

Aviation and Avarice

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

This entity is worth 2.6 trillion dollars a year, supports 65.5 million people, and is visited by more than 2 billion people a year. You may think I'm talking about Switzerland, France, or even the United States, but I'm actually talking about the aviation industry. The aviation industry is one of the largest industries in the world accounting for 3.6% of the worldwide GDP and transporting more than 34% of goods by value, yet many people don't understand what it is, how it functions, and the far-reaching impact it has.

The aviation industry is a conglomeration of private businesses, government regulators, government contractors, and government entities that contribute to the development, application, regulation, and production of aircraft. Traditionally this industry has been known to produce products with mostly cost, performance, and profits in mind, leading to an industry that has compromised some values such as environmental sustainability.

For this project, I am highlighting how the motivation to maximize profits in the commercial aviation industry has resulted in decisions that compromise safety, comfort, and sustainability. This will be done by performing a literature review. The literature review will cover what corruption is, how competition has decreased profit margins, and a case study of the Boeing 737 MAX scandal. Data will be gathered from a mix of primary sources, such as interviews and legal texts, and secondary sources, such as media accounts and agency reports about the Boeing 737 MAX. The scandal will then be analyzed using Actor Network Theory by breaking it into a network of actors. This analysis will optimally find that Boeing compromised safety to increase its profits and its use of a flawed accountability system that allowed these tragedies to happen. After the analysis I hope to be able to give ways that companies and entities can avoid a similar

tragedy from happening in the future, and highlight how other companies how developed systems that have prevented similar circumstances in the past.

Literature Review

Corruption is an abstract term that is greatly ingrained into society and capitalistic America. Merriam Webster defines corruption as, "dishonest or illegal behavior especially by powerful people" (Merriam-Webster 2023), but in this paper corruption takes the meaning of behavior that is done in dishonest, immoral manner. People often think of corruption as bribes, speed money, and extortion, but more commonly corruption manifests itself in nepotism, blackballing, and insider trading. As stated by Mr. Belasen, "These quiet killers(corruption) of ethical business practices are what really make it difficult for executives to do business profitably while doing the right thing," (Belasen et al., 2019) meaning that corruption makes it difficult for businesses to perform ethically. The less ominous forms of corruption threaten to make it hard for potential ethical shortfalls or performance inadequacies to come to light by punishing those that are not inline with leadership. Furthermore, the more subtle forms of corruption are the biggest problem for ethical function of large multinational companies as they often don't make headlines. It is therefore important to think about corruption and its impact when looking at society because it has a large impact on the ethics of companies and can lead down a slippery slope of questionable behavior.

Since the recession of 2008, there has been increased competition between airlines and conglomeration resulting in decreased prices and lower profit margins. This was the second stage

of a series of lowered prices that started in the 80's after the airlines industry became deregulated. In his paper Mr. Wolla states, "However, one unintended consequence of the lower airfares and corresponding increase in consumer demand was a decline in the quality of the flying experience," (Wolla et al., 2018) summarizing the trend of the decreased quality of passenger airlines in the past 40 years. This trend was further expanded by the propagation of budget airlines such as Spirit. Before Spirit added a Detroit to Philadelphia flight, the average one-way fare was over \$300, but after it expanded it dropped to \$183. The spread of budget airlines drops ticket prices even for non-budget airlines. The decrease in ticket prices caused plane ticket sales to only cover slightly more than variable costs even though fixed costs are a significant amount of airline costs. This results in airlines trying to cut costs by decreasing staff, leasing aircraft, and buying less equip aircraft. Furthermore, a study by McKinsey and Company found that making negative parts of an experience less negative rather than making experience more positive as a whole works best to improve costumer experience (Bhattacharjee et al., 2021). Altogether, this helps show how and why airlines have been motivated to cut costs and the impact that this has had on the consumer.

Boeing made a large transgression against public trust and the ethical operation of its company with the scandals that came to light during the investigation after the Boeing 737 MAX crash tragedies. The Boeing 737 MAX is an aircraft that was announced in 2011, as a new model based on the 737 that entered service in 1968. Boeing made several modifications to the fuselage and engines to increase efficiency to compete with new competing aircraft (Perell, 2022). Boeing then produced a haphazard and poorly implemented program called, MCAS, that made the 737 MAX perform like the normal 737 in order to prevent pilots from having to get recertified to fly the aircraft (Herkert et al., 2020). Boeing could have designed a new plane from scratch with

safety and efficiency in mind, but instead decided to band aid a problem with cost cutting as the primary objective. Pilots were not informed to the exact function of the MCAS and when the FAA found out about it, Boeing tried to cover it up. In a statement released by the Department of Justice, “Boeing’s employees chose the path of profit over candor by concealing material information from the FAA concerning the operation of its 737 Max airplane and engaging in an effort to cover up their deception,”(Cox, 2021) they explain how the lies and misinformation spread by Boeing limited the governments ability to safely regulate the aviation industry. Boeing made many of these decisions in an attempt to create a quick profit in a monetarily risk adverse method, while sacrificing safety and ethical business codes.

