



# British Airways Customer Experience (CX) Analysis

**Hanish Paturi**

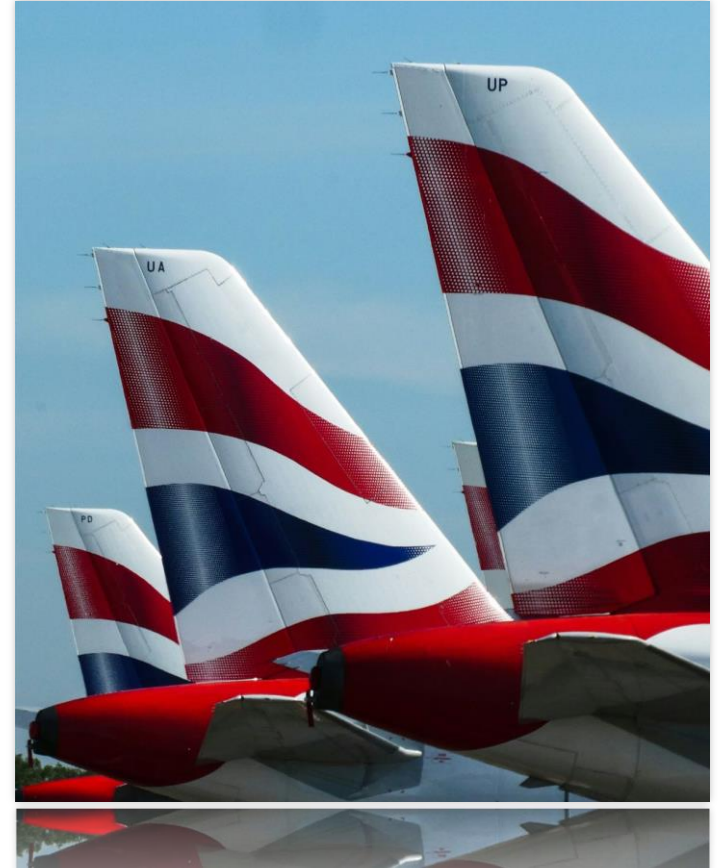
Data Scientist, Cofounder, Agera Consultants

- ❑ Report on Customer Sentiment, CX Challenges
- ❑ Analyzing Business Impact by using customer information and research
- ❑ Recommendations on resolving challenges and improving CX
- ❑ [Scraping](#) and [Analytics](#) Notebooks

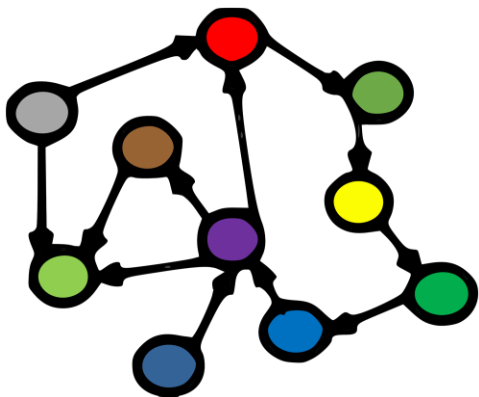
# Context

**British Airways** is UK's flag-carrier airline, and has maintained market dominance, despite numerous setbacks over the years, due to **strategic decision-making** by the leadership.

However, **COVID's impact** on **revenues and customer sentiments** have been devastating, and a strong recovery is needed to avoid **customer churn**.

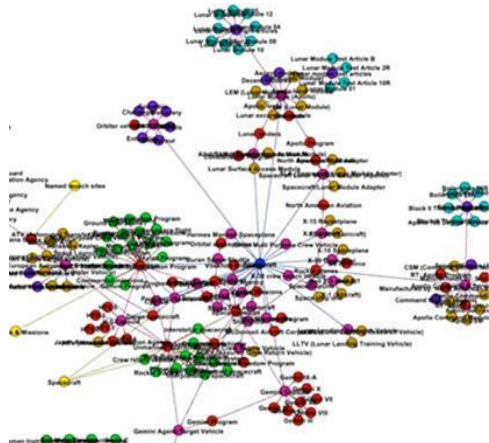


# Major Techniques used



## Sentence Embeddings

Express customer reviews as **vector representations** with **Google's Universal Sentence Encoder**



