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MODELLING FOR FUEL POLICY IN LOW VISIBILITY OPERATIONS IN AIRLINE OPERATIONS MANAGEMENT

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ABSTRACT
Purpose- It can be said that fuel costs have the highest share in airline operation costs. Therefore, fuel efficiency is important for cost optimization in airline operation management. Fuel efficiency has been studied in many ways in airline operation management in the literature. It can be reported that the cost optimization due to additional fuel transportation caused by meteorological conditions is also an important field. This study aims to provide data for making a decision to form a fuel policy for a flight schedule by determining the divert risk rate by analyzing previous meteorology reports when there is a risk of divert due to low visibility in meteorology reports.
Methodology- Thus, by providing data for airline operation managers to make decisions that will provide fuel optimization, cost-effectiveness will also be contributed. Data for the study were taken from OGIMET (the Spanish meteorology website). A simulated flight was created for the study, and the past period forecast efficiency was calculated from previous meteorological data to determine the divert risk rate. Then, it was revealed how much the divert risk rate was reduced if additional fuel was carried for the flight according to the past period meteorological data to ensure that the aircraft waited for suitable conditions in the air at the landing aerodrome.
Findings- The above results reveal the divert risk rate for the airline's flights when additional fuel is loaded and without loading additional fuel in low visibility forecast operations for the three months of the year when low visibility is more common, based on past meteorological data.
Conclusion- As a result of the study, it can be reported that a model has been created relating to how to determine the divert risk rate to make a fuel policy decision for a flight schedule when there is a risk of diverting due to low visibility in airline operation management.

Keywords: Airline operation management, low visibility, fuel policy, airline fuel efficieny, divert risk ratio,
JEL Codes: L93, M21, C44

REFERENCES

Abdelghany, A. et al., (2008). An ıntegrated decision support tool for airlines schedule recovery during ırregular operations. European Journal of Operational Research, 47, 537-544.

Abdelghany, K., Abdelghany, A. and Raina, S. (2005). A model for the airlines fuel management strategies. Journal of Air Transport Management, 11(4), 199-206.

Akbaba, A., (2021). Managing Divert Risk in Airline Operations. International Conference on Applied Economics and Finance & Extended with Social Sciences (e-ICOAEF VIII), 125-136.

Ateş, S., Kafalı, H. and Kılıçoğlu, G. C. (2018). Reducing operational fuel costs of airlines: a model for monitoring and managing fuel consumption using unified modeling language. Celal Bayar University Journal of Science, 14(1), 105-111.

Ballesteros, J. A. and Hitchens, N. M. (2018), Meteorological factors affecting airport operations during the winter season in the Midwest. Weather, Climate, and Society, 10(2), 15-28.

Bien, A. et al., (2020). In-Flight fuel management committing to the destination. Embry-Riddle Aeronautical University, Sao Paulo: Brazil.

Brueckner, J. K. and Abreu., C. (2020). Does the fuel-conservation effect of higher fuel prices appear at both the aircraft-model and aggregate airline levels? Economics Letters, 197, 109-647.

Csereklyei Z. and Stern D., I. (2020). Flying more efficiently: joint ımpacts of fuel prices, capital costs and fleet size on airline fleet fuel economy. Ecological Economics, 175, 106-714.

Fernández, S., et al., (2020). Forecasting of poor visibility episodes in the vicinity of Tenerife Norte Airport. Atmospheric Research, 185(2), 825–848.

González, S.F. et all (2019). Forecasting of poor visibility episodes in the vicinity of Tenerife Norte Airport. Atmospheric Research, 185(2), 825-848.

Guo, L. et al., (2020). Fuel efficiency optimization of high-aspect-ratio aircraft via variable camber technology considering aeroelasticity, Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering, 235(7), 782-793.

Huang, C. and Cheng, X. (2022). Estimation of aircraft fuel consumption by modeling flight data from avionics systems. Journal of Air Transport Management, 99, 102-181.

ICAO (2010). Aeronautical Telecommunications, Annex 10- V.1, Radio Navigation Aids.

ICAO (2014). Meteorological Service for International Air Navigation, Annex 3- Meteorological Service for International Air Navigation-Ch.2, General Provisions.

ICAO (2022). DOC7910-Location Indicator, Icao Code For Aerodromes.

Kang., L. and Hansen., M. (2018). Improving airline fuel efficiency via fuel burn prediction and uncertainty estimation. Transportation Research Part C: Emerging Technologies, 97, 128-146.

