ESMT ACP Proposals 2024-25

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1. Aglukon

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Research Title: “Optimizing Product and Pricing Strategies for AGLUKON: A Multi-Method Approach to Understanding Customer Willingness-to-Pay and Market Dynamics”.

Research Objective:

The objective is to enhance AGLUKON's product management and pricing strategy by integrating customer preferences and performance data using a multi-method approach. Given the difficulty in reaching AGLUKON's customers, this project will explore several methods, including conjoint analysis, surveys, interviews, and competitive pricing analysis, to comprehensively understand customer willingness-to-pay and market pricing dynamics. The aim is to develop a flexible and robust strategy that aligns product features and pricing with market expectations and competitive positioning.

Research Questions:

1. How do customer preferences and product performance influence purchasing decisions in the preselected geographies? (Most likely Spanish-speaking countries such as Spain, Uruguay, and Paraguay, to be finalized at the beginning of the project).
2. What product features are most valued by different customer segments, and how do these preferences vary across the selected geographies?
3. What is the optimal pricing strategy that aligns with customer willingness-to-pay while maintaining competitive positioning in the respective markets?
4. How do competitor pricing strategies impact AGLUKON’s pricing decisions and market positioning?

Research Design:

1. Data Collection (Proposed, open to adjustment):

Given the difficulty in reaching a sufficient number of respondents, a combination of methods will be used to gather diverse insights. This multi-method approach will allow for triangulation of findings and ensure a more comprehensive understanding of customer preferences and pricing dynamics.

- **Multi-Method Approach to Understanding Willingness-to-Pay:**
    - **Conjoint Analysis:**
        - Design and conduct a conjoint study to understand the trade-offs customers are willing to make between product attributes and price. This method will be deployed if a sufficient number of respondents can be reached.
    - **Survey-Based Techniques:**
        - Use the Van Westendorp Price Sensitivity Meter and Gabor-Granger technique in surveys to assess acceptable price ranges and price sensitivity among respondents.
    - **Qualitative Interviews:**
        - Conduct in-depth interviews with key stakeholders, including farmers and B2B customers, to gather qualitative insights on preferences, pain points, and pricing expectations. These interviews will be supplemented with direct questions on willingness-to-pay and competitive perceptions.
    - **Competitor Pricing Analysis:**
        - Collect and analyze data on competitor pricing strategies from industry reports, trade shows, and distributor feedback to understand the competitive landscape. This analysis will inform the development of AGLUKON's pricing strategy and highlight potential opportunities for differentiation.
- **Challenges and Mitigation Strategies:**
    - **Customer Accessibility:**
        - Collaborate with local distributors, agricultural associations, and industry partners to facilitate access to customers. Utilize digital channels, such as email surveys and social media, to reach a broader audience.

2. Data Analysis (Proposed, open to adjustment):

- **Conjoint Analysis (Conditional on sufficient responses):**
  - If a sufficient sample size is achieved, conduct a conjoint analysis to quantify customer preferences for various product attributes and price points. Analyze the trade-offs customers are willing to make between features and pricing.

- **Van Westendorp and Gabor-Granger Techniques:**
  - Use these methods to directly estimate acceptable price ranges and price sensitivity. These techniques will be particularly useful if conjoint analysis cannot be fully implemented.

- **Sentiment Analysis:**
  - Perform sentiment analysis on qualitative interview data and social media feedback to identify key themes related to product features and pricing.

- **Competitor Analysis:**
  - Compare AGLUKON's pricing with competitor offerings to identify areas of competitive advantage or pricing gaps. This analysis will consider factors such as product performance, perceived value, and market conditions.

Expected Outcomes:

- A detailed report on customer preferences and willingness-to-pay across different product attributes, considering the constraints of data collection.
- Identification of acceptable price ranges and sensitivity levels using multiple methods, ensuring robust insights despite potential data limitations.
- Recommendations for pricing strategy for AGLUKON that considers customer preferences, competitor pricing, and market dynamics.
- Recommendations for improving future data collection efforts in challenging markets and leveraging alternative methods to gather insights.

Required Skills:

- Machine learning techniques
- Customer preference modeling
- Conjoint analysis
- Spanish language (B1+) for survey/interview design

Key Terms:

- Willingness-to-Pay
- Product Performance
- Conjoint Analysis
- Pricing Strategy

About the Company:

AGLUKON is a leading player in the agricultural industry, known for its innovative fertilizer products. The company is exploring ways to better understand its customers' needs and preferences, optimize its product management strategy, and develop a competitive pricing model that maximizes profitability while ensuring customer satisfaction.

2. Ärzte Ohne Grenzen

- Name of your company: Ärzte ohne Grenzen
- Division involved in the project: Strategy and Organisational Development
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Research Title: “Optimizing Donor Retention and Lifetime Value Strategies: Predictive Analytics and Segmentation for Enhanced Engagement”

Research Objective:

To develop data-driven strategies for reducing donor churn and identifying new donor segments by leveraging predictive analytics, market segmentation, and effective data visualization. The project aims to provide actionable insights to optimize retention efforts and identifying forecasted donor lifetime value segments for existing donors.

Research Questions:

1. What are the key factors contributing to donor attrition, and how can predictive models help in identifying high-risk donors?
2. How can the existing donor data be segmented to enhance targeted communication and improve donor retention?
3. Which external demographic data sources can be utilized to better predict the donor's lifetime value?
4. How can the findings from donor behavior analysis be effectively visualized to support decision-making and stakeholder engagement?

