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Aviation and the Internet – Some Legal and Economic Issues

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Abstract

It is incontrovertible that, with the ravages inflicted on the world by the Covid-19 pandemic, travel by air has been vastly reduced amidst strict quarantine measures imposed on passengers. The resuscitation of air services to the volume that existed in 2019 will not only take a long time but will also require new approaches to connectivity**.** Trading in air transport will involve more reliance on digital technology and platforms such as the Internet that would promote communication of data and relevant details of route structures and threats posed thereto. Artificial intelligence and the Internet will be essential in providing data and details in a timely manner for both States and their airlines to take effective measures against the spread of another pandemic, the occurrence of which scientists are saying is probable in the foreseeable future. Against this backdrop of ominous reality, the aviation community has no alternative but to lean heavily on spontaneity in the exchange of information to suspend or terminate air services that connect potential hotspots that are likely to spread a virus which infects a particular city and could settle in other cities that are connected by air. This article inquires into the relevance and applicability of technology and the role that the Internet could play in what some call *The New Normal*.

Keywords: 5G; ACI; artificial intelligence; competition; global value chain; IATA; ICAO; internet; virtual travel

1. Introduction

A. 5G and the Internet of Things (IoT)

One of the most harmful and unwanted costs in air transport is the cost incurred by airlines for delay. It is said that the direct cost of air transportation delay is USD 32.9 billion which incurs a loss of USD 8.3 billion to airlines[2]. Digital technology may greatly alleviate this problem as well as problems caused to the industry by the rise of mobile, social media, a multi-layered, multi-screen and fragmented travel experience, and digital transformation and Big Data. Against this backdrop, airlines are competing with each other to possess the most data on the basis that "one who owns data owns the world" As Tim Clarke, President of Emirates has said: "Emirates has to move and move at least at the pace of our competitors. We have put data and technology at the centre of the business. There is no compromise on the spend on technology and digital. Data is key – if you don't embrace data, you will perish. New platforms in which our future processes are going to sit will be fundamental to our future, so deconstructing and reconstructing the firm in the digital environment is what we must do. The way we go about assembling the resources, and how you use back of house systems, are going to be completely transformed by digital'.[3]

In 2019 it was reported that small cell segment accounted for around 48.5% of the global 5G- the fifth generation of cellular network technology that represents the next-generation of mobile networks beyond LTE[4] mobile networks. At least four major phone carriers in the US — AT&T, Verizon, T-Mobile, and Sprint — have already developed plans to put in place their mobile 5G networks in 2019 in the aviation market[5] arguably because the fast growing investment in infrastructure and investment in aviation would require the most current technology to ease congestion and make the air transport product more user-friendly. It is said that 5G is "widely believed to be smarter, faster and more efficient than 4G.[6] It promises mobile data speeds that far outstrip the fastest home broadband network currently available to consumers. With speeds of up to 100 gigabits per second, 5G is set to be as much as 100 times faster than 4G".[7] 5G or the fifth-generation cellular network standard carries with extremely fast communication capabilities, with fail-safe low-latency links that would allow real-time communication and interaction. Another advantage is reported to be 5G's support for huge numbers of connected devices in small areas.[8]

5G will be able to support the rapidly growing number of connected and smart devices in both the consumer context (IoT)[9] and industry (IIoT)[10]. On the consumer side, users will experience reliable and fast communication and new real time

applications such as virtual or augmented reality and highly responsive gaming. Vehicles and their sensors will be constantly connected to both each other (V2V) and also to local infrastructure (V2I) enabling efficient, safer and autonomous driving. One report posits that global 5G in the aviation market will grow at a compound annual growth rate (CAGR)[11] of 53.46% in the 2016-2026 period.[12] The same report says that "[T]he 5G market in aviation is estimated to be USD 0.5 billion in 2021 and is projected to reach USD 3.9 billion by 2026, at a CAGR of 52.7% from 2021 to 2026. The growing demand for better flight experience and the need for fast internet[13] connectivity at airports and aircraft is expected to drive the market in the coming years".[14]

An article in *Deloitte Insights* has revealed that the results of recent surveys give a snapshot of preferences of enterprises for IoT. The results of one survey suggests that, 34 percent of companies—which happens to be the top response—felt they expected gains in efficiency from IoT technology. On the other end of the spectrum, only 6 percent—by far the lowest response polled—anticipated realizing new revenue derived from the use of IoT technology. The article goes on to say that yet another survey of companies that were already using IoT had found similar results: 52 percent used IoT to improve efficiency versus 40 percent that used customer-facing IoT applications for differentiation and generating new revenue.[15]

An earlier article states: "There are more than 20 IoT characteristics which can complement and add value in aerospace systems in many ways by reducing customer pain points such as flight cancellation, flight delays. An exclusive benchmark analysis report published by IATA[16] mentioned that USD 15 billion was spent on direct maintenance, with average maintenance cost of USD 295 million per airline and USD 1087 per flight hour. Identification of potential systems and its relevant characteristics maturity is the key to implement and develop IoT products/systems in aerospace.[17]

