Karlsruhe Institute of Technology

Marketing Analytics

Lecture Winter 2023/24
Martin Klarmann

Lecture Team

Lecture: Martin Klarmann

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Concept

- Time and Place
  - Weekly sessions combining lecture and problem set introduction/general Q&A
  - First session: October 23th, 2023; Building 10.11/R213
  - Final session: December 21th, 2023; online
- “Learning by doing”
  - Instead of an exam students apply the methods taught in class to real-world datasets
  - Group work
- Implementation:
  - Lecture slides will be provided on ILIAS by chapter
  - Tutorials based on groupwork: Problem sets with applied datasets and R
    - Some short prerecorded R video-tutorials to introduce certain methods
    - Each worksheet will be introduced and discussed
    - For each assignment there is a joint Q&A (classroom) and each group gets a group-specific Q&A (Zoom or offline)
    - No prior knowledge of R required
  - Class is managed through ILIAS, forum actively moderated
- Grade:
  - Up to 25 points for each of the four assignments
  - Final grade determined based on sum of points from the four assignments
  - Peer evaluation in groups to avoid free-riding and to identify superior individual performances

Detailed Timeline

Date	Time	Action
23.10 – 05.11.2023	n/a	Registration for the class (via Wiwi-Portal)
23.10.2023	2 pm	Info session (building 10.11, room 213)
30.10.2023	2 pm	Lecture chapter 1
06.11.2023	2 pm	Lecture chapter 1 & Introduction Problem Set 1
13.11.2023	2 pm	Lecture chapter 2 & Joint Q&A Problem Set 1
15.11.2023	Group-specific	Group-specific Q&A Problem Set 1 (Zoom or offline)
17.11.2023	5 pm	Deadline submission Problem Set 1
20.11.2023	2 pm	Lecture chapter 2 & Introduction Problem Set 2
27.11.2023	2 pm	Lecture chapter 3 & Joint Q&A Problem Set 2
29.11.2023	Group-specific	Group-specific Q&A Problem Set 2 (Zoom)
01.12.2023	5 pm	Deadline submission Problem Set 2
04.12.2023	2 pm	Lecture chapter 3 & Introduction Problem Set 3
11.12.2023	2 pm	Lecture chapter 4 & Joint Q&A Problem Set 3
13.12.2023	Group-specific	Group-specific Q&A Problem Set 3 (Zoom or offline)
15.12.2023	5 pm	Deadline submission Problem Set 3
18.12.2023	2 pm	Lecture chapter 4 & Introduction Problem Set 4
21.12.2023	11.30 am	Joint Zoom Q&A Problem Set 4
10.01.2024	Group-specific	Group-specific Q&A Problem Set 4 (Zoom or offline)
12.01.2024	5 pm	Deadline submission Problem Set 4

Overview problem sets (Preliminary)

Chapter	Dataset(s)	Applied Methods	Marketing problem(s)
Chapter I “Complex Regression Models”	Student Performance Dataset (https://www.kaggle.com/datasets/impapan/student-performance-data-set/)	▪ Model selection ▪ Nonlinear regression ▪ Regression with interaction effects	▪ Analyzing demographic and behavioral associations with performance ▪ Evaluating goals and targets for educational programs
Chapter II “Regression Assumptions”	Lifecycle Price and Production (https://www.aeaweb.org/articles?id=10.1257/aer.97.5.1533)	▪ Instrumental variable regression ▪ OLS regression ▪ elasticity	▪ Shopping intensity ▪ Price paid for products ▪ Changes over the course of a customer's lifetime
Chapter III “(Regression) Models for high-dimensional data”	Online reviews for a specific product category (Amazon, WalMart) (provided over ILIAS)	▪ Text/Lasso regression ▪ Topic modeling ▪ Multinomial inverse regression ▪ Neural network regression ▪ Generative AI (Transformer Models)	▪ Customer sentiment analysis ▪ Product feature importance ▪ Competitive positioning ▪ Responding to customer queries
Chapter IV “(Regression) Models for time-series data”	Kaggle Competition: Store sales data from ecuador (https://www.kaggle.com/competitions/store-sales-time-series-forecasting/data?select=holidays_events.csv)	▪ ARIMA Forecast models ▪ Vector-Autoregression (VAR) models ▪ External shock	▪ Sales for product families ▪ Impact of promotions ▪ Influence of holidays, oil price and external shocks (earthquake)