Research Design:

- **Phase 1: Data Collection and Preparation**
    - Utilize existing donor data to analyze historical donation patterns and identify key attributes influencing donor behavior.
    - Evaluate and select external demographic data sources for enriching donor lifetime value model.

  - Evaluate and select external demographic data sources (e.g. from research reports) for optimizing churn reduction.

- **Phase 2: Predictive Analytics**
  - Develop and validate predictive models to identify high-risk donors and factors contributing to donor churn.
  - Create a churn prediction model using techniques such as logistic regression, decision trees, or machine learning algorithms.

- **Phase 3: Market Segmentation**
  - Conduct clustering analysis on existing donor data to identify distinct donor lifetime value segments based on behavior, demographics, and donation patterns.
  - Apply insights from existing donor segments to external demographic data to identify potential new donor segments.

- **Phase 4: Data Visualization**
  - Design and implement visualizations to present key insights from the analysis, including donor segments, churn risks, and retention strategies.

- **Phase 5: Strategic Recommendations**
  - Formulate actionable recommendations for targeted communication and retention strategies based on the analysis.
  - Develop a framework for ongoing monitoring and evaluation of donor engagement and retention efforts.

Expected Outcomes:

- A validated predictive model to identify high-risk donors and reduce churn.
- A segmentation report, including profiles of existing and mapped potential new donors to lifetime value segments.
- Data visualizations that effectively communicate findings and support stakeholder decision-making.
- Recommendations for targeted communication and donor engagement to enhance retention efforts.

Required Skills:

- Data analysis and machine learning (e.g., Python, R).
- Data visualization

- Data search

Key Terms:

- Predictive Analytics
- Donor Segmentation
- Data Visualization
- Donor Retention
- Lifetime Value

About the Company:

Ärzte ohne Grenzen (Doctors Without Borders) is a global nonprofit organization providing emergency medical aid to people affected by conflicts, epidemics, and disasters. Founded in 1971, it focuses on delivering healthcare to the most vulnerable, including those in war zones and areas with limited access to medical services. Donor support is vital for maintaining its independence, enabling rapid response and resource allocation where needs are greatest. By optimizing donor retention and acquisition through data-driven insights, ÄOG seeks to strengthen relationships with supporters and enhance the effectiveness of its programs.

3. CareerOS

- Name of your company: CareerOS
- Division involved in the project: CEO Office
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Research Title: "Market Segmentation Strategy for Enhanced Customer Engagement and Retention at TheCareeros".

Research Objectives:

- Identify and profile distinct customer segments within TheCareeros' user base.
- Understand the key drivers of customer engagement within each segment.
- Tailor engagement and service offerings to meet the specific needs and preferences of each identified segment.

Research Questions:

- What are the key characteristics of the existing customer segments within TheCareeros' user base?
- How do different customer segments correlate with engagement and retention metrics?
- What are the primary factors that drive customer engagement within each segment?
- What engagement strategies can be developed to improve retention rates for each identified segment?

Research Design:

- **Data Collection Methods (Proposed, open to adjustment):**
    - **Existing Data Analysis:**
        - **Customer Profiles:** Analyze demographic, behavioral, and engagement data from existing databases, including user activity, course participation, content interactions, and usage frequency.
    - **Surveys and Interviews:**
        - **Surveys:** Conduct online surveys targeting current and potential users to gather insights on preferences, motivations, and satisfaction levels.

        - **Interviews:** Conduct in-depth interviews with a subset of users from different segments to gain qualitative insights into their needs and expectations.
    - **External Data Sources:**
        - **Market Reports:** Review industry reports and market trends to understand external factors that influence user engagement and retention in the career development and e-learning sectors.

- **Analysis Techniques (Proposed, open to adjustment):**

    - **Exploratory Data Analysis (EDA):**
        - Perform EDA to identify patterns and trends in customer data, focusing on variables that influence engagement and retention. Explore relationships between user behavior and engagement levels.

    - **Clustering Techniques:**
        - Use clustering algorithms (e.g., K-Means, Hierarchical Clustering, DBSCAN) to segment the customer base into distinct groups based on similarities in engagement behaviors, preferences, and characteristics.

    - **Segmentation Analysis:**
        - Profile each segment to understand key characteristics, engagement drivers, needs, and potential value.
        - Analyze how each segment contributes to overall retention and engagement metrics and identify specific factors that drive engagement within each group.

    - **Predictive Modeling:**
        - Develop predictive models to identify which segments are at higher risk of disengagement or churn.
        - Use machine learning models, such as logistic regression or decision trees, to predict user behavior and identify factors that drive engagement for each segment.

Expected Outcomes:

- **Detailed Customer Segments:** Identification and description of customer segments with actionable profiles, including demographics, behaviors, and preferences.

- **Engagement and Retention Strategies:** Development of tailored engagement strategies for each segment, such as personalized content, targeted communication, incentive programs, and engagement features that align with segment-specific needs.

- **Insights for Strategic Decisions:**
    - Insights into which segments are most engaged and offer the highest potential for long-term retention.
    - Recommendations on where to focus engagement efforts and resources to maximize customer satisfaction, loyalty, and overall engagement levels.
    - Identification of key drivers of engagement within each segment to inform the design of new features, content, and services that align with user needs.