A spokesman for *Airbus* has opined that the 5G experience will not only enable passengers to stream more high-bandwidth content than with 4G technology as well as afford them seamless connections between their abodes, modes of transport (taxi) the airport and through to the aircraft cabin. He has added: "with 5G, connectivity will flex to address different IoT-use cases: augmented assets (motorized, un-motorized assets, baggage tracking), enhanced operations (catering, turnaround optimization, passenger flow) and smart airports (building management)," he says. And that's really the gist of this new generation – it's not just about more speed and capacity; it's about how 5G catalyzes virtual reality (VR), augmented reality (AR) and especially the IoT".[18]

Airports too will benefit immensely from advances made in artificial Intelligence (AI), big data and machine learning with many opportunities presented with applications combining all three that would make the passenger experience as well as

operational efficiency more fluid and obstacle free. These applications would be based on predictive (anticipatory) intelligence where AI, big data and machine learning could anticipate an issue and resolve it before the fact, thus offering distinctive value in the product.

Areas that could make expedient and more reliable the functioning of an airport experience are baggage handling, catering, turnaround optimization, passenger flow and resource management. A spokesman for SITA[19] has observed: "[F]or example, being able to monitor and optimize every single vehicle's usage around the airport will deliver considerable savings in fuel costs and overall resources, including labor. 5G will also accelerate the growth of smart airports, with next generation facility and building management. Areas I see where this will make a big difference include baggage handling, catering, turnaround optimization, passenger flow and resource management."[20]

Internet law has evolved, particularly in the developed world, and this article attempts to attenuate established legal principles through regulations and *cursus curiae* that could be relevant to the aviation industry.

B. Impact on the Airline Industry

Products and services offered by the Internet have been of immense advantage for the development of corporate strategy of many airlines. The use of internet applications has also been an enabler for airlines to operate in an ever-increasing connectivity with the world, enabling them to compete in an information driven world. This industry convergence has brought the consumer and the air transport industry closer together, offering the consumer convenience in obtaining air travel without the services of travel agents and having the assurance of a reliable after sales service as well as a unique way of conducting business with an air carrier. For the airlines the advantages lie in the minimising of distribution costs as well as the usual tedium of marketing their product, thus enabling them to offer lower fares.

One of the greatest advantages of the internet lies in the efficiency offered by computerised reservation systems (CRS, also known as Global Distribution Systems) on the Web where the consumer can access the vast up to date flight choices that can be offered to him with the flick of the finger on the keyboard. It is common for many internet sites permit users to access CRS. For example, Sabre offers www.travelocity.com; Galileo originally developed www. travelpoint.com, which is no longer available, but they have now acquired www.trip.com; Worldspan controls www.worldspan.net; and Amadeus offers www.amadeus.net. These are the same systems offered to travel agents. This tremendous advantage also brings with it a drastic

lowering of costs both to the customer as well as the airline. IATA states that: “On 1 June 2008, the industry moved to 100% electronic ticketing and the paper ticket became a thing of the past. Apart from substantial cost savings for the industry of up to US$3billion per year, ET is also more convenient for passengers who no longer have to worry about losing tickets and can make changes to itineraries more easily”.[21] Additionally, the internet can offer simultaneously with the flight that is purchased a bundle of other services which makes for efficiency that obviates the customer to be required to purchase those services separately. The Internet could also facilitate loyalty programmes and customised services. The Annex on Air Transport Services of the General Agreement on Trade in Services (GATS) states that marketing of air transport services includes “all aspects of marketing such as market research, advertising and distribution”. The Annex states, however, that the activities of selling and marketing do not include “the pricing of air transport nor the applicable conditions”. The downside of conducting sales *via* the Internet could be the potential of distortion of market access and manipulation of the consumer with dominance of display of their services by airlines. This is a distinct anti competitive practice. The ICAO *Manual on the Regulation of International Air Services* states: “[T]he primary issue regarding competition is whether certain practices associated with the use of the Internet are likely to undermine competition and consumer benefits, despite a competitive impetus carried to the marketplace by the Internet. On the one hand, the use of the Internet may provide greater opportunities for more vigorous competition and for new businesses, which could result in new products and services and more dynamic technological innovation. On the other hand, some areas of the Internet business may give rise to anti-competitive behaviour, where market incumbents seek to sustain or enhance their market power at least for a certain period”.[22]

This practice is famously called “biasing”. One commentator explains this process succinctly: “[B]iasing is a serious concern in the CRS industry, it is defined as "displaying flight information in a way that favors their [CRS owners] own flights." Biasing became a noticeable problem in the early 1980s. The Department of Transportation found that display bias was "rampant" before regulation began. Biasing is a problem of "deception." Many people did not realize that when they talked to a travel agent and asked him to book them on the most convenient flight the agent would be using a "reservation system tilted in favor of the carrier that sold him the system." In reality, however, CRS carriers biased the displays in favour of their own services. This inhibits a travel agent's ability to provide objective advice."[23]

Some commentators have echoed this idea in a different way: “The adoption of the Internet by the airlines may lead to the management of information at the customer

interface becoming a significant source of competitive differentiation. For example, the Internet provides an opportunity for established airlines to provide a highly customized service to long-haul frequent flyers. Through sophisticated customer profile databases it is now possible to automatically inform staff of customer preferences such as aisle seats or in-flight entertainment. Previously, such information may have been collected but not used to enhance the needs of their most profitable customers".[24]

