

# **1<sup>st</sup> Working Group Meeting of AG MARKETING**

**14<sup>th</sup>-15<sup>th</sup> of November 2019, Karlsruhe,  
Germany**



**Program Committee: Friederike Paetz, Winfried J. Steiner**

**Local Organization: Andreas Geyer-Schulz**



## Call for Papers

1<sup>st</sup> Working Group Meeting of  
AG MARKETING  
14<sup>th</sup> – 15<sup>th</sup> of November, 2019 in Karlsruhe (Germany)

**“Advanced data analysis techniques with marketing applications”**

### **Invitation:**

We cordially invite papers from scholars and practitioners in the field of quantitative marketing!

### **Purpose:**

The increasing availability of marketing data poses a huge challenge for marketing managers. In particular, marketing managers are nowadays expected to rely on marketing data in order to derive and/or improve marketing decisions. Beyond managerial experiences, it is therefore necessary to continuously develop advanced data analysis techniques to extract the relevant information from marketing data for further use in quantitative marketing models, which in turn serve as decision support systems for final marketing decisions.

Marketing data can be classified according to several dimensions: on the one hand, they can represent either revealed preferences from real purchasing activities of consumers (e.g., based on scanner data or click stream data), or stated preferences gained from experimental settings (e.g., based on conjoint or discrete choice approaches). On the other hand, marketing data can be collected at the disaggregate consumer level (e.g., household panel data, discrete choice data) or at the aggregate consumer level (e.g. sales data). Once the marketing data is thoroughly analyzed, the results can be used for normative or predictive modeling and to improve or optimize marketing decisions.

This CfP is not limited to any specific field of marketing and welcomes quantitative contributions that can help to improve marketing decisions in areas like *product innovation management, sales management, pricing, advertising, market segmentation, consumer behavior* etc. However, papers are expected to contribute over the extant literature by proposing sophisticated new data analysis methods in order to extract relevant information from marketing data. For instance, choice-based conjoint or discrete choice approaches are nowadays preferably used for preference measurement, market segmentation, and related pricing or product design decisions, and the consideration of consumer heterogeneity has become state-of-the-art within these approaches. New techniques or models to address preference heterogeneity, threshold effects in preferences, correlations between alternatives, or dynamic effects arising during the data collection process may be proposed here. Aggregate market response modeling has

strongly improved from addressing heterogeneity, functional flexibility, endogeneity, and/or dynamic effects, too. Here, approaches combining several of these features may further improve both their statistical performance or related marketing decisions. Advanced data analysis techniques may further consider competitive effects, background consumer characteristics, budget constraints, etc. These are only some examples, other advanced quantitative methods and data analysis techniques to extract information on consumer/market behavior or consumer/market responses to changes in the marketing mix are highly welcome.

**Date:**

The working group meeting will start on Thursday, 14<sup>th</sup> of November, 2019, and ends on Friday, 15<sup>th</sup> of November, 2019.

**Publishing options:**

Accepted presenters for the *1<sup>st</sup> Working Group Meeting of AG MARKETING* will have the opportunity to submit a full paper for a special issue to the Journal of Business Economics (JBE). JBE is one of the leading academic journals for business and management (VHB: B). Articles must be 10,000 words or less in length. The special issue guest editors (Friederike Paetz, Winfried J. Steiner, Harald Hruschka) will invite reviewers and make final decisions regarding publication. Submission deadline for the full paper is 30<sup>th</sup> of April, 2020.

Additionally, we strongly encourage authors to submit their papers to Archives of Data Science. Our journal covers regular research articles from joint activities of the Gesellschaft für Klassifikation e.V. ([GfKL](#)).

