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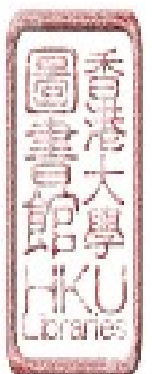
Research Topic

Technology and Social Change: The Interaction between Aviation Development and Hong Kong Society

Community Partner: British Airways

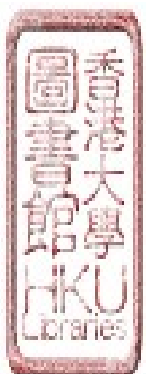
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Abstract

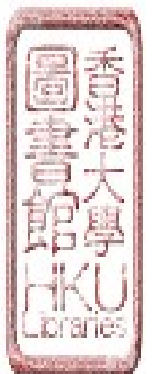
This research will examine the transformation of aviation development and the Hong Kong society during these 80 years starting from 1936 to illustrate the interaction between the technological change and social change. It is proved that the aviation technology and social development are mutually affected and having an interactive association rather than a determinist relation. Neither *Technological Determination* nor *Social Determination* is suitable for the evaluation of this interactive relation, but only *Actor-Network Theory (ANT)* can draw new implications from the interaction. *ANT* is powerful to include all the social and technological factors and respect the contribution from each factor for the generation of a new happening.



Acknowledgement

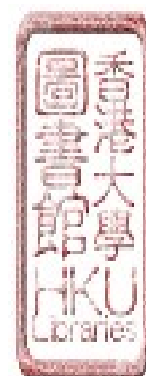
I would like to express my gratitude to Mr. Hon Lam, my coordinator from British Airways; Dr. Tommy Tse, my capstone project supervisor and all of my informants and the staffs of British Airways who have assisted my field work.

Thank you so much for your unconditional support, assistance and guidance throughout the whole research process. Without your contribution, this research may not be completed in this short period of time. The research is actually a collective work of all of you.



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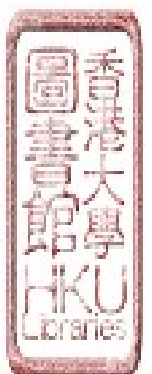


1. Introduction

Study Background

Starting from 1936, ever since the first commercial aircraft ‘Dorado’ of Imperial Airways landed in Hong Kong, aviation technology has brought huge influences on Hong Kong society regarding the social practice, social environment and socio-economic development. By then, the Hong Kong to London’s aviation service was set up in regular basis and British Airways (BA) was treated as the beginner to kick start of the remarkable journey of Hong Kong aviation industry, holding a leading role for the aviation development. The route between London and Hong Kong is most historical and representative, which symbolized as a royal route, since many government officials and even the monarchy have travelled on.

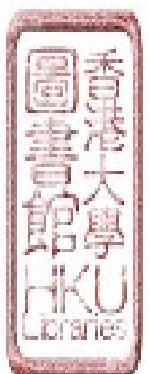
Throughout these 80 years, aviation technology has been getting more and more advanced, including the aircrafts, inflight facilities, ticketing and reservation, safety and security. At the same time, the social environment, social practices towards travel and socio-economic activities related to travel have also been shaped. A debate between *Technological Determinism (TD)* and *Social Determinism (SD)* has long been held for analyzing the relation between technology and the society. *TD* believes that technology constitutes social change whereas *SD* thinks that social factors bring



technology to happen. However, both ideas are contradictory to each other and also incapable to illustrate the interaction between aviation development and the Hong Kong society.

Apart from *TD* and *SD*, the *ANT*, developed by Bruno Latour and his fellows in mid 1980s, would be a more comprehensive solution. *ANT* values every single factor in the transformation process, not limited to human or non-human elements, so that both technological factors and social factors can be equally taken into account. *ANT* seems to be the most suitable approach and is used for analyzing the complex interrelation between aviation development and social change in this research.

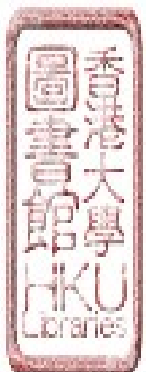
Currently, people are more likely to place attention to how communication technology, such as internet, smart phones or social media influences our life and many related studies are available. In addition, numerous of existing researches about Hong Kong aviation are merely descriptive story telling chronicles without any in depth analysis correlated with the social change. Therefore, it seems to be lack of studies on investigating the correlation between aviation development and the society, leaving an entirely blank new area for this research.