## Topic Models

Extract **hidden** themes, identify problems, using **BERTopic** topic modeling, **UMAP** and **HDBSCAN**



## LLM

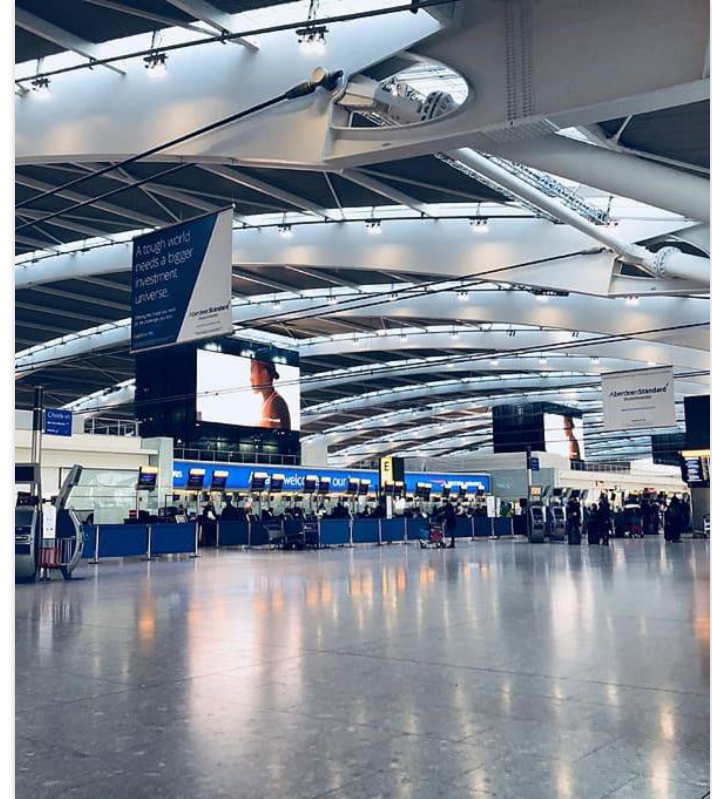
**Standardize** topic labels for analyzing **Business Impact** of identified problem areas