Posner J. in *United Airlines* v. *C.A.B.*, citing Federal Regulations on the subject observed: " CRS carriers [i.e., the airlines that own computerized reservation systems] are engaged in unfair methods of competition" and in "conduct producing competitive harms that may be analogous to conduct that would be labeled an abuse of monopoly power under section 2 of the Sherman Act," are "impeding [travel] agents' ability to use other systems in conjunction with their own," "clearly restrict the output of their product," "have the ability and strong incentives to exercise this [market] power to reduce competition in air transportation, . . . [and] some CRS owners may in fact be exercising this power today."[25] It was also held that display bias involves the ability of a CRS to affect the presentation of information in ways that are not readily apparent to the user, which, in the Department's view, prejudices airline competition and causes travel agents to give misleading or incomplete advice to their customers. The user sees the CRS's presentation but does not necessarily grasp the criteria that have influenced the presentation, such as payments by airlines. The Department of Transport argued that display bias is possible because of the way in which [CRSs] present information on airline service options. [CRSs] display information on computer screens. Each screen can display only a limited number of [airline] flights, so a system must use criteria for ranking the available flights. Display position is important, because travel agents are more likely to book the flights that are displayed first.[26]

On another front, it can be said the IoT greatly benefits air travel. Deloitt says: "The next frontier in the race for share of wallet is the Internet of Things (IoT)—networks of sensor-equipped, intelligent, exponential technologies that can gather data, interpret it, and take action. Actions that can increase revenue while simultaneously improving the overall passenger experience. The IoT has the power to transform the curb-to-gate-to-destination experience and create valuable new revenue stream for airlines, but how? If the "old" internet was for pushing information out, and the modern internet permits personalized, two-way engagement, IoT steps beyond those modalities by equipping the airlines'—and their ecosystem partners'—operational assets to transition from sunk costs into drivers of incremental revenue".[27] There are significant legislations, rules and directives both in the United States as well as the European Union which militate against anti competitive conduct. These are discussed below.

C. Economic and Trade Issues

A) Virtual Travel on the Internet

During this pandemic period we are going through, the question on everyone's lips is "what is the new normal going to be"? In the context of air transport this question has given rise to diverse views, ranging from: "over time, people will forget the crisis ever occurred and its horrendous claim on hundreds of thousands of life and eventually get back to what the world was in 2019"; to "air travel will be different from what it was". No one has adduced any cogent proof of either premise. Hovering over these two scenarios is the shroud of reality that there is an innate desire, almost an obsession, in the average human mind to travel to distant places; breathe different air; swim in different lakes and see different exhibits in museums in their natural state.

There are certain incontrovertible factors to be considered, which admittedly are platitudes but nonetheless true. The first is that the human being is a collective animal. This is brought to bear not merely by the recent outcries and vociferous protests demanding the right to gather together in public by people in places like Serbia and Brazil, and even in the United States but also by the fact that people thronged bars, restaurants, beaches and other public places the moment the lockdown was lifted in various countries. This is an implicit recognition that technology cannot replace human physical interaction. Sherry Turkle, Professor at the Massachusetts Institute of Technology once said: "We expect more from technology and less from each other. We create technology to provide the illusion of companionship without the demands of friendship".

The second truth is that people travel for different reasons: to conduct business; to see places and experience what the world has to offer; to receive education in a foreign country; to experience live music at music festivals; go to the theater; and to visit their friends and relatives. There could be other reasons as well.

We are now globally destitute of all these privileges and, in keeping with our innate and relentless obsession with ingenuity and creativity, we have come up with "virtual travel". In this context, the first thing that comes to mind is: "what is the purpose of travel"? I expand this further to my own persuasion which is the study of air transport: "what is the purpose of international air transport?" The answer, in simplistic terms is "to bring the world together by connecting the world and its people". If one were to be more specific and technical, one could quote the international treaty that addresses international aviation - the Chicago Convention on 1944 – of which the full title is "Convention on International Civil Aviation" which says inter alia in its Preamble that the future development of international civil aviation can greatly help to create and preserve friendship and understanding among the nations and people of the world.

Our present discussion hinges on the words “friendship and understanding among the nations and people of the world”. The question then becomes: would virtual travel succeed in furthering friendship and understanding among us globally”? For instance, how could virtual travel allow us to befriend another at the poolside in a foreign hotel? Would we be able to chat with another tourist from a foreign country while travelling in a train from Budapest to Prague? Would we be able to talk to the owners of a Mom and Pop deli in Chianti about their homemade spaghetti? And speaking of conducting business, what about chit chat at a cocktail reception that could lead to a good deal? Or what about compromises reached at the coffee break at the United Nations?

Those who are proponents of virtual travel claim that there are already 150 million users of Google Maps and many millions using Google Earth as well, which reflect that virtual reality is already popular among people. There are highly attractive virtual tours from places such as the Faeroe Islands and the Bahamas which are calculated to be popular among potential travellers and virtual tourists. They also claim that under the circumstances of constrained air travel people will make informed decisions on the minimum loss of experience of being physically “there” as against the significant advantages of avoiding queues at museums and being able to gape at paintings and artifacts as long as they want to without being rushed to keep moving on in a queue past the Mona Lisa at the Musee du Louvre.