Research Objectives

This research would like to focus on examining the interaction between aviation development and the social change in Hong Kong society. As mentioned above, since the route between Hong Kong and London is the most historical and influential one in Hong Kong and BA has long establishment in Hong Kong aviation history, this research is mainly based on the development of this particular route operated by BA within these 80 years.

Under *ANT*, every segment can form its own network, meaning that technological change (*green circuit*), social change (*purple circuit*) and the interaction (*red circuit*) are all three networks running on their own tracks (*Figure 1*). Basically, the research objectives are divided into 2 levels. For the first level, I would like to explore the technological change and social change respectively by analyzing the aviation development of the route including the aircrafts, inflight facilities, ticketing and reservation and safety and security and examining the social change in terms of social environment, social practices, and socio-economic development throughout these 80 years, making comparison between the past (the old days in Kai Tak) and present (the recent twenty years). For the second level, I would like to illustrate the interaction between the aviation development and the social change by applying *ANT*

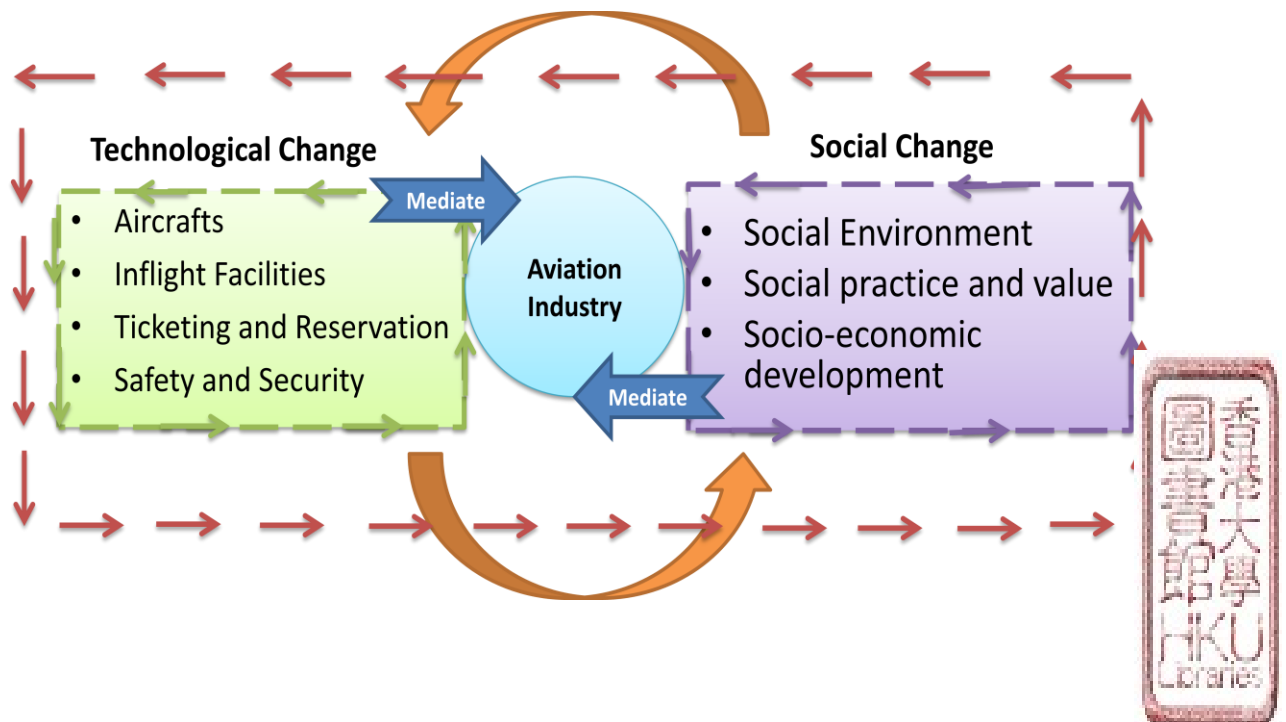


to explain how *ANT* is more capable for the analysis and why *TD* and *SD* are refutable.