# Introduction to British Airways CX Analysis

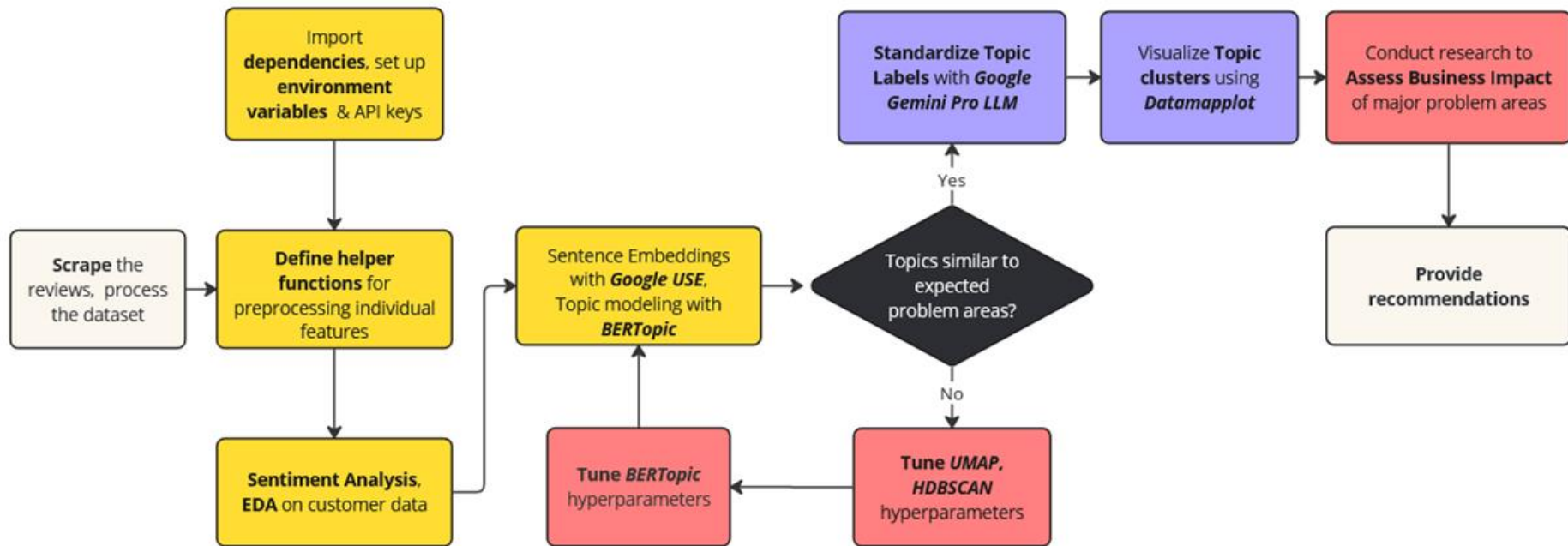
## Overview

**British Airways CX Analysis** is an assessment of the customer experience provided by British Airways, **based on user reviews** and **independent research**, with two main objectives:

- **Identify** opportunities for **enhancing customer satisfaction**
- **Analyze customer feedback** and data and **provide recommendations** for enhancing the overall CX

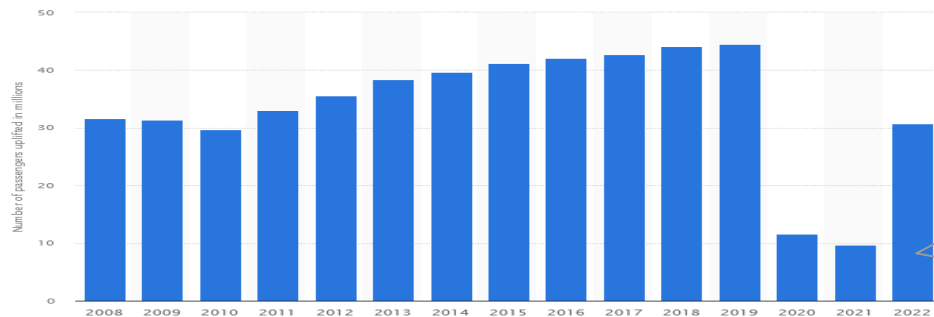


# Workflow [Scraping](#) and [Analytics](#) Notebooks



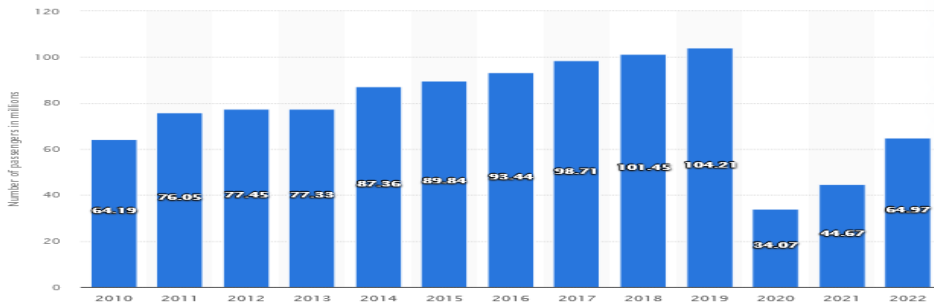
# The Market [Scraping](#) and [Analytics](#) Notebooks

Number of passengers uplifted by British Airways plc from 2008 to 2022  
(in millions)



© Statista 2024

Number of passengers uplifted by Air France KLM from 2010 to 2022  
(in millions)



© Statista 2024

- **Dissatisfaction among BA's core customer base**, as service picks up post-COVID
- **Competitors like KLM** seeing a similar uptick in service
- **75% of airline profits** typically from **Business Class** [[Investopedia](#)]
- **Churn risk, market dominance and profitability:** *Negative user sentiment* for BA in Customer Service, in the context of massive staff layoffs in the wake of COVID

