

BOEING: A PLANE WRECK

Case overview

The crashes of Lion Air Flight JT610 and Ethiopian Airlines Flight ET302 astounded the aviation industry, triggered numerous investigations, and resulted in a worldwide grounding of hundreds of Boeing 737 Max jets. The 737 Max is Boeing's newest family of single-aisle airplane and the fastest-selling airplane in Boeing history, accumulating almost 4,700 orders from over 100 customers worldwide. It first obtained approval for commercial service from the Federal Aviation Administration (FAA) in March 2017. The first crash involving this Boeing model happened on 29 October 2018, when a Lion Air flight plunged into the Java Sea 12 minutes after taking off, killing all 189 passengers and cabin crew on board. A second crash occurred on 10 March 2019, when an Ethiopian Airlines flight crashed near the town of Bishoftu six minutes after take-off, killing all 157 people on board. On 13 March 2019, the FAA issued an Emergency Order of Prohibition which prohibits the operation of the 737-8 and 737-9 in the United States (U.S.). Investigators focused on a specific feature, known as the automated Manoeuvring Characteristic Augmentation System (MCAS), which might have forced both planes into a nosedive that brought them down. As investigations delved deeper into the accidents, several corporate governance issues surfaced.

The objective of this case is to facilitate a discussion of issues such as corporate culture; board effectiveness; executive remuneration; risk management; crisis management; and role of regulators.

The ascend of Boeing

Boeing's beginnings can be traced back to 1916, when its founder, William E. Boeing, founded Pacific Aero Products Co. Prior to that, he developed the Boeing Model 1 seaplane with U.S. Navy officer, George Conrad Westervelt. After mechanical engineer James Foley and aeronautical engineer Wong Tsoo developed an improved new model (Model C) and sent to the Navy during World War I, the Navy took interest in it and ordered 50 more units, contributing to the start of Boeing's success. Boeing subsequently changed the company's name to Boeing Airplane Co., and later on, The Boeing Company (Boeing), which is what the company is known today.^{1,2,3}

In the 1920s and 1930s, Boeing continued to produce and sell products to the U.S. military. In the late 1920s, Boeing started its airmail services. In 1928, Boeing Airplane & Transport Corp. was formed to merge its manufacturing and airline operations. Under the Air Mail Act of 1934 – which restored competitive bidding but dissolved airline and aircraft holding companies – the

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company was forced to dissolve into three separate companies, forming Boeing Airplane Co., United Aircraft Co. and United Air Lines.^{4,5}

Before and during World War II, Boeing developed a few reputable commercial aircrafts, one of which being the Model 247.⁶ Boeing's military products played crucial roles in World War II and it continued to contribute to the military post-war.⁷ In the process, its rivals, Douglas and Lockheed surpassed them in the commercial sector.

To compete in the post-World War II market, Boeing decided to produce an aircraft that could cross the North Atlantic.⁸ In 1958, the Boeing 707 was developed and went into service. Due to its shorter flight time and smoother ride, the Boeing 707 revolutionised air travel and won the hearts of many.⁹ Subsequently, Boeing developed new commercial aircrafts, including models 727 and 737. By the end of the 20th century, the 737 model became the most popular commercial aircraft in the world.¹⁰ Boeing monopolised the long-range air travel market segment after another model, 747, went into service as it allowed airlines to provide inexpensive long-range air travel. Over 1,500 units of Boeing 747 have been sold as at February 2019.¹¹

Boeing continued to innovate and tailored its aircrafts according to market needs and preferences.¹² In addition, it introduced the concept of commonality in its planes by designing new models to 'feel like' its past models. Pilots who are certified to fly one model could quickly adapt to fly a similar one, thereby streamlining the training process and reducing training costs for airlines at the same time.¹³

As commercial air travel increased globally, the sales for Boeing's new commercial jetliners, the 737 Max and 787 Dreamliner, soared due to increased international orders. As a result, Boeing saw its revenue exceeding US\$100 billion for the first time in 2018 and the company's stock price skyrocketed.¹⁴

Boeing's game plan

Boeing's success did not come easy. It braved through two world wars, the Great Depression, and the merciless environment it operated in before achieving its market leader position after a century.¹⁵ In order to remain competitive, Boeing focused on organic growth and complemented such growth with strategic acquisitions.¹⁶

In 2018, Boeing broadened its range of services by acquiring KLX Aerospace Solutions. KLX was a major global supplier of aviation parts and services. This acquisition opened doors to the untapped US\$2.8 trillion aerospace services market.¹⁷ It also invested in two notable joint ventures in 2018 and 2019 respectively – one was with Safran S.A. to design auxiliary power units and another with Adient plc to create high quality seats.^{18,19,20}