Required Skills:

- EDA and clustering techniques
- Predictive modeling
- Conducting surveys and interviews

Key Terms:

- Market Segmentation
- Retention
- Predictive Modeling
- Customer Engagement

About Company:

TheCareeros is a digital platform dedicated to helping individuals advance their careers through personalized learning, mentorship, and networking opportunities. The platform offers a range of services, including career coaching, skills assessment, and tailored job recommendations. By leveraging data-driven insights, TheCareeros provides a personalized user experience that connects professionals with the resources they need to achieve their career goals, whether they are looking to enhance their current skills, transition into a new industry, or find their next job opportunity. The company's mission is to empower individuals by making career development accessible, engaging, and effective.

4. Fintiba

- Name of your company: Fintiba GmbH
- Division involved in the project: Projects and Products department
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Research Title: "Determining the Optimum Price Expats Are Willing to Pay for a Blocked Account in Germany and Understanding the Role Pricing Plays in Their Choice of Provider".

Research Objectives:

- Determine the optimum price point expats will pay for a blocked account in Germany.
- Analyze the role pricing plays in expats' decision-making process when selecting a blocked account provider.
- Provide actionable insights for Fintiba to optimize its pricing strategy and better meet customer expectations.

Research Questions:

- What is the price sensitivity of expats in relation to blocked accounts?
- How do different pricing levels influence the likelihood of choosing Fintiba over competitors?
- What key factors, besides price, do expats consider when selecting a blocked account provider?

Hypotheses (Proposed, open to adjustment):

- H1: There is a specific price range that maximizes the likelihood of an expat choosing Fintiba as their blocked account provider.
- H2: Pricing plays a significant role in the selection process, but other factors like service quality and convenience are also influential.

Methodology:

- **Data Collection (Proposed, open to adjustment):**

- **Survey:** Conduct a survey among current and prospective expats who require a blocked account in Germany. The survey will include questions on price sensitivity, preferences, and perceived value of different blocked account providers.
- **Conjoint Analysis:** This method will help us understand how expats value different attributes of a blocked account, including price, service quality, ease of access, and additional services.
- **Competitor Analysis:** A comparative analysis of Fintiba's pricing and features against those of key competitors will position Fintiba within the market landscape (depending on data availability).

- **Data Analysis (Proposed, open to adjustment):**

  - **Descriptive Statistics:** Summarize the demographic characteristics and preferences of the respondents.
  - **Conjoint Analysis:** Determine the relative importance of price and other attributes in the decision-making process.
  - **Price Sensitivity Meter (PSM):** Identify the optimum price point and acceptable price ranges.
  - **Regression Analysis:** Examine the relationship between price levels and the likelihood of choosing Fintiba.

Expected Outcomes:

- Identification of the optimal price range that maximizes Fintiba's attractiveness to expats.
- Insights into the relative importance of pricing compared to other factors like service quality.
- Recommendations for Fintiba's pricing strategy to enhance market positioning and customer acquisition.

Required Skills:

- Statistical Analysis
- Survey Design
- Data Visualization
- Business Communication

Key Terms:

- Blocked Account
- Conjoint Analysis
- Price Sensitivity

About Fintiba:

Fintiba is a leading provider of blocked accounts for expats in Germany, specializing in supporting international students and professionals. The company aims to streamline the financial verification process required for visa applications and provide a user-friendly, accessible service tailored to the needs of expats.

5. Huggin Munin

- Name of your company: Huggin Munin LTD
- Division involved in the project: Agricom Solutions
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Research Title: “Understanding Consumer Preferences for Food Waste Mitigation.”

Research Objective:

The project seeks to understand consumer behaviors and preferences related to food waste in order to identify the key drivers and develop strategies for reducing household food waste. By combining insights from social media sentiment analysis and survey data, the research will provide a comprehensive picture of public attitudes and trends concerning food consumption and waste mitigation. It will identify the main motivations and barriers that influence waste-related behaviors, while assessing the impact of demographic, behavioral (e.g., shopping frequency and storage practices), and psychographic factors (e.g., household size, environmental awareness) on waste levels. The findings will not only help reduce household food waste but also support businesses in aligning their production with real consumer demand, minimizing excess inventory and improving supply chain efficiencies.

Research Questions:

- What are the main motivations and barriers that influence consumer behaviors related to household food waste?
- How do demographic, behavioral (e.g., shopping frequency and storage practices), and psychographic factors (e.g., age, household size, environmental awareness) impact household food waste behaviors?
- What are the key themes related to food waste mitigation emerging from social media discussions?
- How can data-driven strategies be developed to effectively engage consumers in reducing food waste?

Research Design:

1. **Data Collection (Proposed, open to adjustment):**

- **Social Media Data Collection:**
  Social media data will be used to help identify key themes related to motivations and barriers for reducing food waste. The data will be either scraped by students or purchased by the company at the start of the project. That will eb decided at the beginning of the project. Accordingly, data collection will involve using scraping tools and APIs (e.g., Twitter API, Facebook Graph API) to gather relevant public posts and comments with keywords like #foodwaste, #sustainableliving, and #zerowaste. Alternatively, pre-collected sentiment datasets can be sourced from providers such as Brandwatch, Talkwalker, or Meltwater. Sentiment analysis will be performed using NLP techniques and machine learning models.

- **Survey Methodology:**
  Conduct a survey targeting two distinct groups: customers from Ökullus.de (a platform specializing in organic products) who may already have sustainable consumption habits and other households in Germany. The survey will cover topics such as purchase motivations, preferences for packaging and portion sizes, willingness to pay for sustainably produced foods, and behaviors related to food waste. Additional questions will focus on awareness and attitudes towards food waste, buying patterns, and interest in product information (e.g., shelf life and sustainable sourcing).

