

Table of Contents

Discussion	2
Benefits of the Project	2
Potential Environmental Costs of the Project and Ways of Addressing Them	3
Climate Change	3
Greenhouse Gas Emissions	4
Noise Pollution	5
Waste Management	6
Green Technology	7
Sustainable Energy	8

The Analysis of the Environmental Impacts of the Proposed Third Runway at London Heathrow
Airport and Why It Will Make Aviation Management Easier

Discussion

Benefits of the Project

The research established that there are many advantages linked to London Heathrow Airport expansion. One of the benefits of the airport's expansion through a third runway would be an increased economic benefit. Part of the economic benefit of the project will be the creation of employment opportunities, which will consequently address the problem of unemployment. The government, through the ministry of transport, argues that by building the third runway, the country will experience numerous economic and social advantages. The economic benefits would be in the form of raised employment opportunities, as the project would create more than 200,000 local jobs (Singh, Sharma and Srivastava, 2018). Similarly, the project would open up the country to emerging markets, such as Asia and Arabian countries, since the runway would increase Heathrow Airport's capacity.

Due to the improvement of the facilities, there would be an increase in the number of flights through the airport, enhancing the ease of flying in and out. Hence, the airport would allow for more destinations, enabling the UK to be connected to the fast-growing emerging markets (Özsoy and Örkücü, 2021). Moreover, the project would make it easier for the UK to conduct business with other countries globally as the proposed third runway is to be constructed specifically to cater to business flights. Additionally, the number of freight flights would be escalated through the new runway, making it efficient for locals to access cargo within short time periods.

The expansion of the airport will undoubtedly ease the management of the airport by reducing the delays through the creation of more room for operation. Upon the implementation of

the proposal, the airport's management will switch to the hub-and-spoke model, which will significantly improve the management activities for Heathrow's airport managers (Seabra *et al.*, 2020). Through the switching abilities of flights at the airport, passengers and cargo are efficiently managed. As a result, the convenience of travelers and airport management will be enhanced significantly.

Moreover, the research reveals that the expansion of Heathrow Airport would lead to a significant increase in airport capacity. Consequently, more passengers will be able to use the facilities, which will lead to a higher profitability. Additionally, due to the expansion process, the projected airport growth would improve. There has been an upward trend in the demand for aviation, and the trend is forecasted to increase in the future (Bongo and Ocampo, 2018; Liu *et al.*, 2019; Oliveira, Lohmann and Costa, 2020; Yang *et al.*, 2016). Therefore, the expansion will be instrumental in meeting the high demand in aviation projected in the future.

The study identified that the expansion project of Heathrow Airport would make airport management easier. Due to the increase in airport capacity, the flow and network of the airport would be improved significantly. Therefore, the boost in delegation abilities of the airport, such as making the new runway to serve business purposes, would strengthen the airport's efficiency and operations. As a consequence, the airport would operate optimally, making its management easier.

Potential Environmental Costs of the Project and Ways of Addressing Them

Climate Change

It is vivid that climate change is a pertinent issue when it comes to the environmental perspective of London Heathrow Airport expansion project. In a more recent legal battle, the court of appeal ruled against the proposal on grounds of climate change. However, the contested ruling was overruled by the Supreme Court in December 2020, when the government appealed the

decision of the court of appeal (Hughes-Gerber, 2021). As a result, the government was allowed to commence the project of constructing the third runway at Heathrow Airport. Despite the Supreme Court's decision, the issue of climate change is a considerable concern as various organizations and the government are joining hands in contemporary times to reduce activities resulting in climate change.

The challenge of climate change is mainly aggravated by the fact that the construction of the third runway would significantly increase emissions into the air. The greenhouse gases have been known to be a threat to the climate because they deplete the ozone layer and allow the ultraviolet (UV) rays to penetrate the Earth's atmosphere. The depletion of the ozone layer results in global warming because the UV radiation, which has bounced off the surface of the Earth, is absorbed and retained by the pollutants in the air, such as carbon dioxide (Shahzad, 2015). Therefore, any activity that increases the amount of emissions into the atmosphere is a threat to climate change.