In October 2018, Boeing also opened a production facility, Boeing Sheffield, to produce actuation system components for the 737 and 767 aircraft.²¹ In February 2019, the company signed an agreement for a strategic partnership with Embraer S.A. (Embraer). Boeing was to acquire an 80% ownership stake for US\$4.2 billion in the joint venture comprising the commercial aircraft and services operations of Embraer.^{22,23} Additionally, in June 2019, Boeing

entered an agreement to acquire EnCore Group aimed at enhancing Boeing's competencies in cabin hardware manufacturing to provide more choices, superior products, enhanced capacity and availability to its clients.²⁴

These acquisitions and joint ventures were great additions to complement Boeing's specialty in aircraft development, and allowed Boeing to provide more value to its customers.²⁵ Boeing even acquired its own suppliers with the intention of taking over certain parts of the manufacturing, which would translate into reduced supplier costs and improved operating margins.²⁶

Powering ahead

Between 2014 and 2018, Boeing had a steady increase in revenue from US\$90.8 billion²⁷ to US\$101.1 billion,²⁸ representing a compounded annual growth rate (CAGR) of 2.75%. Its revenue crossed the US\$100 billion mark in 2018 due to an unprecedented number of commercial airplane deliveries and higher revenues in defence, space and services. In 2018, Boeing delivered a record 806 and won 893 net orders for commercial airplanes, raising the company's total order backlog to nearly 5,900 airplanes.²⁹ Boeing's operating margins also improved from 8.2% in 2014 to 11.9% in 2018, with 10.5% attributable to core operating margins. Operating cash flow also increased significantly to a record US\$15.3 billion in 2018, with US\$8.6 billion maintained as cash and marketable securities, providing strong liquidity to the company.³⁰ Based on strong cash generation and confidence in the company's outlook, Boeing's board increased the quarterly dividend per share by 20% in December 2018 and replaced the existing share repurchase program with a new US\$20 billion authorisation in 2018.³¹

The crew behind the wheels

As of March 2019, Boeing's board of directors comprised of 13 directors with various backgrounds and expertise, with 12 of them being independent. The only non-independent director was the CEO, Dennis Muilenburg.³² Boeing's Corporate Governance Principles mandates at least 75% of the board to be deemed independent based on the independence criteria under New York Stock Exchange (NYSE) rules.³³

According to the 2019 Proxy Statement for Boeing, the remuneration mix for independent directors consists of cash, stocks and "other compensation", with cash and equity compensation making up 91% to 100% of the independent directors' total remuneration. Independent directors can choose to defer part or all of their cash fees into stock units under Boeing's deferred compensation plan. The equity compensation each independent director received also includes stock units with a total fair value of US\$180,000 per year. These stock units do not grant voting rights and are accumulated into an account which is converted into Boeing shares in full or in annual arrears upon termination of the director's service. Additionally, dividend equivalents from deferred stock units are credited as more deferred stock units, which would generate more dividend equivalents in future, thereby resulting in an accelerated accumulation of stock units over time.³⁴

Boeing justified its remuneration policy for independent directors by claiming that it would better align the interest of the independent directors with that of shareholders. Boeing's Corporate Governance Principles also specify that all directors with a tenure of more than three years are mandated to hold stock or its equivalent that has an aggregate value of at least three times the annual cash fees received. Boeing disclosed that all of the directors have surpassed this requirement as at April 2019 and disclosed the aggregate stock units held by each independent director in the 2019 Proxy Statement.³⁵

The big Bus

"They weren't going to stand by and let Airbus steal market share,"

– *Mike Renzelmann, a former Boeing engineer*³⁶

The barriers to entry for the commercial aircraft manufacturing industry is high in terms of capital requirements, technical expertise, and customer support. The manufacturing of airplanes is very expensive and complex. A single Boeing 747 reportedly requires six million components pieced together.³⁷ According to Teal Group, an aerospace market analysis company, Boeing and Airbus SE (Airbus) produced more than 99% of larger airplane orders globally, indicating their dominance in the industry.³⁸

The intense competition between Airbus and Boeing put considerable pressure on both companies to deliver quickly and to constantly innovate.³⁹ In 2011, Boeing's business was challenged by Airbus when the latter released its new A320neo aircraft. Boeing's exclusive customer, American Airlines, was contemplating placing orders for Airbus' latest and more fuel-efficient jet. The loss of American Airlines as its customer could cost Boeing billions in sales and thousands of jobs. Boeing reacted swiftly by changing its original idea of developing a new passenger plane to simply modifying its existing 737 workhorse. In just three months, it launched the 737 Max.⁴⁰ Boeing rushed to launch the 737 Max into the market and offered the plane to American Airlines even before obtaining approval for the design from the board.⁴¹

The unexpected tragedy

Just as Boeing celebrated an extraordinary year of exceptional growth came the shocking news of the Lion Air crash.