- **A/B testing:**
  A/B can be employed to evaluate the effectiveness of various consumer engagement strategies, such as providing detailed product shelf-life information or offering discounts on sustainably sourced products.

- **External Datasets:**
  Utilize existing datasets on household food waste, such as those from national statistics, Eurostat Database on Food Waste, or FAO's Food Loss and Waste Database.

2. **Data Analysis Methods (Proposed, open to adjustment):**

- **Descriptive and Regression Analysis:**
  Analyze data to identify common behaviors and the impact of factors (e.g., age, education) on waste levels. Use regression techniques to quantify relationships between drivers like environmental awareness and food waste reduction.

- **Advanced NLP for Topic Modeling and Sentiment Analysis:**

Apply NLP techniques to identify themes related to motivations and barriers, using topic modeling (e.g., Latent Dirichlet Allocation) and sentiment analysis tools to categorize sentiments (positive, neutral, negative).

- **Comparative Analysis:**
  Compare social media sentiment with survey results to detect patterns or differences in attitudes toward sustainability, assessing whether social media discussions emphasize certain concerns more than survey data. A comparative analysis of consumer segments will reveal how different demographics and psychographic profiles respond to waste-reduction strategies, allowing businesses to target interventions effectively.

- **Cluster Analysis, Factor Analsis, or Structural Equation Modeling (SEM):**
  Use these methods to explore relationships between motivations and behaviors, segmenting the data into actionable consumer profiles.

- **Key Factor Identification:**
  Integrate insights to determine the primary factors influencing food waste, such as impulse buying, storage practices, and misunderstandings about expiration dates.

Expected Outcomes:

Insights from the research will support businesses in streamlining their production cycles, aligning inventory levels with consumer demand trends, and reducing waste throughout the supply chain:

- Insights into motivations and barriers to reducing food waste, based on sentiment and topic analysis.
- Key factors influencing household food waste, such as storage habits, awareness, and buying behaviors.
- Comparison of social media and survey data to identify gaps or alignments in sustainability attitudes.
- Recommendations for engaging consumers and reducing food waste, tailored to specific segments.

Required Skills:

- Survey Design and Data Analysis
- NLP and Sentiment Analysis
- Cluster Analysis and Statistical Modeling

Key Terms:

- Food Waste Mitigation
- Consumer Preferences
- Social Media Data Analysis
- Natural language processing (NLP)

About the Company:

Agricom is an impact-driven startup focused on revolutionizing the agricultural sector through innovative technologies and sustainable practices. Our mission is to combat food insecurity and eliminate famine by providing data-driven solutions that reduce food waste and optimize production. By leveraging advanced analytics, artificial intelligence, and precision agriculture, Agricom empowers both producers and consumers to make informed decisions that enhance efficiency and sustainability. We are committed to creating a more resilient and equitable global food system, ensuring that nutritious food is accessible to all while preserving the environment for future generations.

6. JTI

- Name of your company: JT International Germany GmbH
- Division involved in the project: Marketing - Strategic Insights
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    - Phone number:

Research Title: “Detailed Short-Term Sales Forecast”.

Research Objective:

To develop a short-term, product-level sales forecasting model that improves forecast accuracy by incorporating both historical order data and external influences such as weather, public holidays, and other open-source data. The project will also aim to enhance JTI's understanding of AI's role in data analysis and develop a scalable prototype model adaptable to JTI's changing product portfolio.

Research Questions:

1. **What are the key factors influencing short-term sales variability at the product level?**
   Identify both internal (e.g., historical sales patterns, promotions) and external factors (e.g., weather, public holidays) that impact sales.
2. **How can the accuracy of short-term sales forecasts be improved using advanced analytics and machine learning techniques?**
   Evaluate different forecasting models and their effectiveness in accurately predicting sales for the next 2-4 weeks.
3. **To what extent do external factors like weather conditions, public holidays, and tourist movements influence sales performance?**
   Quantify the impact of these factors and integrate them into the forecasting models.
4. **What is the best approach for creating a flexible and scalable forecasting model that can adapt to changes in JTI’s product portfolio and customer base?**
   Explore model adaptability and scalability to accommodate frequent changes in products and pricing.

Research Design:

- **Phase 1: Data Collection and Preparation**
  - Gather historical sales data, external factors data (weather, public holidays), and other relevant datasets.
  - Clean and preprocess the data to ensure consistency and accuracy.

- **Phase 2: Model Development and Testing**
  - **Exploratory Data Analysis (EDA):** Conduct EDA to identify trends, correlations, and potential features for modeling.
  - **Model Building:** Develop and compare various forecasting models, including time-series models (e.g., ARIMA, Prophet) and machine learning algorithms (e.g., Random Forest, XGBoost).
  - **Incorporate External Factors:** Integrate external variables into the models to assess their impact on sales predictions.
  - **Validation:** Validate the models using appropriate metrics (MAE, RMSE) and refine them based on feedback.

- **Phase 3: Implementation and Scenario Testing**
  - Deploy the chosen model and test it under various scenarios, ensuring it can handle different product changes and external influences.
  - Create user-friendly outputs, such as dashboards or automated reports, to facilitate interpretation and usage by JTI's team.

- **Phase 4: Training and Handover**
  - Develop comprehensive documentation and conduct training sessions to educate JTI's team on model usage and maintenance.
  - Provide guidelines on how to update the model as new data or product changes occur.