(*red circuit*)

This research is a pioneer analysis of the interaction between aviation development and social change in Hong Kong and can serve as a foundation for future research. Through this study, people may understand that neither *TD* nor *SD* is sufficient to respond to the relation between technology and society, but only *ANT* is able to show how the social and technological networks operate on their own and how these two networks come across and cooperate with each other to form a bigger network for making new implications. Further research can be conducted on particular focus based on each network.

Figure 1: The research theme work

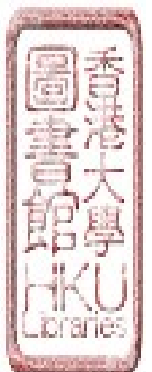


2. Literature Review

The Aviation History of Hong Kong

In fact, Hong Kong aviation history can be chased back to over 100 years. Aviation in the early days was mainly about flying demonstration or presentation and was treated as a public activity rather than a public transportation. The first flying event was held on 18 March 1911 at Shatin by Charles Van den Born. During that period, the influence of aviation is trivial, only for appreciation and visual entertainment but not for physical experience and functional use. Not until the arrival of the first commercial flight in 1936, was aviation industry still regarded as not yet established.

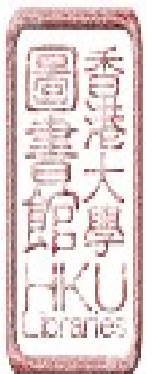
To greet the very first commercial flight “Dorado” to Hong Kong, plenty of preparation was conducted, including the establishment of the governmental structure and the improvement of the Kai Tak Airport. A new government position, Director of Air Services was set up in 1929 and Mr. A. J. R. Moss was appointed as the first civilian airport superintendent in 1930 to cope with the foreseeable increase of commercial aviation service. More importantly, since Kai Tak Airport was officially constructed on 19 March 1927 as Royal Air Force Kai Tak for serving its initial purpose of military use (Ng, 2015), it was necessary to rebuild the airport so as to fit



the commercial needs.

In 1928, British and Hong Kong government had announced to contribute around £200,000 and aimed to develop the most up-to-date and modernist airport facilities at Kai Tak. A crane and slipway to handle flying boats were built in the same year. By January 1932, the improvement of the airport was almost complete and a vast modern steel hangar affordable for housing a number of aircraft was ready. Later on, in 1935, the first control tower and emergency fire engine were also developed (Dunnaway, 2013). As South China Morning Post reported, the original aerodrome at Kai Tak had been successfully converted to a “finest airports in the world, either for land or sea-going aircraft” (Wings, 1998).

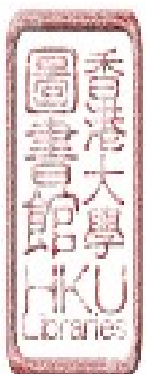
Indeed, several reasons for developing aviation industry in Hong Kong were embedded. Politically, the British were confident that they would rule the sky and were ambitious to establish the air routes to connect all of their colonies. In February 1923, the Air Ministry in London initiated an “Imperial Airship Service” with the main route from Britain to India and Australia, and an extended line to Hong Kong. Further action was taken in May, the British Air Ministry called for tenders from the national aircraft industry for the construction of a large, long flying range



and metal built aircraft competent to fly 1,500 miles non-stop over the Empire Air routes. The two greatest air routes were established from Europe to Australia via India, and Cairo to South Africa (Dunnaway, 2013).

Socially, by September 1929, Imperial Airways' airmail service to London began. Hong Kong's general post office received more than 374 letters and postcards for their first service. However, it took 24 days to reach its destination, departing by sea, via Singapore to India, through India airmail to London, which consumed even longer time than taking the usual trans-Siberian route (Wings, 1998). Regarding the inflexibility of airmail service, complaints about lack of aviation facilities and enterprise were getting more frequent than ever.