It is also predicted by some that the travel industry will eventually realize that travel is not really only about physical travel only but also about “selling experiences” without physical travel. It is claimed that with the rapidly advancing technology this could be made possible with augmented reality. It will be an experience without being there.

Virtual travel, with all that technology has to offer as mentioned above, could be a useful tool for airlines to firstly entice travellers to their route network with pre travel experiences of digitally prepared promotions. This way airlines could amplify their networks and encourage and enhance advance bookings. Secondly, airlines can have their own data and use it to their competitive advantage. They could give virtual reality tours to attract potential tourists by showing favourite destinations and places of interest, favourite cafes and restaurants etc.

One expert commented at a recent webinar conducted on the subject that every crisis has an opportunity and virtual travel could well be that opportunity. In other words, this could be a win-win situation where even the customer would benefit as virtual travel would augment customer experience at low cost.

Of course, it is difficult to envision an era where virtual travel will completely replace air travel. This would be like imagining having food when one is hungry without having real food. It would not allay a person’s hunger. The bottom line is the human

experience. Will the businessman lose an opportunity that would have presented itself at a tête-à-tête in a bar or pub after working hours? Would students not be able to benefit anymore of the feeling of studying in a foreign environment? Would staring at a screen in a lonely basement room watching virtual people drinking coffee at a busy café be the same as being there?

As Sherry Turkle said at a recent Ted Talk: "We are at a moment of temptation, ready to turn to machines for companionship even as we seem pained or inconvenienced to engage with each other in settings as simple as a grocery store. We want to instrumentalize daily life with real people and accept fantasies of "intimate" conversations with robotic personal assistants who have no real understanding of what we are saying to them in terms of what things mean to us.

We seem lonely but afraid of intimacy. Siri, the social network, digital assistants, all of these give the illusion of companionship without the demands of relationship. The path we are on seems fraught with paradox and about the most important human matters".

After all, air transport became the force it is today because it was meant to promote friendship and understanding among people. Would virtual travel change this?

b) The Global Value Chain

The World Bank, in its World Development Report of 2020 defines a Global Value Chain (GVC) as "the series of stages in the production of a product or service for sale to consumers. Each stage adds value, and at least two stages are in different countries. For example, a bike assembled in Finland with parts from Italy, Japan, and Malaysia and exported to the Arab Republic of Egypt is a GVC. By this definition, a country, sector, or firm participates in a GVC if it engages in (at least) one stage in a GVC".

At its most fundamental level of transportation of persons and goods by air is the air transport product and as a GVC it has its various stages attenuated across countries before the product matures for delivery. Unlike a bike, the air transport product can be disaggregated into two areas: the stages where the transportation vehicle i.e. aircraft is assembled with its various components such as the engines (which may come from the United Kingdom, the United States or any other country) and the avionics come from somewhere else and the fuselage is assembled in another country, the air transport product itself in its delivery to the client (the passenger or shipper) undergoes various stages that can be deconstructed. It is the latter that this article addresses, for the reason that, unlike the former, the latter continues to be subject to a rapid change in its metamorphosis due to the acute restrictions imposed on air transport by the Covid-19 pandemic.

The perceived trepidation that air transport is viewed by many today may not be unjustified as it was the main culprit in connecting the virus with the four corners of the world. Naturally, the 4.5 billion passengers who travelled annually by air transport receded to find solace within the safety of their homes instead of exposure to the claustrophobic virus laden confines of a conduit of premature mortality presented by the aircraft, however exciting, and governments added lockdowns and 14 day quarantine periods on arriving passengers.

The figures tumbled: on 20 June 2020 at the height of the pandemic The International Civil Aviation Organization (ICAO) estimated that the possible COVID-19 impact on world scheduled passenger traffic for the full year 2020, compared to Baseline (business as usual, originally-planned), would be: – overall reduction ranging from 42% to 52% of seats offered by airlines – overall reduction of 2,344 to 2,978 million passengers – Approx. USD 308 to 391 billion potential loss of gross operating revenues of airlines. International passenger traffic for 2020, compared to the Baseline – overall reduction ranging from 55% to 67% of seats offered by airlines – Overall reduction of 1,196 to 1,456 million passengers – Approx. USD 208 to 256 billion potential loss of gross operating revenues of airlines.

If this was not the ideal scenario for deconstructing the air transport product, nothing was. We had to throw out of the window all the rule books that made sense in maximising revenues and connecting the world and start all over again. The three most fundamental stages of starting again were: where to fly now; what equipment to use; and what would be the pricing of the product. If the intricacies presented by the first and the second could somehow be circumvented, the third consideration of pricing proved problematic. If social distancing was necessary to coax the passenger to return, the usually healthy load factor (the number of seats occupied in the aircraft) of 72% would have to go down to 62%. To break even at this reduced load, airlines would have to increase fares generally by 40%. Even if this were to be viable, airlines would have to increase their frequencies of operations to lucrative destinations, at increased costs. This has not proved a feasible option as is reflected by the significant retrenchment of airline staff that have happened across the board.

