1 Introduction: The Business Problem

1.1 Why A/B Testing Matters in E-Commerce

E-commerce companies face a fundamental challenge: How do we know if changing our website will increase revenue?

Traditional approaches often rely on:

- HiPPO (Highest Paid Person's Opinion)
- Gut feelings (I think users will like this)
- Observational analysis, such as comparing before and after metrics which are often confounded by seasonality, trends, and external events

All of these approaches fail to establish causality. A/B testing provides a scientific and data-driven alternative.

What is A/B Testing?

A/B testing, also known as randomized controlled trials or controlled experiments, is the gold standard for measuring causal effects in digital products. The process consists of:

1. Randomly assigning users into:
    - Control (A): current experience
    - Treatment (B): new experience with exactly one change
2. Measuring key business metrics such as revenue, conversion rate, and engagement
3. Comparing the two groups to estimate the causal effect of the change

The key principle of A/B testing is randomization. Randomization ensures that both groups are statistically identical except for the applied change, allowing observed differences to be attributed solely to the treatment.

1.2 Our Case Study: Croatian E-Commerce Platform

Business Problem: An online retailer aimed to test whether simplifying their checkout process would increase conversion rates without negatively affecting average order value.

This case study demonstrates the complete A/B testing workflow, covering hypothesis formulation, validation checks, statistical analysis, and business decision-making.

Study Context:

- Platform: Major Croatian e-commerce company
- Timeline: March–June 2021 (Q1–Q2)
- Sample size: More than 102,000 user sessions
- Geography: Zagreb, Split, Rijeka, Osijek
- Devices:
  - Mobile (60%)
  - Desktop (35%)
  - Tablet (5%)

Five Experiments Test:

- Menu Navigation
  - Experiment: A_horizontal_menu vs B_dropdown_menu
  - Goals: Evaluating the Impact of Navigation Design on User Engagement and Conversion Rate
  - Sampel size: 7,000 rows
- Novelty Discovery
  - Experiment: A_manual_novelties vs B_personalized_novelties
  - Goals: Identifying the Most Effective Strategy for Introducing a New Product to Boost Sales
  - Sampel size: 16,000 rows
- Product Recommendation Algorithms
  - Experiment:
    - A_selected_by_others_only
    - B_similar_products_top
    - C_selected_by_others_top
  - Goals: Optimizing Recommendation Algorithms to Enhance Cross-Selling and Upselling
  - Sampel size: 18,000 rows

- Social Proof (Customer Reviews)
  - Experiment: A_no_featured_reviews vs B_featured_reviews
  - Goals: Evaluating the Effect of Social Proof on User Trust and Purchasing Decisions
  - Sampel size: 42,000 rows
- Search Technology
  - Experiment: A_hybris_search vs B_algolia_search
  - Goals: Evaluating the Impact of Advanced Search Technology on Product Discovery Speed and Sales Performance
  - Sampel size: 19,000 rows