**Important Deadlines:**

- **Abstract submission:**  
Please submit your abstract (max. 1800 characters, plain text) until **6<sup>th</sup> of October, 2019** via mail to [agmark-workshop@tu-clausthal.de](mailto:agmark-workshop@tu-clausthal.de)
- **Notification about acceptance:** until **14<sup>th</sup> of October, 2019**
- **Registration:** Please register via mail to [agmark-workshop@tu-clausthal.de](mailto:agmark-workshop@tu-clausthal.de) until **21<sup>st</sup> of October, 2019**.
- **Submission Deadline for special issue in JBE: 30<sup>th</sup> of April, 2020**



## Final schedule

Thursday, 14 <sup>th</sup> of November 2019		Friday, 15 <sup>th</sup> of November 2019	
<i>schedule</i>	<i>event</i>	<i>schedule</i>	<i>event</i>
13:15-14:15	Come-together (snacks & coffee)	8:30-10:00	Session C
14:15-14:25	Registration	10:00-10:15	Coffee break
14:25-14:30	Welcome	10:15-11:45	Session D
14:30-16:00	Session A	11:45-12:00	Initiation of AG MARKETING / Farewell
16:00-16:30	Coffee break		
16:30-17:30	Session B		
19:00	Dinner (optional/self-pay)	12:00-13:00	Lunch (optional/self-pay)

### **Venue:**

KIT Karlsruhe Institute of Technology  
 Seminarraum K1  
 KIT Geb. 01.93  
 Kronenstraße 32  
 76133 Karlsruhe

### **WiFi:**

The KIT is part of the eduroam network allowing you to use your home institution account. Alternatively, KA-WLAN (<https://www.ka-wlan.de>) is available.

### **Dinner:** (on Thursday evening, 14<sup>th</sup> of November)

Mille Stelle (Italian restaurant)  
 Akademiestraße 38-40  
 76133 Karlsruhe  
<http://www.mille-stelle.de>

### **Lunch:** (on Friday noon, 15<sup>th</sup> of November)

Café Palaver  
 Steinstraße 23  
 76133 Karlsruhe  
<http://www.cafepalaver.de>

# Sessions

## Thursday, 14<sup>th</sup> of November 2019

### **Session A (Chair: Friederike Paetz)**

- Accounting for nonlinear, heterogeneous, and dynamic effects in store-level price response models (*Philipp Aschersleben, Winfried J. Steiner*)
- Maximizing Return on Investment from Direct Marketing Campaigns: A New Uplift Modeling Approach for Online Shops (*Daniel Baier, Björn Stöcker*)
- Was this review helpful to you? Determinants of helpfulness voting patterns in the context of online customer reviews (*Filipe Sengo Furtado, Radoslaw Karpienko, Thomas Reutterer, Nadine Schröder*)

### **Session B (Chair: Andreas Geyer-Schulz)**

- The Effect of Randomly Simulated Missing Value Patterns on PLS, ML and FIML Model Fit (*Malek Simon Grimm, Ralf Wagner*)
- Know your Limits: Requirements for the Application of MCMC Procedures for Pareto/NBD Distributed Data Sets (*Lydia Simon*)

## Friday, 15<sup>th</sup> of November 2019

### **Session C (Chair: Daniel Baier)**

- A Mixed Logit model's application: Personality traits as drivers for social preferences (*Friederike Paetz*)
- Confounding in Preference and Structural Heterogeneity (*Narine Yegoryan, Daniel Guhl, Friederike Paetz, Daniel Klapper*)
- Bridging between Hypothetical and Incentivized Choice (*Arash Laghaie, Thomas Otter*)

### **Session D (Chair: Daniel Guhl)**

- How accurate are customers' initial impressions? Using continuous-response measurement to assess thin slices of sales behaviors (*Sandra Pauser, Udo Wagner*)
- Extracting Behavioral Intentions from Movie Trailer Comments: Which Video Components Matter to Consumers? (*Jochen Hartmann, Jasper Schwenzow, Amos Schikowsky*)
- Forecasting Sub-Daily Call Center Arrivals: Investigating the Joint Impact of Data Disaggregation and Model Selection on Accuracy (*Theresa Rausch, Tobias Albrecht, Daniel Baier*)