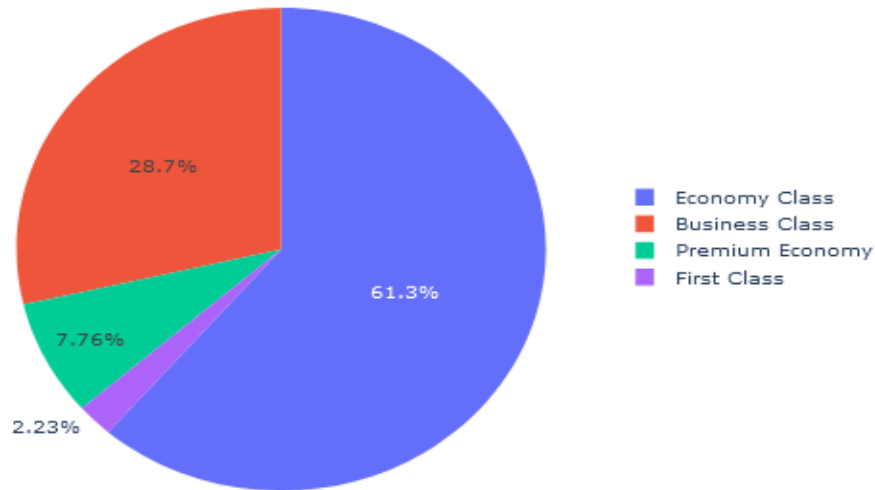
# User Sentiment [Scraping](#) and [Analytics](#) Notebooks

**Note:** High selection bias observed (possible volunteer/social etc biases present). People with extreme