparency puts the consumers at a disadvantage, as they themselves have a limited perception of what actions hurt or benefit their overall FICO score. A deeper understanding of how FICO scores are derived would thus enable consumers to change their financial behavior and improve their credit score and financial well-being. Using interpretable machine learning, this study analyzes a large volume of credit report data to understand the relationship between consumers' financial behavior and their credit score. This credit report data contains 314 variables, including the FICO scores of 93,798 consumers. The interpretable procedure that we consider consists of two steps: 1) Identifying an optimally performing machine learning model for the data, and 2) Enhancing the interpretability of the so-identified black-box model through the use of Shapley Additive exPlanations (SHAP), a tool from game theory that is useful for explaining supervised learning models. This approach allows us to distill the large amount of credit report data into actionable insights with useful implications for consumers. To our best knowledge, this study is the first to examine the guidelines that various financial institutions use to help consumers manage their credit scores. In so doing, our study can offer specific and action-oriented knowledge for consumers to realistically manage their credit scores. Furthermore, this research uses big data analytics to advance existing literature on Transformative Consumer Research, which attempts to benefit consumers and improve their quality of life.

2 - The Dark Side of Marketing: An Empirical Examination of Marketing's Role in the Opioid Epidemic

Rachel Ramey, PhD Student, University of Georgia, Athens, GA, United States, Sundar G. Bharadwaj

From 1999-2019, almost half a million people died from a drug overdose involving opioids. During the pandemic, overdose deaths involving opioids have continued to increase. Media sources have claimed that the Opioid Epidemic was caused by the marketing efforts of pharmaceutical companies and these firms are facing lawsuits for their role in promoting prescription opioids. However, there is little systematic research examining the role of marketing in the Opioid Epidemic. The theoretical background of this research is developed qualitatively through analysis of proprietary marketing strategy documents, interview depositions of key leaders in the pharmaceutical companies and pharmaceutical representative online forums. We utilize a case study of a prominent opioid supplier and market leader. Through a unique national level dataset, which includes CDC Multiple Mortality files, medical journal advertisements, detailing visits and opioid distribution made publicly available in lawsuits, we empirically investigate if the cumulative effect of detailing and advertising spending is associated with the increase in opioid prescription claims and the subsequent opioid overdose deaths. We also examine the effects of substitutes in response to abuse-deterrent formulas. We find that 1% increase in detailing and advertising is associated with a 0.044% and 0.31% increase in opioid prescriptions respectively. Moreover, a 1% in opioid prescriptions is associated with a 0.03% increase in overdose deaths involving opioids. The Opioid Epidemic offers a unique opportunity for insight into a public health crisis fomented by harmful marketing practices. By examining the events empirically and qualitatively, we can learn from past mistakes and educate the next generation of business leaders on how to avoid similar problems in the future.

3 - Buyer Biases and Relationships in Government Procurement Markets

Simha Mummalaneni, University of Washington, Seattle, WA, United States

Procurement auctions are widespread in business and government markets, and buyers in these auctions are typically committed to purchasing from the cheapest vendor. We study the effect of an alternate policy used by Virginia's government procurement platform, in which buyers can choose to purchase from vendors in a preferred group even if they are not the cheapest option. We find that granting buyers this discretionary power leads to discriminatory outcomes: buyers have a pronounced bias towards vendors with whom they have a pre-existing relationship, and they also display a significant bias against women- and minority-owned vendors. These effects are particularly notable given that (a) buyers are not supposed to use pre-existing relationships when determining who wins each auction, (b) the policy in question was implemented specifically to help women- and minority-owned vendors, and (c) the auctions are for standardized goods and services for which there are no major quality differences across vendors. Our findings demonstrate that granting buyers freedom over their purchasing decisions can lead to the unintended consequence of biased purchasing outcomes.

4 - The Impact of Early College Admissions on Applicants' Wellbeing, Decision Complexity, Diversity, and the College Admissions Process

Eric A. Greenleaf, Professor of Marketing, New York University, New York, NY, United States

Deciding where to attend college is a highly consequential and expensive decision for high school students and their families. One notable trend in the United States is the increased popularity of early college admissions, where students apply on an accelerated schedule, and can be obligated to attend the college where they apply early, if accepted. Two types of early college admissions are "early admissions" (EA) and "early decision" (ED). Using an individual-level, analytical model of utility obtained from the college admissions process, we examine how early admission affects applicants' welfare, decision-making complexity, racial and socioeconomic diversity, and trends in college admissions. We also examine how this impact may put minority and lower income students at a disadvantage. Applicants who do not apply early anywhere - and most do not - are strictly worse off. EA makes applicants better off than ED. Even when applicants apply early, ED and EA tends to decrease the number of colleges applied to for students applying to relatively fewer colleges - which is more typical for under-represented minorities and lower income students - while tending to increase the number applied to by students already applying to relatively many colleges, who tend to be more affluent. These findings also help explain the cycle of many students applying to more colleges, and dramatically decreasing acceptance rates, that has occurred in admissions for competitive colleges. We also find that early admissions increases the complexity of deciding whether to apply to any colleges early and, if so, which one, which, again, can work to the disadvantage of lower income and under-represented students, who often have less access to information and decision-making help.