Finally, at 11:35am on 24 March 1936, the British Airways D.H.86 named Dorado successfully reached the Kai Tak Airport and Ong Ee-lim, has become the first commercial air passenger at Kai Tak, flying together with Captain Lock, Copilot A.C. Thomas and 16 bags of mails. Starting from that point, the regular weekly airmail service between Hong Kong and London was begun. The Governor was proud to announce that this should be "another milestone in the history of the Colony" (Dunnaway, 2013). Historical facts proved that aviation technology and society is

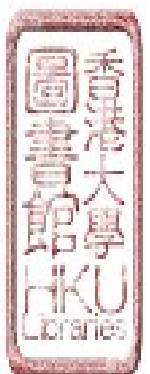


interconnected. Social institution and social environment had changed to coordinate with the profession of aviation service but on the other hand, aviation technology was created and adopted due to strong political and social pressure.

Technological Determinism and Social Determinism

TD is a mere materialist thought and suggests that technology is the main and only salient drive for the social evolution, through the isolation of technology, to assume technology as a self-generating and self-acting force for the creation of new ways of life or provision of materials leading to new ways of life. *TD* tends to undermine the human effort in the creation of technology and treats technology as an embedded knowledge in its artifacts, which is just figured out by human, promoting a passive attitude to technological change, with a focus on how the society adapt technological change rather than how the society shape it. Therefore, *TD* concentrates on the influential consequences that brought by the new technology to the society including how the new technology shape the social practice and human behaviour.

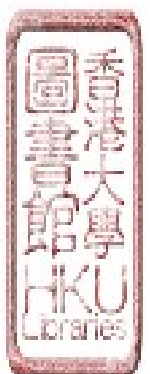
SD holds a totally distinctive view, trusting that “chicken should come before egg”, stressing on human efforts rather than the material itself, to determine a certain technology to be existed. *SD* criticizes that the notion of “discovery” referring



to the uncovering of what is already there is naïve (MacKenzie & Wajcman, 1999) and insists that the emergence of technology should always be due to the human innovation for the purpose of fulfilling human desires. Technology is just an artifact which is neutral in nature and fails to determine its effect to the society, depending on how the society chooses to use it. *SD* insists that technology itself and how it is exercised should be considered as socially determined according to different social factors. Consequently, society motivates the development of technology to accomplish certain social goals and social needs for the sake of a betterment of life. Obviously, technological change is required the society to actively bring it happen rather than passively respond to (MacKenzie & Wajcman, 1999).

Actor-Network Theory

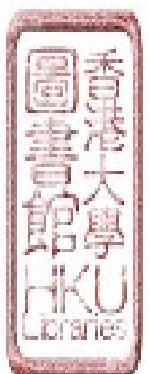
ANT, developed by Bruno Latour, Michel Callon and John Law in 1980s, rejects the deterministic ideas of both *TD* and *SD*, treating the interaction between technology and society as a collective sociotechnical process, stressing on the connections towards both human and non-human entities, applying a relational approach to examine how these two elements develop attachments with one another to create network structures. *ANT* advocates “relational materiality” (Ritzer, 2005), which is about “uncovering and tracing the many connections and relations among a



variety of actors (human, non-human, materials discursive) that allow particular actors, events and processes to become what they are”(Fernando, 2006). *ANT* shares similarities with the Foucauldian idea of material-semiotics and is also in parallel with the concept of the assemblage from Deleuze and Guattari, which networks are dispersed, dynamic and performative.

ANT suggests anti-essentialism and believes that truth does not exist as essences can change overtime, by connecting and reconnecting of entities that may shape or reshape the essences of a certain entity. *ANT* imposes impartiality and neither human nor non-human factors should be privileged. Following the idea of agnosticism, *ANT* abandons any priori assumptions of the nature of networks, casual conditions or the accuracy of entities

ANT avoids using the term “actor” but replaces it by a new term “actant”, so that all entities, whatever human, non-human or even an action can be included. An actant refers to something accomplishes or undergoes an action, which can be any agents, collective or individual, such as a human, an animal, an object, a country or a concept as long as it undertakes an act (Dankert, 2012). When two or more actants are connected, they form group and it would become an actor-network. If we zoom out,



this particular actor-network would serve as an actant of another bigger actor-network.

An actor-network, containing lots of materials, are processual, built activities, performed by the actants out of what they composed and is regarded as a continuous work of assembling. Actor-network is constructed and reconstructed through interaction between actants, which is local, variable, and contingent as each node and link is semiotically derived.