My analysis of the effect of greed in the aviation industry on the compromisation of safety, comfort, and sustainability draws on Actor Network Theory, which allows me to break a company into a network of person and non-person actors to analyze how they work together to perform a task. Instead of emphasizing the inputs and outputs it focus on the process, which allows it to explain how different problems or phenomena might happen during the process (Akrich and Latour 1992). For ANT, an actor can be a person or non-person, but they are both treated the same. The process is how a product gets transformed from the inputs to the outputs, ANT focuses on the power and influence relations throughout the process. I will use the framework of ANT to examine how the actions of the actors within Boeing resulted in fraudulent behavior and the 737 MAX tragedies by breaking Boeing apart into a network of actors. When performing this analysis, I will focus on the timeframe between 2011, when the MAX project started, to current news. While existing research agrees that profit is a motivating factor for the aviation industry, scholars have not yet adequately considered the extent that it motivates the industry and the negative side effects of this motivation.

Methods

When conducting research and gathering sources for my analysis, I will use a mix of primary sources and secondary sources to perform a case study of the Boeing 737 MAX scandal and tragedies. I will use interviews and legal texts as primary sources, and media accounts and agency reports as secondary sources. In my review of the case study, I will look for ways in which money motivated decisions in development and implementation as well as how Boeing determined what variable to value during the process.

Analysis

The drive to increase profits and lower costs has had a profound effect on the aviation industry in the realm of safety. This effect is even more pronounced in the aircraft design section of the aviation industry. A major portion of the costs when designing an aircraft comes from R&D and safety inspections. In 2010, Boeing's competitor, Airbus, released a new line of aircraft called the A320neo which outperformed Boeing's competing model in many aspects (Salas, 2022). Boeing then rushed development of the 737 MAX and designed it in a way where they could bypass the costly FAA recertification and extra design. During certification of a new aircraft, a company can expedite the process if the new aircraft flies similarly to another aircraft in its family. The 737 MAX did not originally fly like the other 737 versions, but a flawed software was added to modify the pilots inputs the fly like the original plane. The hurried design process resulted in a fatal flaw that led to two crashes in 2018 and 2019, killing 346 people (Herkert et al., 2020). The crashes were a direct result of cost cutting during design and flaws that were later unearthed through a thorough investigation. By the use of ANT, Boeing can be broken

down into several interconnected parts: the engineers, the Boeing Executives, the physical aircraft components, and the software installed in the plane. Up until 2010, every CEO of Boeing had engineering experience. In the system called Boeing, the engineers can change the interconnected parts and software within limits dictated by technology and money, while the executives have an end goal and modify those actors through the use of the engineers as a middleman. The flaws of this system start to come pronounced when the gap between the engineers and executives starts to become large and the executives stop listening to the engineers, so there is a one-way flow of power. This happened to Boeing in the 2010s, the engineers were voicing that Boeing needed to produce a new plane using the new technology that had been developed since the 737 originally came out, but the executives wanted a quick, cheap solution that resulted in the flawed 737 MAX. This lack of two way communication was further worsened by the lack of engineering experience between the executives at Boeing. Planning to add more here, need to do more research from additional sources.

In addition, the attempts to decrease costs and maximize profit has greatly reduced the sustainability of the aviation industry and increased the environmental damage done. A study found that a 3% increase in operating costs for regional flights could result in a 71% drop in impact on global warming (Proesmans et al., 2022). Currently aircraft are designed to minimize cost and time in flight by flying quickly at a high altitude, but by changing the aspects of the plane to optimize it to fly slightly slower at lower altitude the climate impact can be greatly lessened. Aircraft designers make planes that are optimized to the greater polluting design because airlines prefer the aspects that these aircraft have. One of the motivating factors is the increased cost and faster advertised speeds that these aircraft can achieve. Airlines want to

minimize time spent in the air to appeal to consumers, but they don't consider that when flying, often a major portion of the time spent traveling is spent on the ground, in transit to the airport or waiting for the flight. Therefore, airlines have optimized their flight model in a way that increases environmental impact, but saves money and might attract more customers to further increase profit. This greedy system emphasizes how the aviation industry makes potentially immoral decisions to maximize profits. One potential flaw with this argument is that it fails to recognize that in a capitalistic society, a business' prime goal is to maximize profit. While this may be true in a pure capitalistic society, the United States and almost every other country does not practice true capitalism, the government intervenes in the economy (Moffatt, 2020). Furthermore, a business truly answers to the shareholders, and many shareholders have values outside of maximizing profits in the near term. Therefore, when business' act in a way that maximizes profits in a way that circumvents government regulations and acts against stock owners' principles, they are acting against the societal and economic structure of the United States.

Conclusion

The motivation to maximize profits has had a negative effect on the aviation industry as seen in the Boeing 737 MAX crashed and poor customer experience among other things, however this can be combated by developing a company culture that centers around ethical work and innovation, supporting communication between engineers and executive position, and not cutting corners throughout development.

The implications of this research are very important for engineers that are developing their moral compass and ethics because it demonstrates the importance of having sound ethics in engineering, since without sound ethics it is only a matter of time until a series of small shortcomings can easily turn into a large failure of a system as a whole. This research could also be of significance of engineers who are already in the field and motivate them to double down on their ethics and not take the easy road as there are consequences. In addition, I think that if a researcher wanted to build off this project, I think they could look into additional fields and show off a similar situation happening in a different industry. I think they could also potentially look into how different economic systems and governmental intuitions may allow and/or encourage un-ethical actions that sometimes result in engineering flaws.

Even though there are flaws and shortcomings happening this doesn't make engineering and innovation wrong or bad. Sometimes progression needs mistakes to happen and the only way to combat this is through spreading awareness for the importance of following a moral code and not taking shortcuts throughout development and design process. Hopefully this research will help this process through showing people how to learn from the mistakes of the past and not continue them in the future.

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