## Abstracts

### Session A

#### **Accounting for nonlinear, heterogeneous, and dynamic effects in store-level price response models**

*Philipp Aschersleben, Clausthal University of Technology, Germany*

*Winfried J. Steiner, Clausthal University of Technology, Germany*

It is well known that store-level brand sales may not only depend on contemporaneous variables like current own and competitive prices or other marketing activities, but also on past prices representing customer response to price changes. It has further been shown that accounting for lagged prices in a sales response model can increase expected brand profits over a static model that ignores price dynamics. On the other hand, non- or semiparametric regression models have been proposed in order to accommodate potential nonlinearities in price response, and related empirical findings indicate that price effects may show complex nonlinearities, which are difficult to capture with parametric models. Additionally, it is nowadays well established to incorporate store heterogeneity in sales response model, independent whether parametric or nonparametric modeling is used. We combine nonparametric price response modeling, heterogeneity and dynamic pricing. In particular, we model sales response flexibly using a Bayesian semiparametric approach and include the price of the previous period as well as further time-dependent effects. All nonlinear effects are modeled via P-splines, and embedding the semiparametric model into a hierarchical Bayesian framework further enables the estimation of store-specific (lagged) price response curves. In an empirical study, we demonstrate that our new model provides both more accurate sales forecasts and higher expected profits as compared to competing models that either ignore price dynamics or just include them in a parametric way. Optimal price policies for brands are determined by a discrete dynamic programming algorithm.

#### **Maximizing Return on Investment from Direct Marketing Campaigns: A New Uplift Modeling Approach for Online Shops**

*Daniel Baier, University of Bayreuth, Germany*

*Björn Stöcker, University of Bayreuth, Germany*

In order to improve return on investment from direct marketing campaigns, usually, a (small) sample of customers is testwise contacted and their positive reactions (e.g. bought advertised products in a predefined time slot) and negative reactions (e.g. bought not) are used to develop a predictive response model (based e.g. on past information and buying behavior) for all customers. Then, the latter is used to select customers for the direct marketing campaign according to the highest positive response predictions among all customers. However, this classical approach has two major shortcomings: First, the response model also selects customers who would positively respond regardless of the campaign (waste of money). Second, the response model only reflects a binary outcome (bought or bought not), not a continuous outcome (sales or profit). Both shortcomings restrict the usefulness of the approach when maximizing the return on investment from the direct marketing campaign. In this paper we propose a new approach that is able to overcome the discussed problems. The new approach connects findings from the field of uplift modeling (see, e.g., Radcliffe, Surry 1999, 2011, Kane et al. 2012) with findings from the field of sample selection (see, e.g., Heckman 1979). Using

the well-known Hillstrom data set and an own actual online shop direct marketing campaign data set (with data from >270k customers) as examples, we show that the new approach is well suited to correctly select the “right” customers as targets and to improve return on investment from direct marketing campaigns.

### **Was this review helpful to you? Determinants of helpfulness voting patterns in the context of online customer reviews**

*Filipe Sengo Furtado, Vienna University of Economics and Business, Austria*

*Radoslaw Karpienko, Erasmus University Rotterdam, Netherlands*

*Thomas Reutterer, Vienna University of Economics and Business, Austria*

*Nadine Schröder, Vienna University of Economics and Business, Austria*

In recent years, the increase in user-generated content (UGC) has brought about a strong counterpart to information issued by manufacturers through marketing communication. With the rapidly increasing amount of customer reviews available online, ‘helpfulness’ features have been established to aid consumers in handling potential information overload. With this study we propose to deepen insights into what drives review helpfulness. While past research focuses on exclusively understanding what makes a review helpful and ignores the fact that some reviews receive more attention than others, we aim to disentangle these two dimensions by differentiating between what drives people to vote and what drives people to vote positively. Apart from well-known variables in the field of review helpfulness, such as review length, we focus on rating and text-related aspects in our research. This way, we are able to test the impact of different psychological and behavioral concepts (such as, e.g., consistency and conformity theory) on perceived helpfulness. We contribute to the existing literature by adopting a different modelling approach that enables us to separate two distinct effects that so far have been considered to be one. In doing so, we also identify a key determinant to the study of helpfulness.