experiences have provided reviews. Cross-verify with user-data in real-time.

User sentiment distribution across travel class

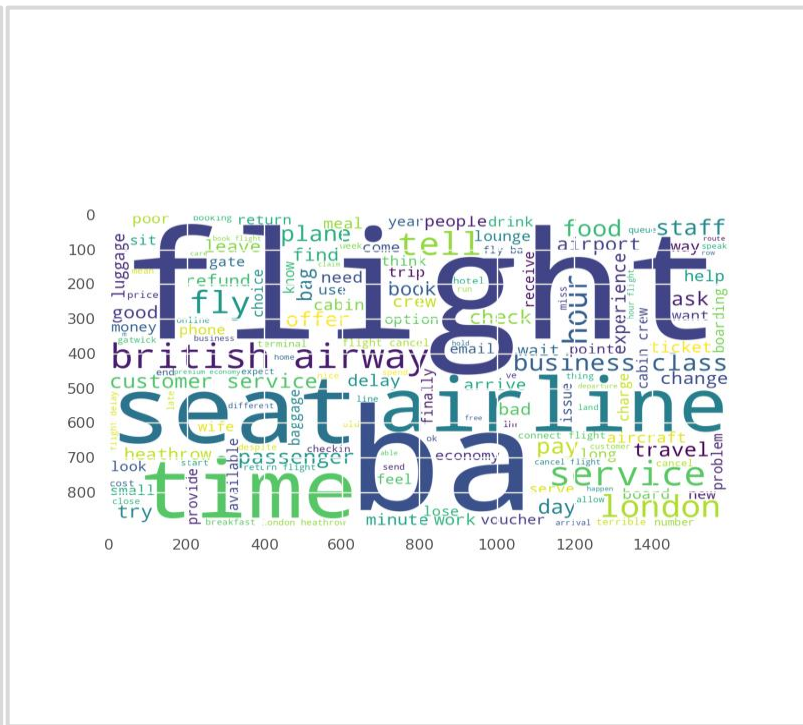
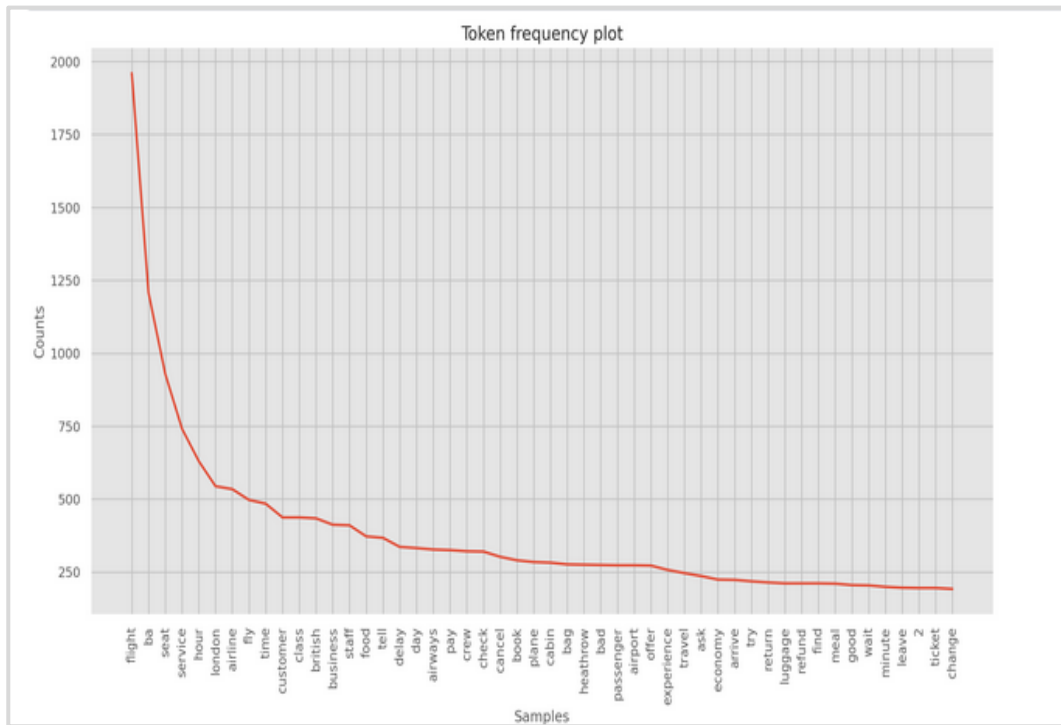