On 29 October 2018, Indonesian carrier Lion Air Flight JT610 flying the 737 Max crashed at high speed into the Java Sea, killing all 189 passengers and cabin crew on board. Both the pilot and co-pilot were experienced,⁴² but on that fateful day, the pilots had difficulties controlling the aircraft which kept descending against their commands.⁴³ A "flight control problem" was escalated to the air traffic control just two minutes into the journey. The Manoeuvring Characteristic Augmentation System (MCAS) responded by pushing the nose of the aircraft down despite the pilots' desperate attempts to bring it up.⁴⁴ According to the cockpit's voice recording, the captain asked the first officer to check the flight manual to find out why the plane kept lurching downwards. Over 20 attempts were made to rectify the issues but they were all unsuccessful.⁴⁵ The Indian-born captain was silent at the end, while the Indonesian first

officer said “Allahu Akbar”, the Arabic expression meaning “God is greatest”.⁴⁶ Eventually, the controller lost contact with the aircraft and it soon went into a steep dive straight into the sea. The whole tragedy happened within 15 minutes after taking off.⁴⁷

The Lion Air crash saw Boeing’s stock price falling nearly seven percent.⁴⁸ However, by early January 2019, the stock price had recovered its losses and climbed to a record high of US\$440.62 on 1 March 2019.^{49,50}

Preliminary findings

Investigations discovered several problems that occurred during the JT610 flight. Some technical issues discovered include the malfunctioning stick shaker, the airspeed and altitude indicators, as well as the newly added MCAS safety software.⁵¹ Right after the plane took off, the pilots had to radio air traffic controllers for information regarding altitude and speed as the system provided incorrect data of the external environment. The faulty sensor also inaccurately triggered the plane’s stick shaker, which relayed the false information that the plane was at risk of stalling and thereby activating the MCAS, causing its nose to be lowered repeatedly.⁵²

It was discovered that this same plane had a near-miss experience just one day before the crash. A flight scheduled from Denpasar to Jakarta on 28 October 2019 experienced a similar problem but was fortunate enough to be resolved by the pilots on board “after running through three checklists.”^{53,54} The pilots successfully disabled the aircraft’s flight-control system and landed the plane safely. It was later reported that the earlier flight had encountered the same problems that appeared to have caused it to crash the day after.⁵⁵

Boeing’s and FAA’s response

Boeing issued a statement on the day of the Lion Air crash, pledging their commitment to provide technical assistance to the accident investigation and expressing sympathy towards the victims and their relatives.⁵⁶ About a week after, Boeing circulated a safety warning to airlines on the potential malfunction of its flight control software.⁵⁷ It also issued a bulletin to help operators learn how to react when a problem happens.⁵⁸ However, Boeing was firm in its view that the design of its flight control system did not violate any process or compliance and thus, even if the problem indeed laid with the MCAS, the crew should have been able to save the plane and people on board.⁵⁹ A month after the crash, Boeing released yet another press statement expressing its sympathy and extending condolences to the victims’ families. It also reiterated its stance that safety is the company’s core value and top priority.⁶⁰

The Federal Aviation Administration (FAA) – the regulator responsible for aviation safety in the U.S. – issued a new airworthiness directive to the owners and operators of the Boeing 737 Max aircraft model, addressing the issues with the aircraft’s angle of attack sensor.⁶¹ The airworthiness directive required airlines to revise their certificate limitations and operating procedures of the airplane flight manual (AFM). Airlines were given three days to make necessary changes such that flight crew will have horizontal stabiliser trim procedures to follow.⁶²

Once bitten, still not shy?

On 10 March 2019, just four months after the first crash, a second disaster involving a Boeing 737 Max 8 occurred. Ethiopian Airlines Flight ET302 with 157 people on board crashed into the ground merely six minutes after taking off.⁶³ The aircraft was bucking erratically, with an unstable vertical airspeed,⁶⁴ again due to the electronic system forcing the nose of the aircraft downwards even though it was far too close to the ground.⁶⁵ The captain, Yared Getachew, and his co-pilot failed to regain control of the aircraft after trying to haul back on their control columns with their combined strength.⁶⁶

The second crash caused Boeing's stock price to slump by about 13%, wiping off approximately US\$30 billion of the company's value.⁶⁷

Uncovering more issues

The second crash involving Ethiopian Airlines shed more light on the problems with the Boeing 737 Max 8 aircraft's automatic flight control system. Parallels were drawn from both aircraft accidents where the MCAS was activated in response to erroneous angle of attack information.⁶⁸ Additional findings revealed that the left and right of the aircraft's angle of attack deviated wildly, which eventually triggered the MCAS security system.⁶⁹ Despite the pilots following the prescribed procedures set out by Boeing after the anti-stall system malfunctioned, they were unable to regain control of the aircraft. This cast serious doubts on the sufficiency of instructions issued by Boeing, leaving people to wonder if the fixing of the system was properly carried out.⁷⁰

Crisis? What crisis?