### **Session B**

#### **The Effect of Randomly Simulated Missing Value Patterns on PLS, ML and FIML Model Fit**

*Malek Simon Grimm, University of Kassel, Germany*

*Ralf Wagner, University of Kassel, Germany*

Missing values (MVs) are an omnipresent problem in quantitative and survey-based researches. Missing data hinder a researcher’s ability to investigate a phenomenon of interest (McKnight, McKnight, Sidani, & Figueredo, 2007) or lead substantial biases. Already a few missing values handled through a case exclusion (case-wise deletion, listwise deletion or complete case analysis) causes significant attribution of the total sample size: A data set with 500 observations and 10 variables with 10% MVs could, for example, reduce the effective sample size to 175 participants if a listwise deletion is applied (cf. Cheema, 2014). A loss of data or information decreases statistical power and MVs can lead to biased results or estimates (Roth, 1994). Nowadays, several Missing Data Techniques (MDTs) are available. Unfortunately, the achievements in the statistical domain seem to have a negligible impact on research practices (McKnight et al., 2007). Building upon the studies of Parwoll and Wagner (2012) and Grimm and Wagner (2019), this research investigates the effects of MVs on measurement quality

within structural equation modelling (SEM). Thereby, the measurement quality, accuracy and stability of the frequently used estimation methods partial least squares (PLS), maximum likelihood (ML) and full-information maximum likelihood (FIML) is comprehensively investigated. MV patterns within the range of 2.22% until 27.78% of MVs are implemented repeatedly into a data set for the European customer satisfaction index (ECSI). The simulation and comparison of repetitive random dropout mechanisms provides a robust understanding about the performance of PLS, ML and FIML.

### **Know your Limits: Requirements for the Application of MCMC Procedures for Pareto/NBD Distributed Data Sets**

*Lydia Simon, University of Duisburg-Essen, Germany*

The Pareto/NBD model is one of the best-known and most used models in customer base analysis. Still, practitioners are confronted with the question of which cohort size and length of calibration period are necessary in order to obtain reliable parameter estimates. In the past years, the usage of Monte Carlo Markov Chain (MCMC) algorithms has increased as these deliver a full posterior distribution rather than just a point estimate for the model parameters. Using MCMC though additionally requires hyper parameters whose choice has barely been discussed in literature yet. We therefore perform a broad simulation study on Pareto/NBD distributed data sets to derive minimal requirements for the model's usage and to outline the choice and influence of different hyper parameters. The results show that the recovery of the purchase process already works well for cohort sizes of 1,000 customers and a calibration period of 52 weeks. Since we are in a non-contractual setting, the dropout process cannot be observed and is therefore much more difficult to estimate from the data. It requires a calibration period of at least two years and 5,000 customers. For all data sets, we generate MCMC estimates using different hyper priors as well as the uninformative Jeffreys' prior. The goodness of fit measures tell us that that Jeffreys' prior should be preferred to the informative hyper distributions. This especially holds when we have no preliminary information on our data set.

### **Session C**

#### **A Mixed Logit model's application: Personality traits as drivers for social preferences**

*Friederike Paetz, Clausthal University of Technology, Germany*

Currently, social consumption constitutes a rapidly increasing trend that has great potential for companies. The characterization of social consumers is therefore highly relevant. To date, socio-demographic variables have been widely researched but turned out to be less appropriated to uniquely characterize social consumers. Psychographic variables are ascribed with the ability to overcome these problems, since recent studies maintain that consumers' personal values and lifestyles are predictors of social consumption. However, personal values and lifestyle represent only two categories of psychological variables. Personality is another variable that is further known to be an antecedent of personal values and lifestyle. In this study, we focus on the characterization of social consumers based on their personalities. We conduct an empirical discrete choice experiment and investigate consumers' personalities as a driver of consumer preferences for the fair trade (FT) label attribute. To operationalize consumers' personalities,

we use the popular five-factor approach. For the determination of consumer's preferences, we estimate a Mixed Logit model that includes both unobserved preference heterogeneity and observed heterogeneity. Observed heterogeneity is captured by both consumer's personality as well as socio-demographic variables. We find gender, academic degree and income as well as four personality traits as important drivers for consumers' social preferences. We work out interaction effects between socio-demographic and personality variables and argue for the consideration of personality within the characterization of social consumers as the core sources for social preferences.