Negative sentiments: User mix



- 1. Reviewer mix by fare class, same as core customer base:** Core customer base is **Economy and Business Class**
- 2. High dissatisfaction in core customer base:** Negative sentiments predominantly from Economy & Business classes (Pie chart)
- 3. Churn risk & overall customer satisfaction and loyalty:** Specific concerns and issues to be identified & addressed
- 4. Topic Modeling techniques:** To identify underlying themes (BERTopic/ Top2Vec/ LDA/ LSA etc.)

## Domain Words: WordCloud, FreqDist [Scraping](#) and [Analytics](#) Notebooks



1. Some common tokens (such as 'flight', 'ba') *spuriously increase sentence similarity* (cosine)
2. Stop words, domain words and other **"non-informative" tokens discarded** to improve **discriminative power** of topic model
3. HDBSCAN clustering performance improves, by clustering around less-frequent, topic-specific tokens



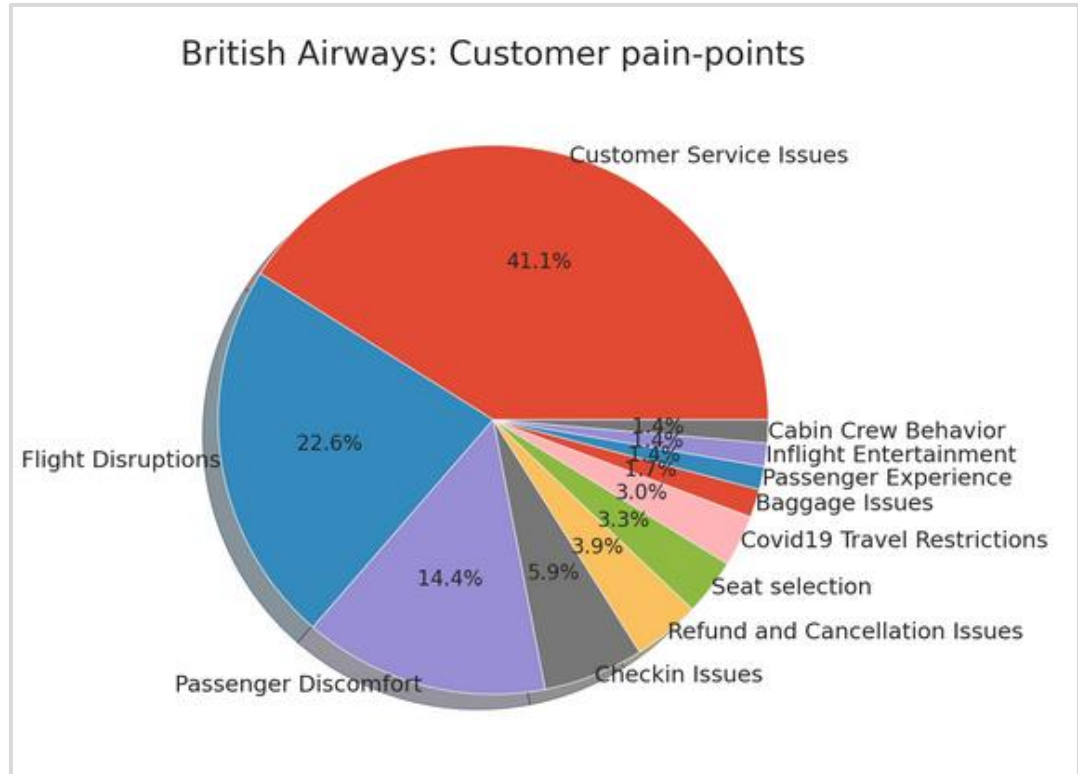
# Topics detected with BERTopic & Google Gemini Pro

[Scraping](#) and [Analytics](#) Notebooks

**Note:** High selection bias observed (possible volunteer/social etc biases present). People with extreme experiences have provided reviews. Cross-verify with user-data in real-time.

Top 5 Issues affected ~85% reviewers

- › **Perform cost impact analysis:** cost factor, time, econometric approaches
- › **Customer Service:** *Surveys, statistical tests and custom metrics to quantify system effectiveness and airport operational performance*
- › Check-ins, refunds and cancellations: **AI powered web applications** flag user complaints and process requests in real time
- › **Self check in kiosks** at **busy hubs** can reduce customer wait times



# Visualizing Inter-topic Distance

[Scraping](#) and [Analytics](#) Notebooks

**Note:** High selection bias observed (possible volunteer/social etc biases present). People with extreme experiences have provided reviews. Cross-verify with user-data in real-time.

- Visualizing 2D representation of **Sentence embeddings**, obtained through **UMAP** dimensionality reduction, clustered by **HDBSCAN**, colored by topic labels.
- Topic model developed with **BERTopic**, **best suited for docs < 1000** in number

```
('3_check staff_check luggage_ryanair_check hand luggage',  
'4_business class seat_airline_class seat_business class',  
'5_business class passenger_bad airline_airline_class passenger')
```

- Raw topic labels not intuitive enough, provides little context, not business-friendly
- Standardize and refine raw topic labels:  
In-context learning with LLM:  
*concatenation of representative docs, topic labels as input text, as input prompt template* for Google Gemini Pro

## British Airways CX Analysis - BERTopic

Labels standardized with 'Gemini Pro'