Registration and groups

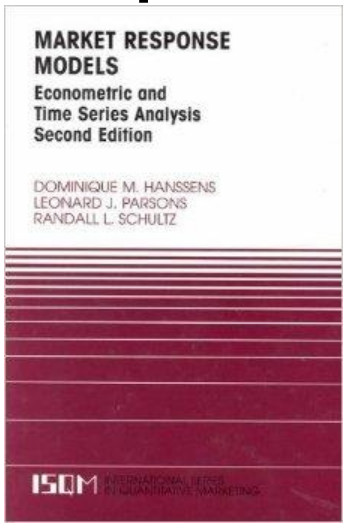
- Application time: Monday, October 23, 00:00 am - Sunday, November 05, 11:55 pm.
- You can register either as an individual or as a group of 3-4 individuals via the Wiwi-Portal (**https://portal.wiwi.kit.edu/ys/7553** or via QR Code*)
  - Group registrations need to name all group members in the commentary section of each Wiwi-Portal application
  - Group registrations with less than 3 or more than 4 individuals will be treated as individual applications
  - Assignments into groups for individual applications will be based on randomized process
- Required information for registration:
  - The year you successfully took our Market Research exam or a screenshot of your registration for the Market Research exam on 04 November 2023
- Latecomers:
  - If you register after 05 November 2023 you need to work on the first problem set alone
  - You will be assigned into a group for the second problem set onwards
  - The deadline for the first problem set does not change
- Illnesses etc.:
  - If you need to miss out on up to one group work, because you are ill, you can make up the missing points through an individual assignment in January 2024
  - If you miss more than one assignment due to illness, you need to retake the class next year or forego the points from the assignments you missed
- Missing market research requirement:
  - Having passed the exam in Market Research is a prerequisite for this class.
  - Exceptions can be made for exchange students that have passed a similar class at their home university
  - You can still register for the exam on 04 November 2023.
- Peer evaluation:
  - Every participant needs to participate in a peer evaluation with regard to other group members
  - The goal is to avoid free riding

*

Applications with R

- Throughout this class, all analyses are carried out using R
- Your assignments also need to be done in R
- Please provide additional text and interpretation as an R notebooks document: https://www.rstudio.com/blog/r-notebooks/
- Reasons behind advocating R:
  - Fast implementation of new techniques through open source approach
  - No licensing issues
  - Standard programming language in the “Analytics World”, e.g.,
    - Google (e.g., https://google-styleguide.googlecode.com/svn/trunk/Rguide.xml)
    - SAP Hana (e.g., http://scn.sap.com/community/developer-center/hana/blog/2012/05/21/when-sap-hana-met-r--first-kiss)
- R can be downloaded at https://www.r-project.org/
- Recommended interface for working with R is RStudio: https://www.rstudio.com/
- Good introduction (free with KIT-IP): http://www.springer.com/us/book/9780387773162
- We will provide some small introductory videos as a starting point

Helpful Literature

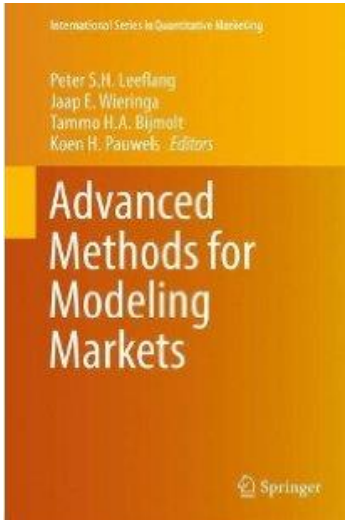


Hanssens, D. M., Parsons, L. J., & Schultz, R. L. (2003). Market response models: Econometric and time series analysis. 2nd ed. Springer.

lib.myilibrary.com/Open.aspx?id=20082

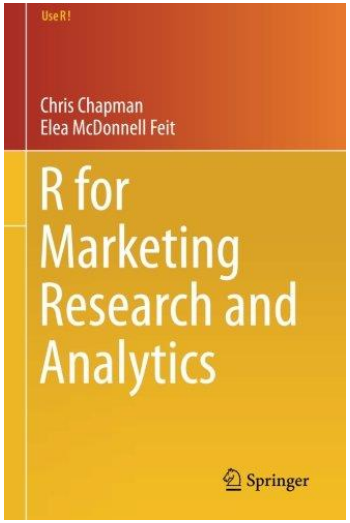
Homburg, Ch., Klarmann, M., Vomberg, A. (Editors, 2023). Handbook of Market Research. Springer.