Greenhouse Gas Emissions

The completion of the project is expected to increase the amount of greenhouse gases emitted into the environment. The rise in demand for aviation coupled with the expansion will result in remarkable activities in the airport, which will in turn lead to an increased emission of greenhouse gases. This is a major concern that the opponents of the proposal have mentioned frequently in the debates against the implementation of the project. In the contemporary world, greenhouse gas emission is a serious concern since it is associated with the depletion of the ozone layer (Solomon, Alcamo and Ravishankara, 2020). Therefore, the anxiety of the project's opponents regarding greenhouse gas emissions is valid.

Allegedly, the expansion of the airport will bring about an increase in carbon dioxide (CO₂) emissions. The emission of CO₂ will be registered because of the escalated fossil fuel use by the growing number of airplanes in the airport upon the completion of the project. The current technological state of the airport does not allow substituting fossil fuel used in the airplanes. The increase in greenhouse gas emissions coincides with the growth in energy demand and use. Increased energy demand will most probably result in greenhouse gas emissions if advanced technological considerations are not regarded. The issue of potentially increased greenhouse gas emissions is a solid point for the anti-campaigners of the project who have continuously opposed it.

Noise Pollution

As evidenced in the result, noise pollution is an important environmental concern that has to be addressed in connection to the expansion of the airport. The connection between noise and health is significant and becomes relevant to address when looking at the environmental impacts of the airport. Community annoyance due to noise pollution is a public concern similar to the health-related issues (Basner *et al.*, 2017). Despite the numerous economic benefits of the project, it would be futile to advocate for the expansion project if it has more detrimental health on the people. Therefore, the question of noise pollution has to be raised and answered for the success of the project to be gained.

However, the civil aviation authorities have continuously encouraged the adoption of better standards and requirements for aircraft in an attempt to address the problem of noise pollution. The aviation authorities have set noise airworthiness standards that act as measures for controlling noise pollution. For instance, the European Union sets the noise worthiness standards to 10 decibels (dB) for commercial planes in an endeavor to ensure that the expectations of noise

management are achieved (Lin, 2013). The UK has airworthiness directions geared towards setting the correct standards for commercial operations in the air. The company can address the challenge of noise pollution that is expected to increase after the project's implementation by observing the set directives and formulating other standards of its own.

Waste Management

The study found that the increase of wastes was another environmental impact of the proposed construction of Heathrow Airport's third runway. For London Heathrow Airport to be functional upon the completion of the third runway, there is a need for it to reduce the volume of waste to make the management easier and more efficient (Cristea and Naudet, 2019). Therefore, the management of the airport should consider formulating strategies and policies that efficiently minimize wastes and take care of those disposed. Any consideration of the management to utilize landfills for wastes would lead to an escalation of environmental impacts.

The problem of increased waste production has been used by opponents of the project in pushing the law suites aiming to stop the expansion. Despite the fact that the government has appealed for the implementation of the project up to the Supreme Court and succeeded in winning, it still has the obligation of addressing the problem (Hughes-Gerber, 2021). Considering recycling of the waste through the advanced technologies as suggested in the results is a critical step towards addressing the problem. The management of the airport can implement International Civil Aviation Organization's (ICAO) strategies to increase fuel efficiency.

ICAO has five major strategic objectives that summarize the work that the organization undertakes. The five objectives include safety, economic development of air transport, air navigation capacity and efficiency, security and facilitation, and environmental protection (ICAO, 2021). ICAO has developed various strategies of achieving these objectives over the past years.

The strategies developed by ICAO are well-researched and formulated to aid in achieving the objectives. Therefore, adopting the ICAO strategies can be effective in gaining the success of recycling the wastes effectively as a way of protecting the environment. Recycling is an important part of waste management that has to be efficiently considered if the management of the airport aims at ensuring a sustainable business environment.

