The Utilisation of Big Data in Qantas Airlines

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INTRODUCTION

Big data refers to the large and complex datasets that traditional data processing software can't handle as effectively as other data categories (*Wikipedia Contributors, 2019*). These datasets are often generated from source sensors, social media, and transactional processing systems like customer databases and emails (*Sagiroglu & Sinanc, 2013*). For businesses and industries, big data is an invaluable aspect as it allows companies to understand customer behaviour, predict future trends and streamline operations. This ultimately provides insight that improves targeted marketing strategies, product placement and supply chain management that caters to the customers' needs (*Leveraging Big Data Applications across Industries | Iterators, 2024*). In this era of extreme and aggressive brand marketing, the ability to use big data to make informed decisions can provide businesses with a competitive edge that becomes critical for saving costs and the brand's reputation (*Labs, 2023*). Qantas Airlines is Australia's largest and oldest airline and has been a competitor in the global aviation industry since the 1920s (*Qantas, 2023*). Operating both domestically and internationally, the airline serves millions of passengers. Within the aviation industry, big data encompasses information regarding aircraft systems, maintenance logs, passenger information and weather patterns. To maintain customer satisfaction, big data is an asset that can optimise flight paths, improve customer satisfaction, save fuel, reduce costs and minimise environmental impact (*Terekhov, n.d.*). This report will delve into these aspects, analyse current applications, stakeholder impact, ethical considerations and finally provide a potential strategy. This analysis of Qantas Airlines is going to show how it uses big data to enhance its current operations while strategically positioning itself for growth and success.

CURRENT UTILISATION OF BIG DATA

Qantas Airlines employs big data for various operational customer-focused functions, greatly enhancing its safety, customer satisfaction and safety. An important aspect of the airline industry is navigating fuel management and route optimisation (*Bazargan, 2016*). A large amount of spending is utilised in fuel consumption, thus reducing fuel usage and choosing the most efficient route can significantly reduce fuel consumption, eventually leading to substantially saving over periods and reducing environmental impact. Through Qantas' analysis of historical flight data, weather patterns, air traffic data and other variables, the company can determine the most fuel-efficient route, thereby reducing fuel costs and minimising air pollutants. A prominent example is the Qantas and GE Aviation collaboration app "Flightpulse," which provides pilots with secure access to personal analytics of flight data (*Flightpulse | GE Aerospace, n.d.*). The app is in the pilots' Electronic Flight Bag (a tablet pilots carry), where sensors aid in real-time data collection (*All Systems Go! FlightPulse Unlocks the Power of Data and Analytics for Airline Pilots | GE Aerospace News, 2024*). It accesses and consolidates data, enabling these pilots to process factors like weather patterns, air traffic and historical performance to make informed and accurate decisions during flights. These include discovering flight paths to conserve fuel and adjusting altitudes. Qantas has managed to save an estimated 1.5 million kilogrammes of fuel annually (*Fitzgerald, 2017*). Additionally, pilot feedback indicates that they have greater control and understanding of their flights (*Login to AviationWeek, 2024*). Big data plays a pivotal role in enhancing customer experience at Qantas. Customer-focused functions of big data are utilised in the aviation industry by analysing aspects like travel history, preferences and behaviour. This allows Qantas to cater to individual needs, such as seat selection preferences, customised in-flight services and tailored marketing offers. A positive customer experience can lead to increased revenue, customer retention and brand image, thus increasing the business's profits and chance for long-term success (*Fitzgerald, 2017*). A practical customer-focused usage of big data in Qantas is its loyalty

program, Qantas Frequent Flyer. By leveraging the data, Qantas can analyse customer preferences and travel behaviour to offer them tailored services to destinations they would like and promotions. In 2013, the insights obtained from big data created targeted marketing campaigns that resonated with specific customer segments that were more likely to respond to certain offers (*Shelper et al., 2019*). By launching this initiative in mobile apps, direct mail campaigns, website advertisements and prepaid cards, the increased customer engagement and satisfaction allowed Qantas to significantly grow its customer base (*Qantas Case Study | Smart Insights, 2013*). Now the Loyalty program boasts over 9 million members and more than 400 program partners, with annual award redemption reaching 660 million dollars (*QANTAS FREQUENT FLYER ADDS 20 MILLION MORE REWARD SEATS in ONE of the BIGGEST EVER PROGRAM EXPANSIONS, 2015*).