Expected Outcomes:

- A highly accurate, short-term sales forecasting model that integrates historical and external data to improve predictions.
- Detailed insights into how external factors affect sales, aiding in strategic planning and decision-making.
- A scalable prototype model that can be adapted to accommodate changes in JTI's product range and customer demographics.
- Explanation of how AI and advanced analytics can be utilized in forecasting and data analysis.

Required Skills:

- Proficiency in Python or R
- Data Analysis and Manipulation
- Statistical and Machine Learning Expertise

Key Terms:

- Time-Series Analysis
- Sales predictions
- Scalability

About Company:

Japan Tobacco International (JTI) is a leading global tobacco company known for its extensive portfolio of cigarette brands, including Winston and Camel, and innovative products like heated tobacco and vaping devices. Headquartered in Geneva, Switzerland, JTI operates in over 130 countries and is committed to sustainability, innovation, and responsible business practices. The company is currently seeking to enhance its data analytics capabilities, particularly in leveraging AI for sales forecasting and decision-making.

7. Mercedes-Benz

- Company: Mercedes Benz AG
- Department: PP/DPF (Digital Factory Campus)
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Research Title: "Supply Chain Damages – Pattern Analysis and Prediction".

Research Objectives:

- To identify and classify patterns of damage occurring during the supply chain process.
- To develop predictive models that forecast potential damage and provide insights to minimize occurrences.
- To integrate internal and external data sources, such as weather and logistics data, to enhance the predictive accuracy of the models (upon availability and feasibility).

Research Questions:

1. What are the most common types and patterns of damage occurring in the supply chain of Mercedes-Benz vehicles?
2. Which external factors (e.g., weather, logistics methods) significantly correlate with the occurrence of damage?
3. How can predictive models be used to forecast and prevent future damage?
4. What actions can be recommended to reduce damage occurrences based on the analysis?

Research Design:

1. Data Collection:

- **Internal Data:** Gather existing data on damages from Mercedes-Benz, including damage ID, area, type, grid section, size, and images per vehicle identification number (VIN).
- **External Data:** Collect relevant external data such as weather conditions, geographical information, transportation and logistics details, and traffic data that align with the timing and locations of the damages (upon availability and feasibility).

2. Data Cleaning and Preprocessing:

- Standardize and clean the data to ensure consistency, especially focusing on image data processing and text classification.
- Handle missing data, outliers, and ensure proper scaling and normalization of variables.

3. Exploratory Data Analysis (EDA):

- Conduct EDA to identify initial patterns, correlations, and anomalies in the data.
- Use visualization tools to illustrate damage patterns and their relationships with external factors.

4. Predictive Modeling:

- Apply machine learning algorithms to develop predictive models.
- Integrate external data (e.g., weather, logistics) into the models to improve predictive performance (upon availability and feasibility).
- Evaluate models using metrics like accuracy, precision, recall, and F1 score.

5. Pattern Recognition and Clustering:

- Use clustering techniques (e.g., k-means, hierarchical clustering) to identify groups of similar damages and underlying patterns.
- Analyze the clusters to understand common characteristics and potential causes of the damages.

6. Validation and Reporting:

- Validate the predictive models with historical data and perform cross-validation to ensure robustness.
- Based on the patterns and predictions, develop actionable recommendations for reducing the frequency and severity of damages.
- Prepare a comprehensive report and presentation for Mercedes-Benz, summarizing findings, predictive models, and recommended actions.

Expected Outcomes:

- A detailed understanding of the patterns and types of damage occurring within the Mercedes-Benz supply chain.
- Predictive models that can accurately forecast future damages and identify key risk factors.

- Recommendations to minimize damage occurrences, potentially leading to cost savings and improved operational efficiency.

Required Skills:

- Data analysis and machine learning (preferably Python).
- Image processing techniques

Key Terms:

- Image Analysis
- Damage Classification
- Cluster Analysis
- Predictive Analytics

About the Company:

Mercedes-Benz is a leading global automotive brand renowned for its luxury vehicles, commitment to innovation, and advanced engineering. Mercedes-Benz is dedicated to optimizing its supply chain operations through advanced analytics, artificial intelligence, and digital transformation initiatives. This research design aims to harness data-driven insights to help Mercedes-Benz tackle critical supply chain challenges, such as minimizing damage during transport and ensuring the reliable, seamless delivery of its vehicles.

8. Quirin Privatbank

- Name of your company: Quirin Privatbank AG
- Division involved in the project: Quirin Privatbank / Quirion AG
- Contact person:
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Research Title: "Evaluating User Experience and Acceptance of the QAi Dialog-Bot: Insights for Enhancing Service Clarity and Adoption".

Research Objective:

On Tuesday, September 10th, Quirin Privatbank introduced Germany's first release of Q.Ai, an AI-powered dialogue bot designed for financial information and wealth advisory services. Q.Ai aims to educate users on the dynamics of financial markets, calculations, macroeconomic topics, investment products, risks and opportunities, costs, and personal investment strategies. This free and secure service is intended to showcase the Q-Group's expertise and attract interest, prospects, and new clients.

The primary objective of this research is to evaluate the user experience and acceptance of the QAi Dialog-Bot, a live service launched by Q-Group, Quirin Privatbank, and Quirion AG. The study aims to identify key areas for improvement in usability, functionality, and clarity, and to explore factors influencing the service's acceptance within its target groups. Additionally, the research will assess the perceptions and attitudes of potential users who have not yet interacted with the service, providing insights into barriers to entry and potential drivers of adoption.