Green Technology

Green technology is surely a solution that will impact all the environmental issues associated with the project. The world has witnessed a considerable advancement in science and technology over the past few years. With these developments, the need for environmental protection has been growing. Reducing emissions, saving energy, and addressing the challenge of climate change have prompted the idea of green technologies. In simple terms, green technologies refer to the application of science and technology to minimize adverse environmental impacts from human activities to the natural environment. In the past years, green research has targeted varied areas, including hydrology, agriculture, atmospheric science, and energy (Lin, 2013). The aviation industry is part of the manufacturing industry and a significant consumer of energy and natural resources. Therefore, efforts towards embracing green technologies have a high impact on air transportation.

The use of renewable energy as a source of power for the airport's third runway is undoubtedly a consideration that will eradicate most complaints from opponents of the project. Examples of renewable energy sources include the use of solar and wind energy sources, among many others (Moutinho and Robaina, 2016). Furthermore, the use of energy-efficient materials, such as photovoltaic panels, at the airport would reduce the airport's dependence on traditional sources of fuel (Sreenath *et al.*, 2020). Additionally, it is believed that the use of the 3R method

would lead to the achievement of the 'green economy' and the zero net greenhouse emission set for 2050. The 3R method, which entails the concepts of reducing, reusing, and recycling, is a sequence coined to aid in the management of waste. The key priority of the concept is to reduce the production of waste followed by reusing resources. Lastly, the concept advocates for giving waste materials a second chance before they are completely disposed. By embracing the concept, the management of London Heathrow Airport will stand a chance of effectively managing the solid and liquid wastes produced within the airport after the expansion.

Sustainable Energy

The fight towards environmental sustainability has been greatly championed by ICAO. The organization strives to come up with strategies that can be used to address all the possible environmental concerns revolving around the aviation industry. The management of London Heathrow Airport can consider the ICAO suggestions, such as adopting the use of SAFs in the third runway, to address the concerns of pollution. The proposal of using SAFs by ICAO is a strategy geared towards reducing the emissions from the aviation industry.

SAF is a biofuel used to help in powering aircrafts. The SAFs have similar properties as the other jet fuels and, therefore, do not compromise the performance of the airplanes. However, they have a lower carbon footprint compared to the former fuels (ICAO, 2021). SAFs, which are continuously gaining popularity in the aviation industry, are produced from renewable waste resources and biomass. Based on the technologies and feedstock used for the production, SAFs have the ability to drastically reduce the lifecycles of greenhouse gas emissions. According to the United States Office of Energy Efficiency and Renewable Energy, some of the new SAF pathways have recorded an impressive negative GHG footprint. Most of the SAFs have limited aromatic components that enable their combustion to be cleaner in the engines (ICAO, 2021). Therefore,

the use of SAFs implies that the aircrafts produce limited harmful gases around the airports when landing and taking off.

The use of SAFs has other advantages beyond environmental conservation and preservation. For instance, the adoption of SAFs can provide more economic opportunities for the farmers since their production depend on growing and sourcing of biomass crops (ICAO, 2021). Therefore, if the management of the airport fully embraces the use of SAFs, it may have a great impact for both the environment and economy. It is important to realize that the use of SAFs is not an entirely new idea for London Heathrow Airport. Although at a low quantity, the airport has been supporting the use of SAFs. Recently, the CEO of Heathrow Airport, Holland-Kaye, has urged the United Kingdom government to facilitate and encourage a wide-scale production of SAF since they believe it generates 70% less carbon compared to the traditional fossil fuel (*Heathrow Airport urges UK government to promote SAF production, 2021*). From the results, it is vivid that the negative effects that the project poses to the environment is significant although it is also clear that there are plans that can be used to mitigate the environmental threats.

The research plays an instrumental role in outlining the benefits of the expansion project for the third runway. By illuminating the benefits, it becomes clear why proponents of the project have supported its implementation over the years. Additionally, by articulating the environmental drawbacks, it becomes vivid why the opponents have complained about the project and why so many court cases have been raised over the years. The decision on which side to lean on is a difficult one as both the environmental concerns and the benefits bear significant points. However, they create a need for a balance, which may lead to a win-win situation. Therefore, the possible strategies that can be utilized in addressing the potential environmental concerns are important in

bridging the gap between the advantages and potential threats. They also play an instrumental role in justifying the fact that the Supreme Court ruled in favor of the completion of the project.