Several airlines went bankrupt, while others looked for cash infusions by their States. Against this backdrop, The two stages of GVT left as a last resort were somewhat paradoxical in that the first was to reinvent the wheel and go back to basics where several decades ago States infused incipient national carriers with cash and other subsidies and the other was to seek solace in Artificial Intelligence (AI) which would readily give airlines the most profitable permutations and combinations of routes to operate air services with appropriate equipment provided the States - the ultimate

arbiters of where airlines could carry traffic – gave them permission. AI would also alert airlines to avoid hotspots if a possible outbreak of communicable disease broke out in any spot in the world. This would indeed be a battle between Covid law (which has its own formula for multiplication of the virus) and Moore's Law (where the computational power of a micro chip doubles every 24 months) where hopefully Moore's Law would win.

Deconstruction necessitates going back to the origin of air transport which was a blend of competition and equality of opportunity for airlines to compete with each other. Here is where the States would come in to determine the most equitable formula for the revival of air transport in a post Covid-19 era. Understandably, this will be gradual, as the International Air Transport Association (IATA) – the global trade association of airlines – has opined that for air transport to reach 2019 levels of productivity and carriage would take another three years at least.

The final stage of deconstruction of air transport in the Covid-19 context would be to climb out of the window where the rule books were s thrown and retrieve the ultimate Constitution of international civil aviation – The Chicago Convention of 1944 – which recognizes in its Preamble, that certain principles and arrangements should be in place so that international civil aviation may be developed in a safe and orderly manner and that international air transport services may be established based on equality of opportunity and operated soundly and economically.

The deconstruction of air transport from the range of obstacles presented by the Covid -19 spread to the depth of value that air transport presents to the global economy, will ultimately hinge on equitable and universally acceptable regulations promulgated by the States through global institutions such as ICAO, IATA and the Airports Council International (ACI) – the global association of airlines.

These three institutions have already been robust and active in addressing the effects of Covid-19 on air transport. One can only be sanguine that this process will continue.

2. Legal and Regulatory Issues

The Sherman Antitrust Act of 1890 stipulates in Section 1 that every contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several States, or with foreign nations, is illegal. Any person (including corporations and associations existing under or authorized by the laws of either the United States, the laws of any of the Territories, the laws of any State, or the laws of any foreign country who contracts or conspires to restrain trade that is found to

be is guilty of a felony, and, on conviction thereof, punishable by fine, not exceeding $10,000,000 if a corporation, or, if any other person, $350,000, or by imprisonment not exceeding three years, or by both said punishments, in the discretion of the court seized of the matter. Section 2 is against the monopolization of trade, charging anyone who monopolizes, or attempts to monopolize, or combines or conspires with any other person or persons, to monopolize any part of the trade or commerce among the several States, or with foreign nations, is guilty of a felony, and, on conviction thereof, to be liable to be punished by fine not exceeding $10,000,000 if a corporation, or, if any other person, $350,000, or by imprisonment not exceeding three years, or by both said punishments, at the discretion of the court. In the case of *Alaska Airlines, Inc.; Midway Airlines; Muse Air Corporation,* v. *United Airlines, Inc., and Alaska Airlines, Inc, and Northwest Airlines, Inc.,* v. *United Airlines, Inc., and American Airlines, Inc.*,[28] the plaintiffs, each previous subscribers to Apollo and SABRE, were unhappy about the ability of their largest competitors to extract substantial booking fees from them. Accordingly, plaintiffs brought suit under the Sherman Act. Plaintiffs argued that United and American had individually violated Section 2 of the Sherman Act by, among other things: denying plaintiffs reasonable access to their CRS services, which were alleged to be "essential facilities"; and "leveraging" their dominance in the CRS market to gain a competitive advantage in the downstream air transportation market. The district court granted summary judgment in favour of defendants on both claims, holding that the traditional claim for monopolization has two elements: the possession of monopoly power in the relevant market; and the willful acquisition or maintenance of that power as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident.

In the 1945 case of *United States* v. *Aluminium Co. of America*[29] the Court upheld the principle of extra territoriality by saying that any state (in the United States) could legislate for its laws to apply to a foreign person outside its borders against an act committed by that person if such act affected the state concerned. This principle was later clarified by the *Foreign Trade Antitrust Amendment Act 1982* which provides that the Sherman Act would only apply to trade or commerce with foreign nations if an act has a direct, substantial and foreseeable effect on trade and commerce in the United States.[30]

In 1914 the United States Legislature passed the Clayton Act, which essentially prohibits any conduct that restricts trade. It must be noted that the philosophy behind these acts, particularly the Sherman Antitrust Act, as elucidated in the 1911 case of *Standard Oil Co. of New Jersey* v. *United States*,[31] was based on the "then existing practical conception of the law against restraint of trade, and the intent of Congress was

not to restrain the right to make and enforce contracts, whether resulting from combinations or otherwise, which do not unduly restrain interstate or foreign commerce, but to protect that commerce from contracts or combinations by methods, whether old or new, which would constitute an interference with, or an undue restraint upon, it".[32]