Research Questions:

- How do current users perceive the usability, functionality, and clarity of the QAi Dialog-Bot service?
- What are the most common issues or challenges faced by users during their interaction with the service?
- How does the user experience of the QAi service compare with user expectations?
- What improvements can be made to enhance user satisfaction, service clarity, and increase adoption rates?

- How knowledgeable are users about ETFs and their benefits as an investment option? How does their knowledge influence their interaction with and perception of the QAi service?
- What are the attitudes and perceptions of potential users towards the QAi Dialog-Bot service?
- What are the main barriers to adoption for those who have not yet used the service?
- What features or benefits would encourage potential users to try or adopt the service?

Research Design:

- **Study Population:**
  - **Current Users:** Individuals who have interacted with the live version of the QAi Dialog-Bot.
  - **Potential Users:** Individuals within the target demographic who have not yet used the service.

- **Data Collection Methods:**
  - **Surveys:**
    - Conduct online surveys in German to collect quantitative data on user satisfaction, perceived value, usability, clarity of the service, barriers to continued use, perceptions of potential users, and knowledge of ETFs.
    - Include questions on acceptance within target groups and feedback on service clarity.
    - Surveys may include Likert-scale questions, open-ended questions for qualitative insights, and demographic information.
  - **Usage Data Analysis:**
    - Analyze usage data from the QAi service to identify behavioral patterns, common drop-off points, and underutilized features.
  - **A/B Testing (Optional):**
    - Implement A/B testing on various features or interface designs to evaluate their impact on user satisfaction, engagement, and service clarity.

- **Data Analysis:**

  - **Quantitative Analysis:**
    - Utilize statistical tools to analyze survey data, focusing on trends and correlations between user demographics, satisfaction, acceptance, clarity perceptions, and adoption likelihood.

- **Comparative Analysis (for A/B Testing):**
    - Compare usage data before and after any interface changes or feature enhancements to assess their impact on clarity and acceptance.

Expected Outcomes:

- **User Experience Report:**
    - A comprehensive report highlighting the strengths and weaknesses of the QAi Dialog-Bot service from a user perspective, including feedback on clarity and acceptance within target groups.
- **Recommendations:**
    - Actionable insights and recommendations to improve the service based on user feedback and data analysis, focusing on enhancing clarity and increasing acceptance among target groups.

Required Skills:

- Data Analysis and Visualization
- Survey Design (in German!)
- German Language (B1+ level)
- A/B Testing (optional)

Key Terms:

- AI and Chatbot
- User Experience (UX) Evaluation
- Service Clarity and Acceptance
- Adoption Barriers

About Company:

Quirin Privatbank AG is a German financial institution specializing in transparent, fee-based financial advisory services, offering personalized wealth management solutions to private clients. As a pioneer in digital financial services, its subsidiary, Quirion AG, provides innovative, low-cost, and user-friendly online investment management through its robo-advisor platform. Quirion AG aims to make professional investment accessible to a broader audience, leveraging advanced technology to deliver efficient and tailored investment strategies, particularly focusing on ETFs (Exchange-Traded Funds). The company is committed to enhancing client experience through

continuous innovation, including AI-driven tools like the QAi Dialog-Bot, designed to streamline customer interactions and improve service delivery.

9. Rainmaker Society

- Name of your company: RainmakerSociety GmbH
- Division involved in the project: Operations/Product
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Research Title: "Matching Algorithm for candidate – job profiles: Leveraging GenAI/LLM for Enhanced Talent Matching".

Research Objective:

The primary objective of this research is to develop and define a concept for improving the matching of job descriptions with candidate profiles using Generative AI (GenAI) and Large Language Models (LLMs). This project aims to enhance the accuracy and efficiency of the matching process by leveraging advanced AI techniques to analyze and interpret both structured and unstructured data, ultimately creating a more precise and personalized candidate-job matching experience for Rainmaker Society.

Research Questions:

- How can Generative AI and Large Language Models improve the accuracy of job description and candidate profile matching?
- What are the key factors (e.g., skills, experience, qualifications, personality type, etc.) that contribute to a successful match in the talent acquisition process?
- How can these data be generated out of the existing job and candidate data without asking client and candidates?
- How can LLMs be trained to understand industry-specific and job role-specific language and terminologies for better candidate-job matching?
- What challenges or limitations might arise in integrating GenAI into the matching process?
- How can GenAI reduce bias and improve fairness in the selection and recommendation process while not decreasing the overall matching success.

Research Design (Proposed, open to adjustment):

- **Study Population:**
  - Clients (Job Posters): Companies and organizations that post job descriptions on Rainmaker Society's platform (internal) and other external resources, e.g. LinkedIn, Xing, job platforms.
  - Candidates: Job seekers with profiles on Rainmaker Society's platform and other external sources, e.g. LinkedIn, Xing, job platforms.

- **Data Collection Methods:**

  - **Job Description Analysis:**
    - Collect and analyze job descriptions across various industries, functions and roles.
    - Identify key patterns, skills, qualifications, and terminologies used in different industries, functions and roles

  - **Candidate Profile Analysis:**
    - Analyze candidate profiles to understand the diversity of skills, experiences, and competencies.
    - Use NLP (Natural Language Processing) techniques to extract insights from unstructured data in resumes and CVs.