# Standardize topic labels: LLM In-context learning

[Scraping](#) and [Analytics](#) Notebooks

```
def freq_table_topics_label_gen(llm_input):

    prompt_topic_label = f'''
    You are a Senior Customer Experience Executive in the aviation industry.
    You've been hired as a consultant to identify customer pain points
    based on the reviews they have given.

    Review text: {llm_input}
    Input_list: {list(issues_dict_adj.keys())}

    Your instructions are as follows:

    Generate only 1 topic label of less than 4 words, based on the themes present in the input list.
    Pay special attention to the first 10 topic words, which are generated
    using BERTopic.

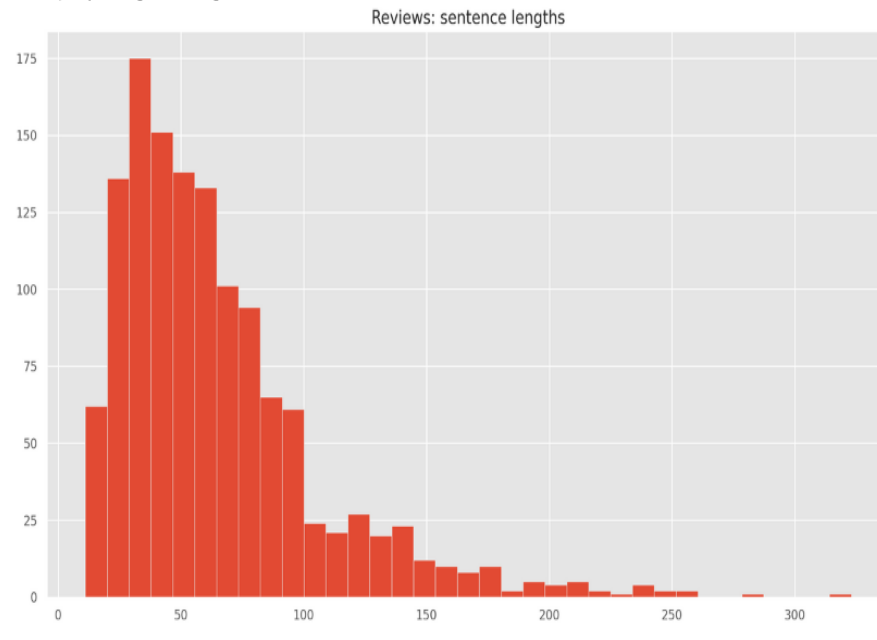
    ***Generate only the topic headline labels and nothing else in a list format.***
    ***DO NOT PRINT supporting keywords from the text.***
    ***DO NOT PARAPHRASE***

    '''

    response = llm_model.generate_content(prompt_topic_label.format(llm_input)).text

    return response
```

The longest review has: 323 words  
Most frequently occurring sentence lengths: 32



1. Gemini Pro, for regenerating business-friendly topic labels.
2. Review Text: Prompt inputs were a concatenation of raw topic labels and representative documents.
3. Additional support given by seed topics, corresponding to commercial aviation expected core CX areas.

# Resolving CX challenges: Recommendations

41%

## Customer Service

**Streamlined booking, Dedicated helpline:**  
**AI-integrated** app with **chatbots**, trained helpdesk operators

- Invest in app design and integrate user feedback
- Deploy chatbot powered by fine-tuned LLMs
- Train helpline operators, incentivize performance

23%

## Flight Disruptions

**Communication & service disruptions:** **App alerts, push-messaging**, strategic partnerships w/ network providers

- Real-time notifications
- Efficient rebooking procedures
- Collaborate with network providers for a seamless experience

14%

## Passenger Discomfort

**Trained flight attendants; Hygiene**, aircrafts outfitted with essentials - **charging ports, Wi-Fi, and in-flight entertainment**

- Upgrade seating comfort options, and crew service
- Improve onboard amenities.
- Enhance cabin temperature control.

12%

## In-flight service, Baggage Handling, misc.

**Trained flight attendants; Reliable baggage handling, Incentives, incident reporting** and performance reviews; **pay-hikes to staff**

- Continuous staff training programs
- Issue resolution protocols
- Performance-driven staff incentives
- Efficient baggage handling systems

6%

## Check-ins

**Streamlined check-in process:** Improved app design with **AI-integrated features** for enhanced CX; Self check-in kiosks

- Deploy Queue Management Systems at airports
- Personalised check-in assistance
- Intuitive self check-in kiosks and web checkin interface

4%

## Refunds and Cancellations

**Payment intermediaries and gateways;** App alerts to notify cancellations and failed bookings

- Automated notification systems
- Dedicated customer service support, with AI chatbot integration
- Expedited refund processing time and simplified procedures

# Recommendations for BA Engineering and Analytics

1. **Deploy LLM powered chatbots.** This could add a human-touch, especially in the context of staff shortages.
2. **Measure chatbot responsiveness** and user experience based on user rating (eg a 5-star rating system).
3. **Fine-tuning and quantizing LLMs** for domain use case using **PEFT** can be considered. Multi-lingual support can be built-in to the LLM or as a transformer layer, to accommodate the interests of different language-groups. **BLEU or ROUGE scores** can be used to evaluate model performance. This fine-tuned model can be used improve chatbot response quality, and inference latency.
4. **Integrate option for human-intervention**, beyond the AI layer.
5. Improve systems to **expedite refund processing**.
6. Deploy **automated notification systems** to notify flight disruptions, cancellations and payment-related information to the user.
7. Push for improved **user-centric app design and interface**. Measure and document metrics by various means such as **A/B tests**.