Moreover, big data was used to gather customer feedback to identify common issues, monitor customer sentiment, and make data-driven improvements to these services. The feedback allows the airline to enhance overall satisfaction and loyalty by addressing customer concerns quickly and effectively (*Kim & Lim, 2021*). Therefore, Qantas Airlines' current usage of big data enhances operation efficiency through optimised fuel management and flight data, whilst also enhancing customer satisfaction by offering personalised services and addressing customer feedback. This drives loyalty and growth.

STAKEHOLDER IMPACT AND ETHICAL CONSIDERATIONS

Qantas refers to their stakeholders "as groups that are likely to sustain a social, environmental, economic or financial impact from the actions of Qantas' (*Qantas, 2023*). They include shareholders, customers, suppliers, employees, governments, regulators and members of the communities where Qantas operates and may be affected by Qantas' activities (*Qantas, 2023*). The use of big data at Qantas involves several stakeholders, which also raises ethical considerations, as the questions that need to be asked are how the data is managed, utilised and protected. The first stakeholders that need to be discussed are the customers. Customers are one of the primary stakeholders affected by Qantas' big data enterprises. Big data can aid Qantas in delivering personalised experiences for customers by creating tailored inflight services, marketing offers and promised flight schedules (*Taneja, 2017*). For example, Qantas uses data from its Frequent Flyer program to understand customer preferences and provide relevant services. The program shows how customer data can increase service quality, which then increases the loyalty of the customers. However, customers may have possible concerns about security, data privacy and how their personal information is being utilised. Therefore, obtaining consent is vital to ensure transparency and trust (*Qantas Case Study | Smart Insights, 2013*). Employees are another important stakeholder. Pilots, ground staff, and customer service managers all benefit from big data through improved operational efficiency and enhanced decision-making tools (*Mcafee & Brynjolfsson, 2012*). A possible example is the Flightpulse app that was stated before. This app provides pilots with real-time data to help them make informed decisions about route optimisation and fuel management. This directly impacts the safety of customers, pilots and other service workers like cabin crew. This data-driven approach empowers employees to make the right decisions but additionally raises concerns about the extent to which their performance is monitored and analysed, questioning privacy and job security *(Bernhardt et al., 2022*). Regulatory bodies are the final stakeholders being discussed. They include aviation safety authorities and data protection agencies, who enforce compliance with regulations and laws (*Authority, 2021*). They ensure Qantas adheres to safety standards and data protection laws, like the General Data Protection Regulation (*GDPR, 2018*). Especially when handling large volumes of customer data, collaborating with regulatory bodies plays a role in safeguarding public interest and maintaining ethical standards in data usage (*Edquist et al., 2022*). However, regulatory bodies face the ongoing task of keeping pace with rapid technological advancements to ensure adequate oversight (*Regulation Can Keep Pace with Changing Tech. Here's How., n.d.*). Qantas faces several ethical dilemmas; a significant ethical consideration in big data usage is data privacy (*Regulation Can Keep Pace with Changing Tech. Here's How., n.d.*). Especially with stakeholder interaction, transparency is vital to build, as stated before. Ensuring that

stakeholder data is stored, collected and processed securely with explicit consent is an essential requirement. Security is an additional consideration, as is protecting data from breaches and unauthorised access to safeguard sensitive information against cyber threats and hacking. Qantas must implement robust cyber security measures to prevent potential misuse of all stakeholder data. Finally, fairness and non-discrimination use of data is an essential way for Qantas to use big data insight to not disadvantage any group of stakeholders. For example, targeted marketing should avoid profiling, essentially leading to biased outcomes (*Kant, 2021*). However, Qantas's approach to combating this is to audit the data and possibly all campaigns that include the usage of big data (*Frame, 2016*). Hence, addressing it not only safeguards the interests of stakeholders but also strengthens Qantas' reputation as a responsible and innovative airline.