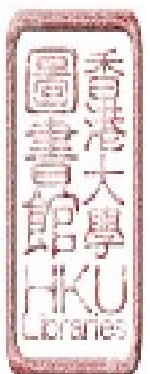
Translation refers to the process of establishing identities and the conditions of interactions, and of characterizing representations, which would take place during the formation of or an actor-network or a third entity (Ritzer, 2005).

When a person is shot to die, neither a gun nor a man killed the person, but the “gunman”, a newly formed third entity between a man and a gun under translation.

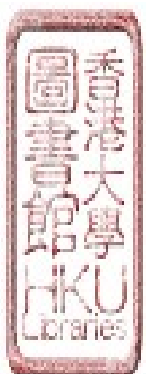
Once we act, we always interact with other and through translation, we eventually change other actants but simultaneously we are being changes by other actants as well.

Actants are influencing other constantly and consequently the actor-network would be changed regarding the successful translation. The interaction between actor-networks

should be non-stop, like a flow from one actor-network to another, forming new larger scale of actor-networks continuously. However, somehow *ANT* works like a black box, concerning only the inputs and the outputs within the actor-network, but with no



information on how the translation is proceeded, which may undermine its explanatory power towards a certain phenomenon.



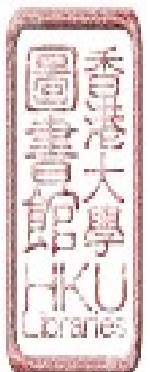
3. Methodology

Data Collection

As this research requires collecting lots of factual information as well as human affections towards the aviation development and social transformation to support the analysis, a qualitative research method is adopted. Ethnographic research is a more comprehensive approach to handle the investigation on both historical facts and sentimental memories. The data collection exercise was started in December 2015 and finished by February 2016 until similar data are collected repeatedly.

(a) Archive Research

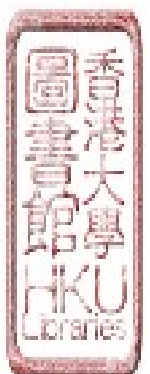
BA has kept a huge volume of company archive at their Heritage Centre. I focus on reviewing the specific archives that is relevant to Hong Kong since 1936 and have mainly collected the details regarding the development of the route between Hong Kong and London throughout these 80 years, such as types of aircrafts that have been used, flight schedule and operation frequency, the flying routes, flight duration and the air ticket fares. Apart from that, BA published newsletter each months, and I flipped through the publication year by year and gathered some old news that related to Hong Kong. In addition, BA stored many materials in the early days, for example, the old version of boarding pass, an air ticket booklet in written format and the flight



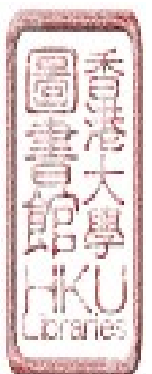
safety training manual with drawings and I took pictures of those materials for record. Some old pictures capturing the aircrafts landing on Kai Tak Airport, cabin crews serving on flight and having training are also found. The collected visual data can help conceptualize the flight operation and travel experience in the old days and are good facilitators to recall the memory of the informants when those are presented during the interview.

(b) Semi-structured In-depth Interviews

The interview targets are set to be those who have witnessed the transformation from Kai Tai Airport to Chek Lap Kok Airport starting from 80s, so that direct comparison between the past and the present can be done by the same person on his or her own perception. Different types of informants including the BA staffs, BA customers and travel agents are invited to facilitate a comprehensive review on the same issue from diversified perspectives in terms of a labour and a traveller. Both gender views are weighted equally in the data setting so as to avoid imbalance of gender representation. Nationality of the informants is not a concern as long as they have strong experience with the Hong Kong aviation development.