On the day of the fatal Ethiopian Airlines crash, Boeing issued a statement expressing that it was "deeply saddened" and extended its sympathy to families of the victims.⁷¹ Two days after, on 12 March 2019, the board released a public statement reiterating that safety is its utmost priority, claiming that the 737 Max observed high safety standards.⁷² On the same day, the FAA released an official statement stating that the review concluded an absence of systemic performance issues with the 737 Max and thus, the 737 Max would not be grounded.⁷³ Nonetheless, an increasing number of countries and airlines had begun to ground their 737 Max planes.^{74,75}

However, the following day, U.S. President Trump's administration ordered the grounding of the 737 Max.⁷⁶ FAA followed suit and released a statement following Trump's order and indicated that they have discovered similarities between the two tragedies which prompted its decision to suspend Boeing's 737 Max 8 and Max 9 jets. Consequently, Boeing announced that it recommends the temporary grounding of the 737 Max out of caution, despite having "full confidence in the safety of the 737 Max".⁷⁷

On 26 March 2019, in an open letter to Ethiopian Airlines and the aviation industry, Boeing said that it was "humbled" and that this tragedy would serve as a learning experience.⁷⁸ Yet, no apologies were made.

Finally, on 4 April 2019, CEO Muilenburg posted an apology video on the company website and on Boeing's official Facebook page, attributing the cause of both accidents to the MCAS and the inadequate training that pilots received.^{79,80}

Boeing faced a number of lawsuits from relatives of the victims of both crashes. Families of the victims were still upset by the delay in apology and the fact that there was no direct communication or support extended to them. The public felt that Boeing's response was slow and defensive. One parent of a victim pointed out that the CEO "talks to other people but not us, the victims' families".⁸¹ Boeing was accused as acting more as a business-to-business company by providing information only to airlines but not to the public on how they were going to get to the bottom of the issues.^{82,83}

After the two accidents, Boeing lost the trust and confidence of the public.⁸⁴ A survey by UBS Group AG found that 70% of people of those surveyed would hesitate to book a flight on the 737 Max.⁸⁵ Another separate survey conducted by Atmosphere Research Group found that at least 40% would book a more expensive or less convenient flight to avoid the 737 Max.⁸⁶ Besides passengers, airline companies such as Garuda of Indonesia cancelled US\$15 billion worth of orders of the 737 Max jets.⁸⁷ Due to the grounding of its Max aircrafts, Boeing delivered only 380 commercial airplanes in 2019, its lowest level since 2007.⁸⁸

The Federal Aviation Administration (FAA)

"The fact is the FAA decided to do safety on the cheap which is neither cheap nor safe and put the fox in charge of the hen house."

– *Richard Blumenthal, U.S. senator*⁸⁹

As investigations went on, scepticism about FAA's approval procedure came under attention.⁹⁰ A system known as the Organization Designation Authorisation (ODA) program provides manufacturers with the authority to ascertain the airworthiness and safety of their new aircrafts.⁹¹ The policy of aircraft manufacturers helping with their products' certification was first endorsed by the U.S. Congress in 2003 to speed up the certification process and cut costs.⁹² In 2005, the FAA created the ODA program which expanded the authority given to manufacturers to help certify their own products^{93,94} and granted Boeing "in-house oversight for new planes in production and approval of major repairs and alterations".⁹⁵ The idea behind the ODA program was that by delegating about 90% of its certification work, the FAA would be able to free up resources to focus on its oversight role, ensuring that tasks are carried out correctly, according to its own rules and procedures.⁹⁶ Over the years, the FAA was seen to be increasingly entrusting major decisions to the manufacturers.⁹⁷ In view of this, the delegation program and the FAA's oversight role have come under scrutiny.⁹⁸

According to current and former FAA employees, the agency handed substantially all the authority for the certification of the 737 Max, including the responsibility for approval of MCAS, to Boeing to speed up the process of releasing the new planes.^{99,100} In the Joint Authorities Technical Review (JATR) report commissioned by the FAA after the two deadly crashes,¹⁰¹ the panel questioned FAA's utilisation of Boeing's employees in the certification and found signs that Boeing put "undue pressure" on these employees, triggering more questions relating to

the quality of the certification done.¹⁰² In addition, critical changes in the 737 Max, such as the MCAS, was not properly reviewed by the FAA. After significant changes were made to the MCAS by Boeing, the agency did not conduct another safety review of the anti-stall system, as the said changes “did not affect the most critical phase of flight, considered to be higher cruise speeds”.¹⁰³ Furthermore, under the impression that the system was not significant, officials did not require Boeing to tell pilots operating the MAX aircrafts about MCAS.¹⁰⁴

The JATR report concluded that the FAA was not sufficiently aware of what MCAS was and hence was unable to discharge its oversight duties.^{105,106} This was confirmed by some FAA engineers who commented that they did not fully comprehend the system and that the FAA failed to independently analyse the risk associated with the system before the approval.¹⁰⁷ The report further criticised FAA’s approval procedures for focusing only on individual improvements and not how these improvements will affect the existing systems or the people operating it.¹⁰⁸

Experts also raised the possibility of modifying the FAA’s certification processes, taking into consideration the complex systems present in today’s aircraft, as the current standards were set in a period when aircraft systems were less automated.¹⁰⁹

Too cozy?