In Re Air Passenger Computer Reservation Systems,[33] was a case where the plaintiffs, a group of ten airlines ("USAir plaintiffs"), filed an antitrust action against defendants United Airlines ("United") and American Airlines ("American"), claiming damages from monopolization or attempted monopolization by each defendant of the Computer Reservations Systems ("CRS") industry. The plaintiffs averred *inter alia* that the predatory pricing of the defendants was subsidized for over seven years from incremental revenues received by the vendor airlines in the air transportation market through "biasing" the system. The court observed, citing an earlier decision handed down by the Supreme Court,[34] that certain criteria had to be met that would enable the plaintiffs to succeed in recourse: (1) whether the nature of the plaintiff's injury is the type the antitrust laws were intended to forestall, (2) the directness of the injury; (3) the existence of more direct victims; (4) the risk of duplicative recovery; and (5) the complexity of apportioning damages.[35] The court held that the direct victims of an attempted monopolization claim are the competing CRS vendors. "`The existence of an identifiable class of persons whose self-interest would normally motivate them to vindicate the public interest in antitrust enforcement diminishes the justification for allowing a more remote party such as the [plaintiffs] to perform the office of a private attorney going to Europe, the Treaty on the Functioning of the European Union (TFEU)[36] in Article 101(1) makes all agreements void *ab initio* where all agreements between undertakings, decisions by associations of undertakings; and concerted practices which may affect trade between Member States and which have as their object or effect the prevention, restriction or distortion of competition within the internal market, and in particular those which: directly or indirectly fix purchase or selling prices or any other trading conditions. Also included were: limit or control production, markets, technical development, or investment; share markets or sources of supply; application of dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage; and making the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts. This provision also appears in Article 85 of the Treaty of Rome[37] which established the European Economic Community in 1957, which later became the European Union.

Abuse of dominant position is covered in Article 102 (which initially appeared in the Treaty of Rome as Article 86) which provides that any abuse by one or more undertakings of a dominant position within the internal market or in a substantial part of it shall be prohibited as incompatible with the internal market in so far as it may affect trade between Member States. Such abuse may, in particular, consist in: directly or indirectly imposing unfair purchase or selling prices or other unfair trading conditions; limiting production, markets or technical development to the prejudice of consumers; applying dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage; making the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts. A special responsibility devolves upon enterprises in a dominant position not to let its business conduct distort the market In *Michelin* v. *Commission*[38] it was held that: "the purposes of investigating the possibly dominant position of an undertaking on a given market, the possibilities of competition must be judged in the context of the market comprising the totality of the products which, with respect to their characteristics, are particularly suitable for satisfying constant needs and are only to a limited extent interchangeable with other products. However, it must be noted that the determination of the relevant market is useful in assessing whether the undertaking concerned is in a position to prevent effective competition from being maintained and behave to an appreciable extent independently of its competitors and customers and consumers".[39]

Abuse of dominant position must apply to competitors who are as efficient and who offer a similar product to the market.[40] It has been held that the dominant position relates to a position of economic strength enjoyed by an undertaking which enables it to prevent effective competition being maintained on the relevant market by affording it the power to behave to an appreciable extent independently of its competitors, its customers and ultimately of consumers.[41]

3. Conclusion

ICAO has already published its Handbook for Civil Aviation Authorities (CAAs) on the Management of Aviation Safety Risks related to COVID-19. This document was developed by ICAO with the support of the aviation experts from ICAO's Safety Management Panel (SMP) and was the first version with updates to follow that reflect new developments as the aviation community continues to "learn from the challenges presented by the COVID-19 pandemic".

The document, which is consistent with ICAO's existing Safety Management Manual focuses on three areas: assessment and prioritization of risks based on collection and analysis of data; application of safety management principles to support risk-based decision-making; and management and monitoring of CAA approvals in light of the flexibility needed across the aviation system to continue safe operations. These three pronged approaches are based on what ICAO calls the three Cs: cooperation; communication; and collaboration.

On 13 May 2020 the European Commission published its own document: COVID-19:Guidelines on the progressive restoration of transport services and connectivity which says inter alia "it will be essential that aviation and health stakeholders communicate widely on the measures in place, as well as on how these measures mitigate the risks. The aviation sector should make sure that measures are highly visible, coordinated, and communicated to passengers at all times".

The Commission has stated that it will develop a Protocol to ensure that ventilation, hospital grade air filtering and vertical airflow will be strengthened and contamination risks will be limited along the travel process (e.g. avoiding concentration of passengers, limiting interaction on board, exploring the most appropriate allocation of seats based on technical constraints, and prioritizing electronic documents and means of payment). Furthermore the Protocol will call for the reduction of movement in the cabin and adequate management of passenger flows by provision of early arrival time at the airport; prioritizing electronic/self-check-in; ensuring distancing and minimizing contacts at baggage drop-offs, security and border control points, at boarding, and during baggage collection). It calls for accessible information on airport processes to be provided to passengers in advance of travel.

The ICAO Handbook sagely suggests that civil aviation authorities should adopt effective communication practices that include the use of existing digital platforms already in place to urgently communicate information with other States, industry stakeholders and the public, not to mention traditional and less common means such as e-mails, video conferences, social media and websites with view to expeditiously advising industry of a possible outbreak and appropriate risk mitigation measures as well as provision of safety and regulatory services (i.e. surveillance activities); and key announcements and contact information.

Sensitizing and guiding the civil aviation authorities may not be enough. For its part ICAO should establish an extended focus on the ICAO regional and sub-regional offices as the "eyes and ears" of the Organization. A serious review by the ICAO Council in this context could result in consistent communication between ICAO and its regional representations on the possibility of infection in a country or region that could result in

widespread infection through air transport. The emphasis could be on the incontrovertible fact that the Covid-19 global spread was due to population movement, the center of which is air transport. The internet would play a crucial role in this regard.