### **Confounding in Preference and Structural Heterogeneity**

*Narine Yegoryan, Humboldt University Berlin, Germany*

*Daniel Guhl, Humboldt University Berlin, Germany*

*Friederike Paetz, Clausthal University of Technology, Germany*

*Daniel Klapper, Humboldt University Berlin, Germany*

Consumer heterogeneity has been an important topic in choice modeling in marketing for many years. While the main focus has been on accounting for preference heterogeneity, only a few studies have recognized the importance of a specific type of structural heterogeneity, when consumers consider only a subset of attributes in a purchase decision (also referred to as attribute non-attendance). We use a latent class model with continuous parameter distributions in each class to account for both attribute non-attendance and preference heterogeneity. Restrictive cases of this model, ignoring either or both types of heterogeneity, enable us to investigate their possible confounding. Five empirical applications indicate that biases may arise in both cases either resulting in an overestimation of attribute non-attendance or biased estimation of preference heterogeneity. The results also suggest that the magnitude of the bias is application-specific and depends on the choice complexity and product category involvement.

### **Bridging between Hypothetical and Incentivized Choice**

*Arash Laghaie, Goethe University Frankfurt, Germany*

*Thomas Otter, Goethe University Frankfurt, Germany*

The hypothetical nature of choices collected in typical discrete choice experiments (DCEs) for market research has long been a source of concern for both researchers in academia and industry. Because choices in these experiments are more or less inconsequential for respondents, inferences gleaned from this data may lack external validity. Recent research in marketing indeed demonstrates increased predictive validity of models calibrated based on choices by properly incentivized respondents. However, conducting so called incentive-aligned (ICA) DCEs is more costly compared to the standard hypothetical (HYP) setting. The goal of this project therefore is to develop a model based framework that parsimoniously bridges between data from HYP-DCEs and data from ICA-DCEs for the purpose of conserving on data collection effort and cost, however, in keeping with the goal of predicting to incentivized choices. The framework leverages certain invariance assumptions to fuse a large amount of data from HYP-DCE and a relatively much smaller amount of data from ICA-DCE collected in independent experiments, but in the same population, for the purpose of simulating incentivized choices in this population. The framework assumes, in line with economic theory, a common

set of invariant ('deep') preference parameters, but explicitly accounts for differential decision effort between the HYP and the ICA setting. Thus, the basic structural assumption we make in our model is that only the information set, i.e., what attributes are used at all, and the level of processing of attributes and alternatives change across the HYP and the ICA choice setting. As a consequence, the amount of decision effort may materially change choice probabilities and outcomes, even if underlying deep preference parameters are invariant. Operationally, we build on process-based choice models developed in mathematical psychology and specially the recently proposed dependent Poisson race model (DPRM).

## **Session D**

### **How accurate are customers' initial impressions? Using continuous-response measurement to assess thin slices of sales behaviors**

*Sandra Pauser, University of Vienna, Austria*

*Udo Wagner, University of Vienna, Austria*

A good first impression is crucial for the success of a sales interaction. Prior research demonstrates that individuals are able to make accurate predictions about one's personality, skills, traits, or competencies from brief observations, so-called thin slices. Specifically, studies point on the importance of nonverbal cues (i.e., facial expressions, gestures) in the formation of initial impressions. However, these behaviors are perceived mainly unconsciously, which makes measurement a difficult task. Moreover, existing research is dominated by post-exposure measures and neglects customers' processing of impressions over time. This research tackles the problems outlined above and introduces continuous measurement of initial impressions in a sales context by a variety of different data sources. We provide novel insights by applying high-precision coding of nonverbal behaviors in 22 videotaped sales presentations (elevator pitches) by making use of the body action and posture coding procedure (BAP), which allows the analysis of sales behaviors over the course of time based on over 140 different variables with a granularity of 25 observations per second. In addition, respondents ( $n=663$ ) evaluated these presentations by means of a program analyzer with a granularity of 2 observations per second. Findings show that a substantial percentage of respondents form their impression about the sales representative within the first few seconds, whereas negative first impressions are formed faster than positive ones. The application of continuous measures (of nonverbal behaviors and customer responses) provides various advantages over existing means of measurement and yields important implications for marketers and future research.