FUTURE POTENTIAL OF BIG DATA FOR QANTAS

The potential for the utilisation of big data is beyond the current application that Qantas is applying. They can further exploit big data to innovate and improve their operations. Qantas can leverage advancements in predictive analytics that use big data to further refine its operations. By analysing the vast and different datasets from weather forecasts, air traffic, historical flight data and flight schedules, Qantas can predict and adjust the variables associated with the datasets (*Predicting Flight Delays: How Airlines Are Harnessing AI to Minimize Disruptions, 2024*). Predictive analytics can also be applied to anticipate passenger needs based on individual travel patterns, historical data and personal preferences, hence enabling Qantas to offer more personalised services like customised loyalty rewards and tailored in-flight experiences (*Tian et al., 2022*). Additionally, using predictive models to optimise cargo loads can reduce costs, maximise cargo space utilisation and enhance fuel efficiency *(Jiang et al., 2023*). Implementing these strategies could significantly enhance operation efficiency and customer satisfaction by enhancing the possible capabilities of big data usage. The integration of artificial intelligence and machine learning with big data can bolster Qantas operations. In real-time, AI and ML algorithms can analyse vast amounts of data, providing insight into dynamic models that can adjust the pricing of tickets and other marketing variables (*Harazim, 2024*). This approach could fill more seats on each flight and increase revenue.

Furthermore, AI and ML can enhance personalised marketing campaigns by analysing big data like purchasing history, feedback and customer behaviour (*Haleem et al., 2022*). Hence allowing Qantas to send targeted offers and promotions that are more likely to attract the attention of the consumers. Additionally, to reduce costs AI-driven chatbots and virtual assistants can improve customer services by providing instant support and bolstering the overall customer experience. To fully capitalise on the benefits of big data while maintaining customer trust and clear communication about data usage is essential, Qantas can adopt several strategies. Qantas should communicate how stakeholder data is collected, used and protected. Hosting web seminars, FAQs, and video tutorials on websites can demystify the practice and explain the benefits of Qantas' usage of big data. Additionally, implementing an opt-in feature where customers can choose how their data is used can enhance trust. Allowing stakeholders to update preferences and access their data can build loyalty between stakeholders and Qantas. A prominent example of this is when Delta Air Lines effectively intertwined stakeholder consent with big data in their app Flight Weather Viewer (*Flight Weather Viewer | Delta News Hub, 2019*). Similar to the Flightpulse app, it allows pilots to access real-time weather data to optimise flight routes. Deltas' transparent communication strategy about its data usage and stakeholder-centric innovations helped maintain stakeholder trust and satisfaction, demonstrating a successful model for Qantas to consider (*Jahansoozi, 2006*). Therefore, by embracing predictive analysis, AI and ML, Qantas can further optimise its operations, enhance customer experience and maintain its competitive edge in the aviation industry.

CONCLUSION

Qantas Airlines has demonstrated the transformative advantage of big data in the aviation industry, leveraging it to enhance operational efficiency, boost customer satisfaction and improve safety. Through initiatives like the Flightpulse app, Qantas has achieved substantial fuel savings and reduced carbon emissions by enabling pilots to make data-driven decisions in real time. Additionally, the airlines use big data to personalise customer interaction to strengthen loyalty and engagement through loyalty programs and targeted marketing. In the future, Qantas can capitalise on big data by integrating predictive analysis, machine learning and artificial intelligence to optimise flight operations. However, Qantas must additionally prioritise ethical considerations like security, transparency and privacy to maintain stakeholder trust and comply with regulatory rules. Ultimately, Qantas's strategic use of big data is a benchmark for the aviation industry, highlighting the critical role of data analytics in shaping the future of air travel. Even with the advancement of technology, Qantas must continue to innovate in big data to maintain a competitive edge and deliver greater services to its stakeholders.

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