When Covid-19 was discovered in Wuhan, the most served routes from Wuhan which were points in Taiwan, South Korea and Japan could have been immediately identified and States alerted to take necessary action. ICAO could cooperate with the associations representing airlines and airports to put in place artificial intelligence which are already in place. Again, the internet would be a suitable conduit for the dissemination of information.

The new normal should be a change in mindset at a micro level of serving the passenger. When applications of artificial intelligence are applied they should be intrinsically linked to embracing online training, mostly through the internet, for all categories of civil aviation including staff at airlines, airports, air navigation services providers and regulators. One of the most important measures as a start would be to emphasize the need for management empathy, for example when "hot spots" connecting an infected area are identified, a higher degree of service quality from the industry at both airports and airlines which should be in place globally, could be activated. The mindset in management should include the value proposition that within the parameters of service should come empathy. In other words, treat the passenger not in a commoditized way as a means to an end (exclusively from the perspective of the balance sheet) but as an end in itself, whose fears and concerns must be allayed through an assurance of understanding and visionary management. The second mindset principle should be based on information and the sharing of timely and useful information with the passenger particularly on the proactive measures the airport has taken to address possible infection. The passenger must be comfortable with the information provided. Also, the information must be clearly conveyed in comprehensible means.

Scientists have stated that we could be faced with future pandemics and the aviation sector must heed this warning seriously.

Endnotes

[1] Dr. Abeyratne is former Senior Legal Officer at the International Civil Aviation Organization.

[2] Ramalingam Thirunavakkarasu, Benaroya, Christophe, Wamba, Samuel Fosso, Assessing the Potential of IoT in Aerospace, Project: IT, Organisationnel, Inter-Organizational and Society Transformation, Conference on e-Business, e-Services and e-Society, October 2017. See https://www.researchgate.net/publication/320186118_Assessing_the_Potential_of_IoT_in_Aerospace

[3] 7 Challenges for Airlines, *Openjaw*, June 18, 2019 at https://www.openjawtech.com/7-challenges-airlines-18/

[4] 5G is the 5th generation mobile network. QUALCOMM records that "It will take a much larger role than previous generations. 5G will elevate the mobile network to not only interconnect people, but also interconnect and control machines, objects, and devices. It will deliver new levels of performance and efficiency that will empower new user experiences and connect new industries. 5G will deliver multi-Gbps peak rates, ultra-low latency, massive capacity, and more uniform user experience". See Everything You Need to Know About 5G at https://www.qualcomm.com/invention/5g/what-is-5g

[5] https://www.att.com/5g/

[6] 4G has been defined as "the fourth generation of mobile technology which follows the 2G and 3G networks that came before it. It is also sometimes referred to as 4G LTE, but this is not technically correct as LTE is only a single type of 4G. It is currently the most advanced technology that's adopted by the majority of mobile network service providers". See *Megapath*, September 30, 2019, at https://www.megapath.com/blog/blog-archive/what-is-4g-network. 4G will be replaced by 5G which, as already discussed, is fast gaining ground in the aviation industry as a more efficient and vastly quicker mobile technology.

[7] See What is the difference between 4G and 5G? *Gemalto* at https://www.justaskgemalto.com/en/difference-4g-5g/

[8] Mordor Intelligence, *5G Market in Aviation - Growth, Trends, and Forecast (2020 - 2025*). See https://www.mordorintelligence.com/industry-reports/5g-market-in-aviation.

[9] The phrase Internet of Things (IoT) was introduced in 1999 by Kevin Ashton. The function of IoT is to connect the real-world objects with speech, vision, hearing, smell and touch, so inanimate things can perform jobs more accurately, responsively, collaboratively with learnings. The internet of things (IoT) has been defined as "a rapidly growing technology which aims connect all devices to the existing Internet infrastructure. At present only Mobiles, Computers, Tablets and Smart TV is connected with internet. By using IoT all the devices (e.g. coffee maker, air conditioner, washing machine, ceiling fan, lights almost any thing you think of) having sensors can be connected with internet". See Aman Kumar, Quora at https://www.quora.com/What-exactly-is-Internet-of-Things-IoT.

[10] The term Industrial Internet of Things (IIoT) applies to interconnected sensors, instruments, and other devices networked together with computers' industrial applications, including manufacturing and energy management.

[11] CAGR is the rate of return that would be required for an investment to grow from its beginning balance to its ending balance, assuming the profits were reinvested at the end of each year of the investment's lifespan. See Chris B. Murphy, Compound Annual Growth Rate, Investopedia, June 13, 2019 at https://www.investopedia.com/terms/c/cagr.asp.

[12] *Fortune Business Insights, Global 5G in Aviation: Global Market Analysis, Insights and Forecast 2019-2026*. See https://www.marketsandmarkets.com/Market-Reports/5g-market-aviation-152979610.html?gclid=EAIaIQobChMI89nzk4Pe5wIVRtbACh0jSwvOEAAYASAAEgIZPfD_BwE.

