UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Quantitative Analysis of Companies for Marketing

2627-2-F7704M013

Learning objectives

The course (10 credits) aims at providing the knowledge needed to perform market analyses and to design experiments for providing information supporting management decisions. By the end of the course, students are expected to acquire the knowledge of the data sources useful to meet information needs, the ability to apply statistical methods to data, the ability to correctly interpret results.

Contents

Part of Quantitative Market Analysis:

- data sources;
- analysis of purchasing behaviour;
- analysis of target market;
- sales forecasting.

Part of Design of Experiments for Marketing:

- single factor experimental designs;
- multiple factor experimental designs;
- linear models;
- generalized linear models.

Detailed program

Part of Quantitative Market Analysis:

1. Quantitative market analyses:

a. definitions and purposes of a market analysis;

b. phases of a market analysis;

c. data sources for market analyses.

2. Analysis of target market:

a. market potential estimation;

b. brand positioning;

c. launch of a new product;

d. market share analysis.

3. Analysis of purchasing behaviour:

a. customer segmentation;

b. brand switching analysis.

4. Demand forecasting:

a. time series analysis for sales forecasting;

Part of Design of Experiments for Marketing:

Review of basic statistic: Statistical indicators, random variables, expected value, variance, and their properties. Random variables: normal, Student's t, Chi-square, Fisher's F. Point estimates of the mean and variance. Hypothesis testing for the mean in the case of sampling from a normal distribution. Introduction to R software for solve statistical problems.

Completely randomized single-factor experimental designs: Description of the experimental design and objectives. Specification of the model interpreting the quantitative dependent variable, interpretation of parameters, and assumptions. Hypothesis testing to be performed on model parameters. Estimation and hypothesis testing with known and unknown parameters. Decomposition of total sample deviance into within-group deviance and between-group deviance. Variance estimator based on within-group deviation and variance estimator based on between-group deviation: definitions, expected value, probability distribution. Construction of the test statistic. Balanced and unbalanced design. ANOVA table. p-value. Statistical indicators. Applications.

Completely randomized two-factor experimental designs: Description of the experimental design and objectives. The model interpreting the dependent quantitative variable, interpretation of parameters, assumed hypotheses, and useful graphs for main effects and interaction parameters. Descriptions of hypotheses to be tested. Decomposition of total sample variance: variance due to the first factor, variance due to the second factor, variance due to interaction between the two factors, variance due to error. Construction of the test statistic. ANOVA table. Applications.

Linear model with qualitative variables: Review of the linear model, assumptions underlying it, and parameter estimation. Specification of the model with one quantitative covariate and one qualitative covariate with two levels. Specification of the model with one quantitative covariate and one qualitative covariate with multiple levels. Linear

model with interactions between variables and multiple qualitative covariates. Interpretation of the model, hypothesis testing on parameters, and implementation. Applications.

Extension of linear model concepts to generalized linear models: Specification of the model with one quantitative covariate and one qualitative covariate with two levels. Interpretation of the model, and applications.

The applications will be partly carried out with the support of the statistical software R.

Prerequisites

A solid knowledge of descriptive and inference statistics is recommended.

Teaching methods

The course consists of 70 hours of frontal lessons.

Assessment methods

The assessment of learning outcomes consists of a written exam for each course module, including open questions, close-ended questions and exercises.
The exam score is on a 30-point scale.

Textbooks and Reading Materials

Statistica per analisi di mercato. Autori: F. Bassi, S. Ingrassia, anno di pubblicazione 2022. Editore: Pearson.
Piccolo, D. Statistica per le decisioni. Il mulino, terza edizione, 2020.
Dean, A., Voss, D., Dragulji?, D. Design and Analysis of Experiments (Springer Texts in Statistics) 2nd ed. 2017.
Montgomery, D. C., Progettazione e analisi degli esperimenti, 2005.

Semester

The course is annual. Quantitative Market Analysis is held in the first semester, Design of Experiments for Marketing is held in the second semester.

Teaching language

Italian

Sustainable Development Goals

QUALITY EDUCATION