The fact that the FAA, which ensures that new planes are safe to fly in the air, outsources inspections to aircraft manufacturers raised concerns about the close relationship between the two.¹¹⁰ As Ralph Nader, a prominent consumer advocate mentioned in an interview with the Wall Street Journal, the regulators are no longer in an arm’s length relationship with the manufacturers due to the excessive delegation of powers in the certification process.¹¹¹

Concerns over FAA’s independence to oversee the work of the manufacturers in the certification process were also highlighted.¹¹² It was reported that in 2012, the U.S. Department of Transportation received indications from some FAA employees regarding the issue of Boeing having too much authority in the certification process, and that many FAA employees would have faced retaliation if they spoke up.¹¹³ It was uncovered that FAA managers were not always supportive of employees’ efforts to hold Boeing accountable. Consequently, employees were uncomfortable in speaking about the issue.¹¹⁴ The release of similar messages by both Boeing and the FFA after the two 737 Max crashes raised more questions regarding the relationship between the two. Mary Schiavo, a former U.S. Transportation Department inspector general, commented that the FAA “were just parroting what Boeing told them”.¹¹⁵

Critics also pointed out the “revolving door” phenomenon in the aviation industry where employees change their jobs from the industry to the regulatory agency or vice versa.¹¹⁶ According to the Project On Government Oversight (POGO), Boeing had hired a total of 84 former officials from the U.S. Defense Department as of 2016. Former U.S. President Barack Obama, recruited Boeing’s board members as his Chief of Staff and Commerce Secretary.¹¹⁷ Current U.S. President Donald Trump also recruited Patrick Shanahan, an ex-Boeing employee who worked for the company for over 30 years, as his acting Secretary of Defense even though Shanahan had no prior military experience.¹¹⁸ Shanahan was put in control of the Pentagon’s US\$700 billion budget as the Secretary of Defense and had made comments advocating Boeing while discounting its competitor.¹¹⁹

It was reported that Shanahan contributed to Pentagon's US\$1.2 billion decision to purchase Boeing's F-15X combat aircraft even though the U.S. Air Force was against it.¹²⁰ Former and current U.S. Presidents have also advocated Boeing's interest. For instance, Obama helped Boeing in promoting its aircrafts while Trump implemented policies that benefitted Boeing's business, resulting in a huge surge in its stock price ever since he became president.^{121,122}

Trump has always been interested in the aviation industry, having owned his own airline, Trump Shuttle, in the past.¹²³ After assuming his role as President of U.S., Trump broadened his connections to the industry. This included the CEO of Boeing, Muilenburg, who reassured Trump about the safety of the 737 Max aircraft over a phone call after the Ethiopian Airlines crash. The U.S. was thus among the last countries to ground the 737 Max.¹²⁴

Concerns over Boeing's relationship with the Trump administration was speculated to be the reason behind Ethiopia's decision to send Flight 302's black boxes to France for examination instead of the U.S., which was an unusual move.¹²⁵ It was also noteworthy that Boeing was one of the top companies which engaged in lobbying in the U.S., spending up to US\$15.1 million in 2018. As a government contractor, Boeing was not allowed to participate in lobbying itself and hence employed about 100 lobbyists to assist with its lobbying activities.¹²⁶

Training to be 737 Max pilots

Boeing has been well known in the aviation world for a design philosophy that gives pilots significant authority over the aircraft's flight controls.¹²⁷ One major difference between the 737 Max and its predecessors is the larger engines fitted further forward on the 737 Max aircraft's wings. However, in order to counteract the increased risk that the aircraft could stall if pilots angled the nose too high as a result of the new fittings, Boeing introduced the MCAS, which automatically nudges the aircraft's nose down if its sensors detect that the aircraft was at a risk of stalling.¹²⁸ Chesley B. Sullenberger III, a retired pilot, commented that "in creating MCAS, they violated a longstanding principle at Boeing to always have pilots ultimately in control of the aircraft."¹²⁹

One area of focus in the air crash investigations was whether the training procedures for the 737 Max, approved by the FAA, were sufficient for pilots to know how to operate the new aircraft. Bloomberg reported that Boeing engineers repeatedly invited FAA officials to look over their designs in one of the company's simulators to determine whether certain changes made would necessitate 'Level D training', which required more intensive training using a full-scale simulator.¹³⁰ By making the aircraft handle like a 737 predecessor, Boeing ensured that pilots would not need to undergo extensive extra training, thus helping airlines to cut costs and giving airlines additional incentive not to defect to its competitors.^{131,132} Instead, Boeing expected pilot training to be computer-based.¹³³ When Lion Air – one of Boeing's first 737 MAX airline customers – indicated that it wanted to exceed Boeing's recommended training and suggested that its pilots have a simulator session, Boeing convinced it that the extra training was unnecessary. Boeing was concerned that such an arrangement would set a precedent for other airlines to follow suit and undermine its sales promise and regulatory lobbying that current 737 pilots required only minimal training to operate the new 737 Max aircraft.¹³⁴