In total, I have conducted 9 interviews, with 3 BA staffs, 1 frequent passenger, and 5 travel agents, by having 1 male to 2 females for the labour side and 3 males and females each for the traveller side. BA staffs can serve as a professional body corresponding to their duty segments. I have interviewed the Hong Kong Airport Manager, the Cabin Crew Manager and a senior cabin crew, who told me about their different work experiences at Kai Tak and Chek Lap Kok, such as the check-in procedure, boarding arrangement, inflight duties and safety training; observation of changing customers' behaviours; personal opinion towards the two airports; and expectation on the aviation industry. Similar questions are asked to the frequent passenger and the travel agents but focus is put more on their own travel experience, especially the inflight entertainment and their expertise in the travel industry, particularly the ticketing procedure and tour guiding. I have interviewed a British loyal customer of BA who started travelling to Hong Kong at his age of 5 and now keep travelling between London and Hong Kong every 6 weeks; and managers of Wing On, Hong Tai and EGL who have been working in this field starting from 1980s.

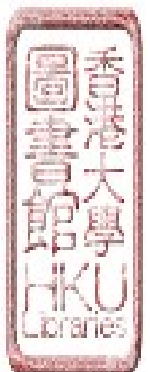


(c) Site Visit

I went to visit the cabin crew training centre and observed how the cabin crews conduct their training and assessment. I have seen their training materials, interactive classroom, simulation practicing areas, medical treatment set and safety slide. I have taken pictures for record and dropped down field notes for this visit.

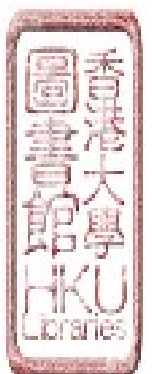
(d) Informal Dialogues

Along with my interviews, I have communicated with some of the BA staffs who are experienced in particular aspects in aviation development to get more insights. The Inflight Entertainment and Technology Manger told me about the transition of the inflight entertaining technology. The Crew Learning and Development Manager guided me for the site visit and introduced the normal arrangement on crew training. The administrator of BA Heritage Centre explained how the ticketing operated in the old days. A British BA retired cabin crew who has been serving on flight for 36 years since 1957, shared lots of his flying experience in the old days. Note taking has been done for every conversation.



Data Analysis

All interviews are taped and have been transcribed into text format. Along with the archive data and other notes, similar ideas are highlighted and grouped together. The grouped data are separated into two big sectors. Under the technological sectors, data are categorized into 4 aspects: aircrafts, inflight facilities, ticketing and reservation, safety and security. Under the social sector, data are classified into 3 areas: social environment, social practice and value, socio-economic development. Then, analysis for each subsector can be easily carried out. Other data that are failed to be categorized may serve as supporting for the evaluation on interaction between aviation development and social change.



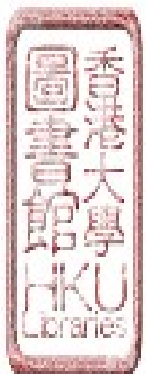
4. Findings and Discussion

Technological Change

(a) Aircrafts

During these 80 years, several models of aircrafts were used to operate the royal route between Hong Kong to London and the aircrafts have been enhanced in terms of their speeds, flying ranges and capacity. In 1936, as a first flight from London to Hong Kong, DH86, Dorado, containing 16 bags of mail and just one passenger, flying for 10 days, had stopped over at 21 cities (*Table 1*), before its arrival to Hong Kong. By then, regular weekly flight service for this royal route began and the DH86 aircrafts could carry 10 -12 passengers. The terrifying number of intermediate destinations was largely because the limited flying range of an aircraft, which needed to get its fuels refilled and also due to the low operation frequency, it was necessary that all colonial territories had to be connected at once for a single journey.

By 1946, a new type of flying boat, Short Hythe and Short Plymouth which were able to take 24 passengers, flying for 7 days and took stop for only 9 cities, replaced the DH86 in operating the route. In 1949, a land plane, Canadair Argonaut, entered the service, allowing 52 passengers on board, taking 4 days and stop over 6



cities. In 1957, Bristol Britannia, replaced Canadair Argonaut, which could accommodate for over 100 passengers and was the final propeller airplane operated for this route. Starting from 1959, the first jet plane, Comet IV emerged and a same day journey between two places was finally born, which only needed 22 hours and later in 1960, it speeded up to 19 hours and 50 mins by the newly Boeing 707. Until 1977, the first double-deck aircraft Boeing 747- 100/200 enlarged its capacity to over 300 passengers, and in 1980, it took only one stop over at Bombay and enhanced to 15 hours for the travel.