https://link.springer.com/referencework/10.1007/978-3-319-57413-4



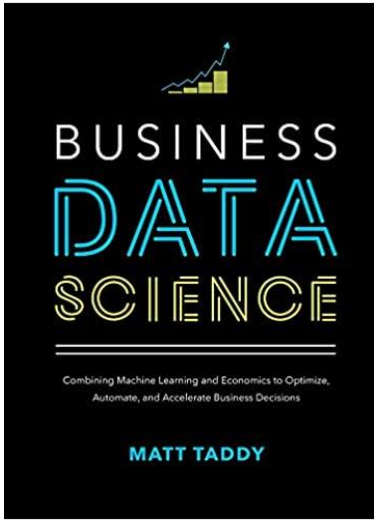
Leeflang, P.S.H., Wieringa, J.E., Bijmolt, T.H.A., Pauwels, K.H. (Editors, 2017), Advanced Methods for Modeling Markets. Springer.

link.springer.com/book/10.1007/978-3-319-53469-5



Chapman, C., & Feit, E. M. (2019). R for Marketing Research and Analytics. Springer.

https://link.springer.com/book/10.1007/978-3-030-14316-9



Taddy, M. (2019). Business Data Science. McGraw-Hill.

„Marketing analytics“ – defined

- “[T]echnology-enabled and model-supported approach to harness customer and market data to enhance marketing decision making”
  (Germann, Lilien, and Rangaswamy 2013, p. 114)
- Worldwide google search requests for “Marketing analytics” (indexed)

„Marketing analytics“ – My understanding

- Subdomain of larger field “Market Research”
- Focused on analyses where
  - data is available through other channels (“secondary data”)
  - data is often longitudinal
- Marketing analytics is related to
  - “Big Data”: Application field, but in many cases methods only required “small” data
  - “Customer Analytics”: Customer-level analyses only (http://wcai.wharton.upenn.edu/about-us/)
  - “Data Science”: Larger term, interdisciplinary, covers data exploration and analysis
- Marketing analytics is not “Machine learning,”
  - because it is driven by theory and models
  - it emphasizes learning processes at the individual and organizational level (not learning by a computer)

Some exemplary data sources

Shopping history data

Data from household and store panels

nielsen

GfK

Browsing data

Google Analytics

Data from customer databases / CRM systems

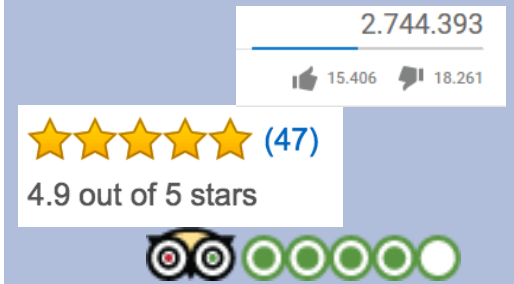
SAP CRM

sas

salesforce

ORACLE
SIEBEL

Online reviews



Social media communication

Data science initiative of the Institute of Information Systems and Marketing (IISM)

- “Data scientists” highly sought after on current jobmarket
- Few degree programs available
- Four BWL modules offered by research groups within IISM
- All focus on aspects of data science
- “Data science” branding by common element in module titles

Data Science: Evidence-based Marketing
- Market Research (Klarmann)
- Marketing Analytics (Klarmann)

Data Science: Intelligente, adaptive und lernende Informationsdienste
- Recommendersysteme (Geyer-Schulz)
- Intelligent Agent Architectures (Geyer-Schulz)
- …

Data Science: Data-Driven Information Systems
- Business Intelligence System (Mädche)
- Business Data Strategy (Weinhardt)
- Data-Driven Information Systems (Weinhardt/Mädche/Setzer)
- …

Data Science: Data-Driven User-Modeling
- Business Data Analytics: Applications and Tools (Weinhardt)
- Modeling & Analyzing Consumer Behavior with R (Dorner/Weinhardt)
- …

http://datascience.iism.kit.edu/