Kheraie, A. Z. and Mahmassani, H. S. (2012). Leveraging fuel cost differences in aircraft routing by considering fuel ferrying strategies, transportation research record. Journal of the Transportation Research Board, 2300(1), 139-146.

Kumar, V. and Prasad, P. (2020). Business Policies and Management Strategies, IJSART, 6(7), 621-633.

Kwan, I. and Rutherford, D. (2015). Assessment of U.S. domestic airline fuel efficiency since 2010, transportation research record. Journal of the Transportation Research Board, 2501(1), 1-8.

Lim S., H. and Hong Y. (2014). Fuel hedging and airline operating costs. Journal of Air Transport Management, 36, 33-40.

Malandri, C. et al., (2020). Impacts of Unplanned Aircraft Diversions on Airport Ground Operations. Transportation Research Procedia, 47, 537-544.

Munro, P. and Mogford, R. (2018). Managing Variability: a cognitive ethnography of the work of airline dispatchers. Proceedings of the Human Factors and Ergonomics Society 2018 Annual Meeting.

Navotny, K. K, et al., (2021). Assessment of TAF, METAR, and SPECI Reports Based on ICAO ANNEX 3 Regulation. Atmosphere, 12(2), 138-149.

Ogunsina K., Ilias B. and Daniel, D. L. (2021). Exploratory data analysis for airline disruption management. Machine Learning with Applications, 6, 100-102.

Oliveira, D., S. and Caetano M. (2019). Market strategy development and ınnovation to strengthen consumer-based equity: the case of Brazilian Airlines. Journal of Air Transport Management, 75, 103-110.

Şafak, Ö., Çavuş, Ö. And Aktürk, M. S. (2022). A two-stage decision dependent stochastic approach for airline flight network expansion. Transportation Research, 158, 78-101.

Süzer, A. S. (2023). Dispeç kaynaklı aksaklıkların diğer operasyon birimlerine etkisi. Akıllı Ulaşım Sistemleri ve Uygulamaları Dergisi, 6(1), 123-138.

Patriarca R., Francesco Simone, Giulio Di Gravio, (2023). Supporting weather forecasting performance management at aerodromes through anomaly detection and hierarchical clustering. Expert Systems with Applications, 213, 119210.

Pei et all., (2021). Decision support system for the ırregular flight recovery problem. Research in Transportation Business & Management, 38, 100-501.

Singh, J., Sharma, S. K. and Srivastava, R. (2018). Managing fuel efficiency ın the aviation sector: challenges, accomplishment sand opportunities. FIIB Business Review, 7(4), 244-251.

Singh, V. and Sharma, S. K. (2015). Fuel consumption optimization ın air transport: a review, classification, critique, simple meta-analysis, and future research ımplications. European Transport Research Review, 7(12), 15-24.

Swidan, H., Merkert, R. and Kwon, O. K. (2019). Designing optimal jet fuel hedging strategies for airlines-why hedging will not always reduce risk exposure. Transportation Research, 130, 20-36.

Tang et al., (2020). Evaluating the ımplementation of performance-based fuel uplift regulation for airline operation. Transportation Research, 133, 47-61.

Zou et al., (2014). Evaluating air carrier fuel efficiency in the US airline ındustry. Transportation Research, 59, 306-330.

URL 1, Sheffield School of Euronautics (2021). Reasons an Aircraft Dispatcher May Divert a Flight, Accessible URL: (https://www.sheffield.com/articles/reasons-an-aircraft-dispatcher-may-divert-a-flight) (Date of access: 23.09.2021).

URL 2, Simple Flying (2021). What Happens When An Aircraft Diverts? Accessible URL: (https://simpleflying.com/what-happens-when-an-aircraft-diverts/) (Date of access: 23.09.2021).

URL 3, SKYbrary (2021). Accessible URL: (https://skybrary.aero/articles/precision-approach). (Date of access: 16.11.2021).

URL 4, Professional information about meteorological conditions in the World (2021). Accessible URL: (https://www.ogimet.com/cgi-bin/gmsat2?lang=en). (Date of access: 16.11.2021).

URL 5, Comparison of different scoring methods for TAFs and other probabilistic forecasts (https://ams.confex.com/ams/May2000/webprogram/Paper13166.html). (Accessed: 16.01.2023)