[13] The internet is a public and global communication network that provides direct connectivity to anyone over a local area network (LAN) or Internet Service Provider (ISP). See Ronan McIvor, Ronan, O'Reilly, Dolores, and Ponsonby, Sharon, (School of International Business, University of Ulster, UK), The impact of Internet technologies on the airline industry: current strategies and future developments, *Strat. Chan*ge 12: 31–47 (2003) Published online 13 January 2003 in *Wiley InterScience*, 31 - 47 at 33.

[14] *Ibid*.

[15] Mariani, Joe, Zmud, Johanna, Krimmel, Elizabeth, Sen, Rana, Miller, Matt, Flying smarter: The smart airport and the Internet of Things, *Deloitte Insights*, 1 July 2019, at https://www2.deloitte.com/us/en/insights/industry/public-sector/iot-in-smart-airports.html.

[16] The International Air Transport Association is a trade association of the world's airlines founded in 1945. IATA has been described as a cartel since, in addition to setting technical standards for airline, IATA also organized tariff conferences that served as a forum for price fixing.
[17] Thirunavakkarasu, Benaroya, and Wamba, *supra*, note 2.
[18] Fendt, Martin, quoted in Sillers, Paul, High Five: 5G Set to Turn Aircraft Into IoT-Flying Devices, *Connectivity*, 2 July 2018 https://apex.aero/2018/07/02/high-five-5g-turn-aircraft-into-iot-flying-devices.
[19] SITA is a multinational information technology company providing IT and telecommunication services to the air transport industry. The company provides its services to around 400 members and 2,800 customers worldwide which it claims is about 90% of the world's airline business.
[20] Bloch-Morhange, Gilles, ATS Products & Solutions, Head of SITA, quoted in *5G Takes Off At World's Airports And In The Skies* at https://worldaviationfestivalblog.com/5g-takes-off-at-worlds-airports-and-in-the-skies/
[2121] https://www.iata.org/en/programs/stb/e-ticketing/ United Airlines was the first airline to issue electronic tickets, back in 1994. A decade later however, only 20% of all airline tickets were electronic. The industry was missing out on an opportunity to save costs and make travel for passengers easier. In June 2004, IATA set an industry target of 100% ET in four year. It took only four years to reach 100% ET. Together, IATA and airlines, travel agents, airports, system providers, and GDSs have moved an entire industry from the paper age into the full electronic era. Armed with a mandate from the IATA Board, Stub was able to mobilise the industry.
[22] Manual on the Regulation of International Air Transport, *Doc 9626,* Second Edition 2004 at 4.7. The European Union echoes this concern: "Computerised Reservation Systems (CRSs - also known today as Global Distribution Systems - GDSs) act as technical intermediaries between the airlines and the travel agents. The CRSs provide their subscribers with instantaneous information about the availability of air transport services and the fares for such services. They permit travel agents, whether brick-and-mortar or on-line, to make immediate confirmed reservations on behalf of the consumer. As these distribution channels might influence the consumer choice, a 1989 Regulation (No 2299/89), last amended in 2009, ensures that air services by all airlines are displayed in a non-discriminatory way on the travel agencies' computer screens". See https://ec.europa.eu/transport/modes/air/internal-market/distribution-networks-crs_et.
[23] Minick, Aimee, Computer Reservations Systems, Airlines, and the Internet, *Journal of Air Law and Commerce*.
[24] McIvor, O'Reilly and Ponsonby, The impact of Internet technologies on the airline industry: current strategies and future developments, *supra*, note 14 at 42.
[25] United Airlines' case *supra* note 24 at 1117.
[26] 69 Fed.Reg. at 992, 998.
[27] Exploring the benefits of deploying the IoT in aviation: Traveling at the speed of knowledge, https://www2.deloitte.com/nl/nl/pages/consumer-industrial-products/articles/exploring-the-benefits-of-deploying-the-iot-in-aviation.html.
[28] 948 F.2d 536 (1991).
[29] 148 F2d 416 (2nd Cir 1945).
[30] See *Hartford Fire Insurance Co*. v. *California* 509 US 764 (1993).
[31] 221 U.S. 1 (1911).
[32] *Id.* 3.
[33] 727 F. Supp. 564 (C.D. Cal. 1989), US District Court for the Central District of California, 727 F. Supp. 56.

[34] *Associated General Contractors of California, Inc*. v. *California State Council of Carpenters*, 459 U.S. 519, 103 S. Ct. 897, 74 L. Ed. 2d 723 (1983).
[35] *Id*. at 538-47, 103 S. Ct. at 908-13.
[36] Version of the Treaty on the Functioning of the European Union, 2012/C 326/01, Official Journal C 326, 26/10/2012 P. 0001 – 0390, http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:12012E/TXT.
[37] The Treaty of Rome, 25 March 1957. See http://ec.europa.eu/archives/emu_history/documents/treaties/rometreaty2.pdf.
[38] *Michelin* v. *Commission*, Case 322/81 [1983] ECR 3461.
[39] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A61981CJ0322.
[40] *Deutsche Telekom AG* v. *Commission*, [2010] ECR 1 000.
[41] see *Hoffmann-La Roche* v *Commission* [1979] Case 85/76] ECR 461, paragraph 38, and Case C-202/07 P and *France Télécom* v *Commission* [2009] ECR I-2369, paragraph 103).