Reference List

- Basner, M. *et al.* (2017) 'Aviation noise impacts: state of the science', *Noise & Health*, 19(87), p. 41. doi: 10.4103%2Fnah.NAH_104_16
- Bongo, M.F. and Ocampo, L.A. (2018) 'Exploring critical attributes during air traffic congestion with a fuzzy DEMATEL–ANP technique: a case study in Ninoy Aquino International Airport', *Journal of Modern Transportation*, 26(2), pp. 147-161.
- Cristea, I.A. and Naudet, F. (2019) 'Increase value and reduce waste in research on psychological therapies', *Behaviour Research and Therapy*, 123(1), p. 103479. doi: 10.1016/j.brat.2019.103479
- Heathrow Airport urges UK government to promote SAF production* (2021) Available at: <https://www.airport-technology.com/news/heathrow-airport-promote-saf-production/> (Accessed: 16 October 2021).
- Hughes-Gerber, L. (2021) 'A third runway for Heathrow? To build or not to build? A brief review of the Supreme Court's recent judgment', *Air and Space Law*, 46(2).
- ICAO (2021) *Sustainable aviation fuels (SAF)*. Available at: <https://www.icao.int/environmental-protection/pages/SAF.aspx> (Accessed 15 October 2021).
- Lin, Z. (2013) 'Making aviation green', *Advances in Manufacturing*, 1(1), pp.42-49.
- Liu, S. *et al.* (2019) 'Impact of high-speed rail network development on airport traffic and traffic distribution: evidence from China and Japan', *Transportation Research Part A: Policy and Practice*, 127(1), pp. 115-135. <https://doi.org/10.1016/j.tra.2019.07.015>
- Moutinho, V. and Robaina, M. (2016) 'Is the share of renewable energy sources determining the CO2 kWh and income relation in electricity generation?', *Renewable and Sustainable Energy Reviews*, 65(1), pp. 902-914. doi: 10.1016/j.rser.2016.07.007

Oliveira, A.V. Lohmann, G. and Costa, T.G. (2016) 'Network concentration and airport congestion in a post de-regulation context: a case study of Brazil 2000–2010', *Journal of Transport Geography*, 50(1), pp. 33-44.

Özsoy, V.S. and Örkücü, H.H. (2021) 'Structural and operational management of Turkish airports: a bootstrap data envelopment analysis of efficiency', *Utilities Policy*, 69(3), p. 101180. doi: 10.1016/j.jup.2021.101180

Seabra, F. *et al.* (2020) 'Determinants of Brazilian international flights: the role of hub-and-spoke and infrastructure variables', *Journal of Air Transport Management*, 89(1), pp. 1-18. doi: 10.1016/j.jairtraman.2020.101866

Shahzad, U. (2015) 'Global warming: causes, effects and solutions', *Durreesamin Journal*, 1(4), pp.1-7.

Singh, J. Sharma, S.K. and Srivastava, R. (2018) 'Managing fuel efficiency in the aviation sector: challenges, accomplishments and opportunities', *FIIA Business Review*, 7(4), pp. 244-251.

Solomon, S., Alcamo, J. and Ravishankara, A. (2020) 'Unfinished business after five decades of ozone-layer science and policy', *Nature Communications*, 11(1), p. 4272. doi: 10.1038/s41467-020-18052-0.

Sreenath, S. *et al.* (2020) 'Solar PV energy system in Malaysian airport: glare analysis, general design and performance assessment', *Energy Reports*, 6(1), pp. 698-712. doi: 10.1016/j.egyr.2020.03.015

Yang, L. Hu, M. Yin, S. and Zhang, H. (2016) 'Characteristics analysis of departure traffic flow congestion in mega-airport surface', *Acta Aeronautica et Astronautica Sinica*, 37(6), pp. 1921-1930.