Yet another troubling finding is that many pilots, including those from American Airlines and Southwest Airlines, said that they were unaware of the MCAS before the Lion Air crash. The key change to the system which ran in the background was neither mentioned during pilot training sessions nor part of the flight manual for the 737 Max. They said that the manual did not explain it or provide explicit instructions on how to disable it.^{135,136}

To split or not to split

On April 2019, a month after the second tragedy, proxy advisory firms, Institutional Shareholder Services Inc. (ISS) and Glass Lewis, recommended that Boeing separate the roles of the then CEO and Chairman, Dennis Muilenburg, citing reasons such as the importance of having the board play an oversight role.¹³⁷

Further, during the 2019 Annual General Meeting (AGM), a shareholder motion was raised to maintain an independent Chairman and re-nominate an independent Chairman whenever the existing Chairman was deemed to be non-independent. In response to this, the board stated that it believed that the existing leadership structure was in the best interests of its shareholders and held that the board should not be tied down to such a rigid policy as it would hinder its ability to decide on an effective leadership structure. Further, the board felt that the presence of a lead independent director and a highly independent board would provide sufficient management oversight and thus, recommended that shareholders vote against this motion. Moreover, the board stated that “it [was] not aware of any clear evidence that splitting the CEO and Chairman roles is beneficial for companies”.^{138,139} The shareholder motion failed to go through.

Despite that, the board subsequently announced six months later in October 2019 that Muilenburg would be stepping down from his Chairman position and would be succeeded by David Calhoun, the lead independent director. This move was said to be to allow Muilenburg to focus on bringing the 737 Max back on service.¹⁴⁰

Risk management of Boeing

For the longest time in Boeing’s history, risk management has always been a function under the audit committee. The Chairman of the Audit Committee also came under the scrutiny of Glass Lewis, which felt that Lawrence Kellner should be removed from his Audit Committee Chairman position due to probable shortfalls in Boeing’s risk management framework that might have resulted in the crashes.¹⁴¹ The apparent lack of a specialised risk management committee focusing on aviation safety, coupled with Boeing’s close relationship with the FAA, have left many questioning how vigorous the testing processes were before the planes were certified and deemed ready to be in the skies.

In the board of 13 directors, the closest person having some technical expertise relevant to the aircraft manufacturing industry is David Calhoun, who used to be the Chief Executive of GE Aircraft Engines.¹⁴² The next person in line who might have some knowledge about aviation safety is Art Collins, who was the former Chairman and CEO of medical device maker Medtronic. It is, however, arguable whether an understanding of medical devices is

a transferable skill set that is applicable to the aviation industry. Furthermore, safety-related experience was not one of the criteria for appointment of directors.¹⁴³

On 25 September 2019, Muilenburg announced the addition of a new permanent fixture at Boeing, the Aerospace Safety Committee, with the responsibility of ensuring that the company's products and services are safe. The committee's main objective is to review policies and processes that were in place for the design and development of the airplanes to ensure safety and recommend any changes or improvements to those policies and procedures.¹⁴⁴ The committee, however, will not investigate the Lion Air and Ethiopian 737 Max accidents due to all the ongoing formal investigations.¹⁴⁵

The new committee would be led by retired admiral Edmund Giambastiani Jr., former Vice Chairman of the Joint Chiefs of Staff. Giambastiani would lead the three-member committee, whose other members are Boeing directors Lynn Good, Chairman and CEO of Duke Energy, and Lawrence Kellner, President of Emerald Creek Group and former Chairman and CEO of Continental Airlines. After the two catastrophes, Boeing added safety-related experience to the list of criteria it would consider when appointing future directors.¹⁴⁶

Prior to the formation of the Aerospace Safety Committee, the "Committee on Airplane Policies and Processes" was formed in April 2019 following the two airline crashes. After a five-month independent review of the company's policies and processes for airplane design and development by the Committee, some of the changes recommended by the board included: a new product and services safety organisation to be created which would report directly to senior company leadership and the board's Aerospace Safety Committee; engineers throughout Boeing, including the new product and services safety organisation, would report directly to the chief engineer, who in turn reports directly to the company's CEO; and the establishment of a design requirements programme.¹⁴⁷

Nose diving deeper into trouble

"This is more evidence that Boeing misled pilots, government regulators and other aviation experts about the safety of the 737 Max,"