# Sources [Scraping](#) and [Analytics](#) Notebooks

1. **British Airways - statistics & facts** <https://www.statista.com/topics/5372/british-airways/#topicOverview>
2. **British Airways Plc: Competitors** <https://www.globaldata.com/company-profile/british-airways-plc/competitors/>
3. **How Much Airline Revenue Comes From Business Travelers?** <https://www.investopedia.com/ask/answers/041315/how-much-revenue-airline-industry-comes-business-travelers-compared-leisure-travelers.asp>
4. **British Airways Competitors** <https://www.comparably.com/companies/british-airways/competitors>
5. **British Airways plans to make up to 12,000 staff redundant.** BA boss says more than one in four jobs could go as coronavirus causes global collapse in air travel <https://www.theguardian.com/business/2020/apr/28/british-airways-plans-to-make-up-to-12000-staff-redundant>
6. **British Airways Plc's worldwide revenue from FY 2010 to FY 2022 (in million GBP)** [https://www.statista.com/statistics/264296/british-airways-worldwide-revenues-since-2006/?kw=&crmtag=adwords&gclid=CjwKCAiAiP2tBhBXEiwACslfnrguU6XsRAXQ25JuO3AEwckyFTHvHdCD9DcUI-8Pr2XRFdLSbYCdXR0cJaEQAvD\\_BwE](https://www.statista.com/statistics/264296/british-airways-worldwide-revenues-since-2006/?kw=&crmtag=adwords&gclid=CjwKCAiAiP2tBhBXEiwACslfnrguU6XsRAXQ25JuO3AEwckyFTHvHdCD9DcUI-8Pr2XRFdLSbYCdXR0cJaEQAvD_BwE)
7. **Airport Operational Performance and Its Impact on Airline Cost** [https://www.researchgate.net/publication/300299980\\_Airport\\_Operational\\_Performance\\_and\\_Its\\_Impact\\_on\\_Airline\\_Cost](https://www.researchgate.net/publication/300299980_Airport_Operational_Performance_and_Its_Impact_on_Airline_Cost)
8. **Individual Annual Financial Report 2022, IAG** <https://www.iairgroup.com/investors-and-shareholders/financial-reporting/annual-reports/>
9. **Andrijana Bogdanovska Djurovic** "Transformational Change or Not?: The Case of British Airways (2008-2010)" [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1947296](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1947296)
10. **Alderighi et al.** "A case study of pricing strategies in European airline markets: The London – Amsterdam route" <https://www.sciencedirect.com/science/article/abs/pii/S0969699711000226>
11. **Gov, S.A. and Dergisi, Y.B. (2020)** "Strategic Alliances in airline business: Comparison of Skyteam, Oneworld, Star Alliance groups," [Preprint]. Available at: <https://doi.org/10.35408/comuybd.629382>.
12. **Graham, A. (2020)** "U.K. regional airports" Air Transport and Regional Development Case Studies , pp. 64-85. Available at: <https://doi.org/10.4324/9781003092063-5>.
13. **Havlovic, S.J. (2020)** "European works councils in the airline industry," Strategic Innovative Marketing and Tourism , pp. 1-6. Available at: [https://doi.org/10.1007/978-3-030-36126-6\\_1](https://doi.org/10.1007/978-3-030-36126-6_1)
14. **Light, L. (2020)** British Airways needs to revitalize its Brand , Forbes . Forbes Magazine. Available at: <https://www.forbes.com/sites/larrylight/2020/08/14/british-airways-needs-to-revitalize-its-brand/?sh=6eaeef0d747e8888>

**Fin.**