### **Extracting Behavioral Intentions from Movie Trailer Comments: Which Video Components Matter to Consumers?**

*Jochen Hartmann, University of Hamburg, Germany*

*Jasper Schwenzow, University of Hamburg, Germany*

*Amos Schikowsky, University of Hamburg, Germany*

In 2018, global box office revenues reached \$42 billion (MPAA 2018). Ample research has investigated how to forecast the commercial success of movies from pre-release predictors (e.g., Eliashberg, 2000), out of which movie trailers are the most important advertising tool. While few marketing scholars have explored the drivers of viral video ads (e.g., Nikolinakou & King,

2018; Tellis et al., 2019), little knowledge exists about which video components of movie trailers matter most to consumers in forming behavioral intentions to watch a movie. Drawing on extant theories from cinematography and storytelling literature (e.g., Quesenberry & Coolson, 2019), we propose a novel data analysis approach to establish a link between the video components of a movie trailer and consumer response. For this purpose, we pursue a multi-method approach. Specifically, we employ video mining and natural language processing techniques to analyze more than 1,000 movie trailers from YouTube of the highest-grossing English movies released in the years 2016-2018. To reveal behavioral intentions of consumers, we train a Random Forest (RF, Breiman, 2001) as a comment classifier to automatically detect "want-to-watch" expressions (e.g., "I can't wait to see this!!", "Finally..! Who else is going?"). RF is a versatile machine learning method, which can deal well with high-dimensional data (e.g., Hartmann et al., 2019a; Hartmann et al., 2019b; Wang et al., 2018). Classifying more than two million user comments, our analyses reveal a U-shaped effect between average trailer brightness and consumers' intention to watch a movie while brightness variance exhibits a negative association. Interestingly, we also find genre-specific interactions. Discussions about our findings with marketing managers from the movie industry suggest that our novel text-based success measure can complement existing success measures such as the number of comments and views to gain deeper knowledge about consumer response to movie trailers.

### **Forecasting Sub-Daily Call Center Arrivals: Investigating the Joint Impact of Data Disaggregation and Model Selection on Accuracy**

*Theresa Rausch, University of Bayreuth, Germany*

*Tobias Albrecht, University of Bayreuth and Project Group Business & Information Systems  
Engineering of the Fraunhofer FIT, Germany*

*Daniel Baier, University of Bayreuth, Germany*

Customers' perception of high service quality contributes to customers' loyalty and therefore, drives a company's success and survival within their competitive environment. Drawing on marketing literature, perceived service quality is determined by interaction quality and outcome quality. The latter comprises – among others – customers' waiting times. Thus, call center managers are expected to provide high service quality by decreasing waiting times and simultaneously to keep operating costs at a minimum by deploying an appropriate number of agents. Hence, this paper conducts a model comparison to predict call arrivals with multiple seasonality. We compare traditional and barely investigated time series models (i.e., ARIMA, Random Walk, TBATS, Innovation State Space, Dynamic Harmonic Regression), regression models (i.e., Generalized Linear Models, Zero Inflated Models), and a machine learning approach (i.e., Random Forest). Additionally, we consider a new data processing related approach to enhance forecast accuracy: we investigate whether aggregating sub-daily data to daily values and in turn, disaggregating daily predictions according to averaged call distribution per interval yields more accurate forecasts than predictions of sub-daily data. We analyze call arrivals recorded at a German online retailer's call center comprising 174.5 weeks of half-hourly data. We calculate forecast accuracy using cross validation in combination with a rolling forecast origin for 52 weeks. Our findings indicate that a Dynamic Harmonic Regression model has substantial predictive potential for practical use. Random Forest yields comparable results and outperforms traditional approaches. Moreover, we prove that time series models without explanatory variables perform more accurate on ordinary weekdays whereas machine learning and regression models with explanatory variables are more suitable to capture the course of special days, e.g., holidays. For the majority of the models, disaggregated daily predictions generate higher accuracy than predictions of sub-daily data.