– Jon Weaks, president of the Southwest Airlines Pilots Association¹⁴⁸

Boeing's troubles, however, were far from over. Text messages between Mark Forkner, Boeing's chief technical pilot, and Patrik Gustavsson, another Boeing's pilot, discussing the MCAS in 2016 were leaked. Forkner stated during the exchange that the MCAS was "running rampant", highlighting the fact that the MCAS malfunction was actually discovered two years ago during a simulator test. The FAA, which was responsible for the authorisation of the 737 Max, was deemed to be misled by Forkner, who requested for the MCAS to be removed from the pilot manual. Forkner justified his request by explaining that the need to activate the MCAS will only occur once in a blue moon.¹⁴⁹

Even though Boeing knew about the text messages, they were not disclosed to the U.S. Department of Transportation and other relevant authorities immediately upon discovery.¹⁵⁰ This came to the attention of the FAA which then published a letter to Muilenburg demanding

an explanation for the text messages and asking him to justify Boeing's delay in disclosing them to the safety regulator.¹⁵¹

Mystery unravelled?

"I was shocked that in a room full of a couple hundred mostly senior engineers we were being told that we weren't needed."

– *Mark Rabin, former Boeing software engineer*¹⁵²

When the MCAS malfunction was first discovered, the question as to why a company renowned for its well-designed planes could have made such a fatal mistake leading to not one but two tragedies remained a conundrum. It was subsequently revealed that Boeing was firing experienced software engineers at the development stages of the 737 Max, while pressuring its suppliers to cut costs.¹⁵³

Moreover, Boeing had allegedly relied on outsourcing the development and testing of its 737 Max's software to "\$9-an-hour engineers" predominantly from India, where knowledge in the aerospace industry is lacking. These "\$9-an-hour engineers" were temporary employees, with some of them being fresh college graduates. These outsourced employees were from HCL Technologies Ltd and Cyient Ltd, India-based software developers engaged by Boeing to develop and test the 737 Max's flight-display software and flight-test equipment software respectively. These codes developed for the software utilised in the 737 Max turned out to be inefficient and prone to errors, according to Rabin.^{154,155}

Looking back, Boeing's decision to outsource the development of the 737 Max also paid off in other ways. Due to its contribution to the Indian economy by providing employment opportunities to the local market, Boeing secured multiple orders to supply aircraft to the Indian military as well as to the commercial market, thereby allowing it to gain a stronger foothold in a market previously dominated by Airbus.¹⁵⁶ "I was pleased to learn of an Indian airline's (SpiceJet) recent order of 100 new American planes, one of the largest orders of its kind which will support thousands of American jobs," commented President Trump, after SpiceJet Ltd, an Indian airline company, placed a sizeable order with Boeing.¹⁵⁷

Boeing's cost cutting culture has also come under scrutiny. Bjorn Fehrm, an aviation industry analyst, claimed that Boeing's preoccupation with cutting corners and profit maximisation is the cause of the dual tragedies.¹⁵⁸ Adam Dickson, a former 737 Max engineer, confirmed that Boeing engineers were put on a tight budget with respect to production costs of 737 Max and because of this cost cutting culture, the resources provided to produce the 737 Max were inadequate.¹⁵⁹ A spokesman for the union representing a group of 737 Max workers also claimed that workers would be labelled as "troublemakers" whenever they highlighted issues during the production process, thus reducing the workers' desire to ensure product quality.¹⁶⁰ Boeing, however, said that Dickson's comments were incorrect, and insisted that it did not cut corners or launch the new aircraft before it was ready.¹⁶¹

A whistle-blower, Boeing's own employee, Curtis Ewbank, also emerged following the tragedies. Ewbank was part of a team responsible for analysing past plane crashes in order to draw

essential learning points such that future tragedies can be prevented. He highlighted an internal ethics complaint that accused the management of rejecting vital safety recommendations for the 737 Max on the basis of “cost and potential (pilot) training impact”. He added that the rejected safety add-ons had the capacity to avert the dual tragedies.¹⁶²

Will the 737 Max soar the skies once again?

“The recertification of the aircraft is one thing, but the recertification of the trust and confidence is another,”

– *Dennis Tajer, a spokesperson for the Allied Pilots Association*¹⁶³

The 737 Max grounding has resulted in a backlog of more than 400 planes manufactured but not delivered. Moreover, as airlines are not willing to take possession of too many planes at a time, it is projected that Boeing would need several quarters to clear this backlog. The growing inventory of manufactured planes coupled with various additional costs, including compensation to airlines for their loss in revenue, led to Boeing reporting a US\$3.7 billion loss in their second quarter results in 2019.¹⁶⁴

Boeing was still hoping to get the ban on the 737 Max lifted in January 2020.¹⁶⁵ Muilenburg made promises as to how Boeing was doing everything it could to prevent such an accident from happening again.¹⁶⁶ Boeing redesigned the MCAS by adding a software fix with three additional layers of protection to prevent it from activating erroneously.^{167,168} In addition, it also promised to give pilot training and crew manuals a much needed update which would ensure that pilots learn to fly the 737 Max safely.¹⁶⁹ Boeing also established a US\$100 million relief fund to help with family and community needs of the crash victims.¹⁷⁰

However, by April 2020, the grounding of the 737 Max remained in place and is expected to continue until at least June or July 2020. Regulators have said that there is no firm timeline to allow the aircrafts to fly again.¹⁷¹ Meanwhile, the entire aviation industry has been buffeted by the COVID-19 virus which has led to massive cancellation of flights and many airlines requiring bailouts.¹⁷²

New crew or just changing shift?