  - **Algorithm Development and Testing:**
    - Develop a concept for a matching algorithm powered by GenAI/LLM that can understand both job descriptions and candidate profiles with enhanced accuracy.
    - Test and validate the algorithm using historical job and candidate data to assess its performance.
    - Identify tools that could improve the process efficiency / accuracy

  - **A/B Testing:**
    - Conduct A/B testing to compare the performance of the GenAI-powered matching algorithm against the existing matching process.
    - Evaluate success rates based on metrics such as candidate placement, client satisfaction, and matching accuracy.

- **Data Analysis:**

  - **Algorithm Performance Metrics:**

        - Measure the performance of the GenAI/LLM model using accuracy, precision, recall, and other relevant machine learning metrics.

    - **Comparative Analysis:**
        - Compare results from the GenAI/LLM model with traditional matching methods to assess improvement in matching quality.

    - **Bias Detection and Mitigation:**
        - Use fairness metrics to evaluate bias in the algorithm and implement methods to reduce any detected bias in the matching process.

Expected Outcomes:

- **Concept Report:** A comprehensive report outlining the concept for improving job-candidate matching using GenAI/LLMs, including key factors influencing match accuracy and potential limitations.

- **Prototype Matching Algorithm:** A functional prototype of the matching algorithm that integrates GenAI/LLM for Rainmaker Society, tested and validated through real-world data and A/B testing.

- **Recommendations for Implementation:** Strategic recommendations for integrating the developed matching algorithm into Rainmaker Society's platform, including resource allocation, timeline, and potential challenges.

Required Skills:

- Natural Language Processing (NLP)
- Machine Learning
- Generative AI and LLMs
- A/B Testing Design and Implementation

Key Terms:

- Generative AI (GenAI)
- Large Language Model (LLM)
- Natural Language Processing (NLP)

- Talent Matching

About the Company:

Rainmaker Society is driven by the mission to create a powerful career support network that connects exceptional and entrepreneurial individuals. The organization is dedicated to fostering eye-to-eye exchanges, tackling exciting challenges, and providing mutual support on unique career paths. Rainmaker Society empowers companies to find the right people "to make a difference" and meet future challenges, whether through freelance projects, interim mandates, or filling key positions.

10. REPSA Europe

- Name of your company: REPSA Europe GmbH
- Division involved in the project: REPSA Europe GmbH
- Contact person:
    - Name: Jose Carlos Lopez
    - Job title: CEO
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    - Phone number:

Research Title: "Cost-Benefit Analysis of Battery Energy Storage Systems (BESS)".

Research Objectives:

- **Analyze Historical Data:** Conduct a focused analysis of past energy prices and battery storage capacities to identify significant trends and patterns.
- **Evaluate Revenue Streams from BESS:** Assess potential revenue generation from BESS applications, including peak shaving, frequency regulation, and demand charge reduction.
- **Impact Assessment of BESS on Energy Prices:** Investigate how battery storage influences energy price volatility and market stability.
- **Economic Viability Analysis:** Determine the cost-effectiveness and overall economic benefits of integrating BESS within energy markets.
- **Case Study Analysis:** Review existing BESS installations to evaluate their financial performance and market impact.

Project Scope:

- **Geographic Focus:** European market, with the possibility of focusing on specific countries (upon data availability).
- **Market Segments:** Commercial, industrial, and utility-scale applications (upon data availability).
- **Time Frame:** Historical data from the past 10+ years (upon data availability) and future projections for energy prices and generation versus consumption trends over the next 3 to 5 years.

Research Questions:

- What are the significant trends and patterns in historical energy prices and battery storage capacities in the European market?

- How do different BESS applications (e.g., peak shaving, frequency regulation, demand charge reduction) generate revenue?
- What impact does BESS integration have on energy price volatility and market stability?
- What is the economic viability of BESS installations in terms of CAPEX, maintenance costs, and expected returns?
- How do existing BESS installations perform financially, and what are their impacts on the market?

Research Design:

- **Data Collection & Preparation:**
  - **Energy Prices:** Collect historical data from reliable sources such as government databases, energy exchanges, or industry reports.
  - **Battery Storage Data:** Gather detailed data on BESS capacities, installation dates, geographical locations, and technical specifications. Collect financial data including initial costs, maintenance costs, and lifespan of different types of batteries (e.g., lithium-ion, flow batteries, lead-acid).
  - **Auxiliary Data:** Collect relevant weather data, demand and supply data, and updates on regulatory and policy changes that affect the energy market.

- **Scenario Development:**
  - **Base Case (Without BESS):** Use simplified models of grid operations without BESS, focusing on a few key indicators like energy price volatility.
  - **With BESS:** Simulate only a few scenarios with different BESS sizes and technologies to keep the modeling work manageable. Consider using pre-built simulation tools or templates to save time.

- **Analysis:**
  - **Case Analysis**: Perform detailed evaluations of battery applications such as peak shaving, load shifting, backup power, and renewable integration.
  - **Technical Evaluation**: Analyze grid performance focusing on frequency regulation, voltage support, and reducing renewable energy curtailment.
  - **Benefit Calculation**: Assess the economic advantages of integrating battery storage into off-taker facilities.
  - **Cost-Benefit Analysis**: Compare CAPEX and maintenance costs over the lifespan of different technologies (lithium-ion, flow batteries, lead-acid) to highlight potential savings and returns.

- **Strategic Insights for REPSA:**

- Provide actionable recommendations for leveraging BESS to gain competitive advantage in the market.

- **Reporting:**
  - Compile findings, methodologies, and recommendations into a comprehensive report.