In December 2019, Boeing fired Muilenburg as CEO. This was despite Boeing’s Chairman, David Calhoun, saying in November that the board supported Muilenburg.¹⁷³ Calhoun was appointed President and CEO, while another existing board member, Lawrence W. Kellner, became Chairman.¹⁷⁴ Calhoun has been on the Boeing board since 2009, while Kellner has been a Boeing director since 2011.¹⁷⁵

Muilenburg stepped down from his position with over US\$60 million in pension benefits and stock, after discounting his forfeited stock worth US\$14.6 million. The company also denied him any severance or separation payments.¹⁷⁶

The new captain

“It’s more than I imagined it would be, honestly....And it speaks to the weaknesses of our leadership.”

– *David Calhoun, President and CEO of Boeing*¹⁷⁷

In an interview with The New York Times, Calhoun threw Muilenburg under the plane. Calhoun said that Muilenburg had “turbocharged Boeing’s production rates before the supply chain was ready, a move that sent Boeing shares to an all-time high but compromised quality.”¹⁷⁸

He also said: “I’ll never be able to judge what motivated Dennis, whether it was a stock price that was going to continue to go up and up, or whether it was just beating the other guy to the next rate increase...If anybody ran over the rainbow for the pot of gold on stock, it would have been him.”¹⁷⁹

Calhoun said that he and the rest of Boeing’s board “never seriously questioned that strategy, in part because before the first Max crash off the coast of Indonesia in October 2018, the company was enjoying its best run in years. What’s more, the board believed that Mr. Muilenburg, an engineer who had been at Boeing for his entire career, was so deeply informed about the business that he was a good judge of the risks involved in ramping up production.”¹⁸⁰

He added: “If we were complacent in any way, maybe, maybe not, I don’t know...We supported a C.E.O. who was willing and whose history would suggest that he might be really good at taking a few more risks.”¹⁸¹ On the board’s responsibility, Calhoun said: “Boards are invested in their C.E.O.s until they’re not.”

A few days later, Calhoun walked back on some of his criticisms, expressing regret.¹⁸²

Will things be different under the new CEO? Or is it a case of rearranging the seat configuration in a flawed plane?

The major proxy advisory firms certainly believe that more changes are needed. Although they offered qualified support for Calhoun, they have recommended that some board members be voted out at the April 2020 AGM. ISS recommended shareholders vote against four long-time board members: Edmund Giambastiani Jr.; Arthur Collins Jr.; Susan Schwab; and Ronald Williams. Glass Lewis once again recommended voting against Chairman Kellner, who previously oversaw the board’s Audit Committee. It said: “We believe the audit committee failed to mitigate the risk posed by management’s decisions and should be held accountable for its oversight.”¹⁸³

At the 2020 AGM, Top Boeing shareholder Vanguard Group voted against Chairman Kellner, citing “control failures” under its Audit Committee. Separately, large Boeing shareholder BlackRock Inc. said it voted against four other Boeing directors, citing safety concerns.¹⁸⁴

With the COVID-19 pandemic causing havoc to the aviation industry, Boeing has its own twin disasters to navigate. Only time will tell if it will make a safe landing.

Discussion questions

1. Evaluate Boeing's corporate culture and comment on how it might have contributed to the problems. How can Boeing improve its corporate culture moving forward?
2. Critically evaluate the composition of the Boeing board at the time of the crashes. Was composition a factor in the failure of the board to provide adequate oversight? What other board-related factors may have affected its effectiveness?
3. What is the role of the Boeing board with regards to risk management? What actions should the board take in order to prevent such incidents from happening again?
4. Critically evaluate the remuneration policies for independent directors in Boeing. To what extent do you think that this may have contributed to the crisis?
5. Analyse the independence of the regulators. Evaluate the effectiveness of the FAA's approval procedures as well as its oversight role in the certification process. What are the potential issues that might arise from the lack of independence? What could the regulators have done to avoid such issues?
6. Was Boeing's response to the crashes adequate? What could Boeing have done better to handle the aftermath of the crashes?
7. Did the competitive nature of the aircraft manufacturing industry lead to inappropriate proper decision making of aircraft manufacturers? What should aircraft manufacturers and regulators do in the future to ensure the safety of aircrafts?
8. Consider the recent changes in the Chairman and CEO. Do you think appointing the former Chairman as CEO and an existing director as Chairman would improve Boeing's corporate governance? What do you think of Calhoun's comments about the former CEO and the role of the board? Explain.

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