Expected Outcomes:

- A detailed understanding of the economic and technical benefits of BESS.
- Insights into how BESS can stabilize energy prices and improve market stability.
- Actionable strategies for REPSA to integrate BESS into their operations.

Required Skills:

- Data analysis and modeling tools
- Scenario Simulation
- Cost-benefit analysis

Key Terms:

- Energy markets
- BESS (Battery Energy Storage Systems)
- Cost-benefit analysis
- Case Analysis
- Scenario Simulation

About Company:

REPSA Europe is a company operating in the energy sector, focusing on integrating sustainable energy solutions and innovations to optimize market performance and environmental impact.

Research Project: Minimum Wage

- Name of your company: ESMT Berlin GmbH
- Division involved in the project:
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    - Job title: Assistant Professor
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Research Title: “How do firms respond to minimum wage increases? Evidence from web-scraped data”.

Abstract:

The goal of this research project is to better understand how firms adjust to increases in minimum wages. Standard economic models predict that firms’ demand for labor goes down if the price of labor increases due to increases in the minimum wage. Quite in contrast, however, most empirical studies find little to no employment effects of minimum wage increases (see, e.g., the work of David Card who was awarded the Nobel Prize in Economics for his pathbreaking work on minimum wage effects in 2021).

If employment remains unchanged, an important question is on what margin firms adjust when they are required to pay higher minimum wages to their low-wage employees.

Understanding this question requires both variation in minimum wages and rich firm-level data on employment, output, prices, productivity, wages, and the composition of the workforce. The research project will study a policy reform in Montenegro that significantly increased the minimum wage. It will then explore several channels of firm adjustments to this increase in the minimum wage. To this aim, the project will focus on one of the most important parts of the economy in Montenegro, the tourism industry. The focus on the tourism sector has two advantages: First, it will allow us to consider plausible control groups that are not affected by the minimum wage change, in particular, comparable businesses in the neighboring countries of Croatia and Albania and more upscale businesses that have higher-paid employees. Second, it provides transparent data on prices on online platforms.

The research project consists of two parts. The first part consists of an elaborate data collection task. In particular, the goal is to web-scrape data on prices and offerings by hotels and similar businesses in the tourism sector in Montenegro, Albania, and Croatia.

The second part consists of an empirical analysis of the web-scraped data with modern methods of causal inference. In particular, the goal is to use differences-in-differences (and triple differences) approaches that compare the development of prices and offerings over time in affected firms to plausible control groups.

The results of the project are relevant both from a business and a societal perspective. In many countries, including Germany, there are constant debates about increasing minimum wages to improve conditions for low-wage workers. From a business perspective, it is important to understand which kind of response leads to successful adjustments. From a societal perspective, it is important to understand who bears the ultimate costs of these increases.

Details

Policy Background. In January 2022, Montenegro implemented a massive reform of its national minimum wage. The monthly net minimum wage for full time (40 hours/week) work was raised by 80%, from €250 to €450 per month. In terms of gross wages, the increase was lower (from €410 to €566, representing a 38% increase), as the reform package also (a) abolished compulsory health insurance contributions for employers and employees and (b) introduced a significant tax allowance, which implied that incomes up to €700 remained untaxed.

Data Requirements. The project will collect web-scraped data on one of the most important sectors of the Montenegrin economy: tourism. As businesses in Montenegro's tourism sector are competing with businesses from their neighbouring countries (Albania and Croatia), it seems unlikely that the minimum wage increase can be fully passed through to prices. To assess this point, an important part of the project is to web-scrape information about hotels, motels, and hostels in the Montenegrin tourism sector as well as their offerings and the prices they charge. Additionally, the project will scrape comparable information for business in Albania and Croatia. Using internet archives, it will be able to also collect these data for the period prior to the reform.

Research Design. The research design will particularly focus on the tourism sector in Montenegro. Due to its geographical setting with a long coastline backed by mountains, tourism is an important part of the Montenegrin economy, generating about 25% of GDP. Moreover, due to its orientation towards international tourists, most business (such as hotels, motels, and hostels) are relatively easy to spot on the internet and thus provide the opportunities to web-scrape data that will allow to consider price adjustments after the minimum wage increase. Most importantly, the focus on tourism will allow to identify a plausible counterfactual: hotels, motels, and hostels along the Mediterranean coast of the neighbouring countries of Albania and Croatia. The latter were not affected by the minimum wage increases but continue to compete for similar customers. Therefore, price adjustments to the minimum wage reform will be limited by the competition of close-by substitutes. The Montenegrin tourism sector thus provides an ideal setting to study

response to minimum wage increases where full pass-through to prices is unlikely to occur. This also motivates the examination of survival probabilities of firms in the tourism business.

The project will examine the impact of the minimum wage increase in Montenegro on the tourism industry using two complementary difference-in-differences designs. The first DiD uses close-by firms in Croatia and Albania as control groups. The second DiD compares high-end accommodation (e.g., luxury hotels, that should, at most, be weakly affected by the minimum wage reform) with mid- and lower-tier accommodation, where the reform had a stronger bite. The two sources of variation can be combined in triple difference estimations.

In a final step, the project can use address data to match business activities observed in the web-scraped data with data from official corporate tax records. This will allow to identify "ghosts", i.e., businesses that disappeared from the tax data after the reform, but still displayed traceable activities on the internet. Based on the data and the research design, one can thus separately identify the reform's impact on exit from the formal economy and transition into informality.

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