Awaited by everyone, the non-stop service ultimately existed in 1990 by Boeing 747- 400, using only 11 hours and 45mins to complete the journey. The upper deck of the flight was extended and the changing of staircase design from spiral to straight made the upper deck to be more spacious, increasing the total capacity to over 400 passengers. From 2013 onwards, Airbus 380 and Boeing 777 become the main carriers, bringing along 469 passengers for each trip, signifying the peak of the whole period.

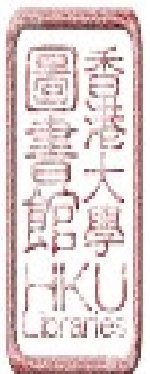
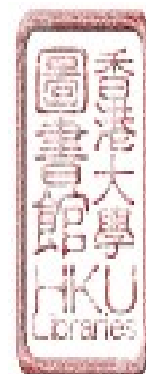


Table 1: Basic information for the route development

Period	Lapsed	Route	Stops	Aircraft	Capacity
March 1936	10 days	London (Croydon)-Paris-(by train)-Brindisi-Athens-Alexandria (nightstop)-Gaza-Baghdad (nightstop)-Basra-Kowait-Bahrein-Sharjah (nightstop)-Gwadar-Karachi-Jodhpur (nightstop)-Delhi-Cawnpore-Allahabad-Calcutta (nightstop)-Akyab-Rangoon-Bangkok (nightstop)-Penang for connecting flight to Hong Kong	21	De Havilland DH86	10-12
September 1946	7 days	(Flight 29/30F) Poole – Marseille – Augusta – Cairo – Basra – Bahrain – Karachi – Calcutta – Rangoon – Bangkok – Hong Kong	9	Short Plymouth Short Hythe (flying boat)	24
September 1949	4 days	(Flight BA908) London Heathrow (North) – Rome – Cairo – Basra – Karachi – Calcutta – Bangkok – Hong Kong	6	Canadair Argonaut	52
September 1957	4 days	(Flight BA930) London Heathrow (North) -Zurich – Beirut – Karachi – Delhi – Calcutta – Rangoon – Bangkok – Hong Kong	7	Bristol Britannia	Around 100
April 1959	22hrs	London Heathrow (North) -Frankfurt – Beirut – Teheran –Karachi – Calcutta – Rangoon – Hong Kong	6	Comet IV	Around 100
September 1960	19hrs 50mins	(BA912) London Heathrow (Terminal 3) – Frankfurt – Rome – Karachi – Bangkok – Hong Kong	4	Boeing 707	140
September 1977	16hrs 35mins	(Flight BA810) London Heathrow (Terminal 3) – Frankfurt – Delhi – Bangkok – Hong Kong	4	Boeing 747-100/200	Over 300
September 1980	15hrs	(Flight BA19) London Heathrow (Terminal 3) – Bombay – Hong Kong	1	Boeing 747-100/200	Over 300
September 1990	11hts 45mins	Non-stop	0	Boeing 747-400	Over 400
September 2013	11hrs 45mins	Non-stop	0	Airbus A380 & Boeing 777	469



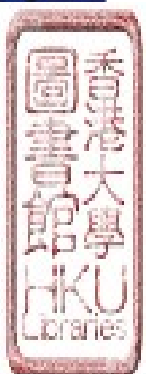
(b) Inflight Facilities

Back to 1936, there was just one screen on the flight, showing a central broadcasting video, shared by all the passengers at once. A same movie was kept looping for the whole journey due to only one film could be installed. Later in 1971, when Sony developed the 8mm video cassette, it was allowed to change movies during the flight and in 1979, the first electric headsets were introduced to replace the old style pneumatic ones (*Picture 1*), enhancing the listening quality. Until 1997, BA started installing the personal in-seat video screen (*Picture 2*), providing 12 channels for Boeing 747-200 and 18 channels for Boeing 747-400 by GMIS system but still under central broadcasting by inverting 12 or 18 different tapes at once.

Picture 1: An old pair of pneumatic earphone

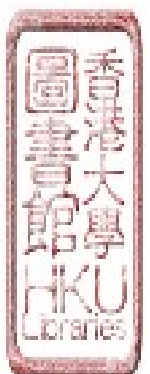


Picture 2: In-seat video screen

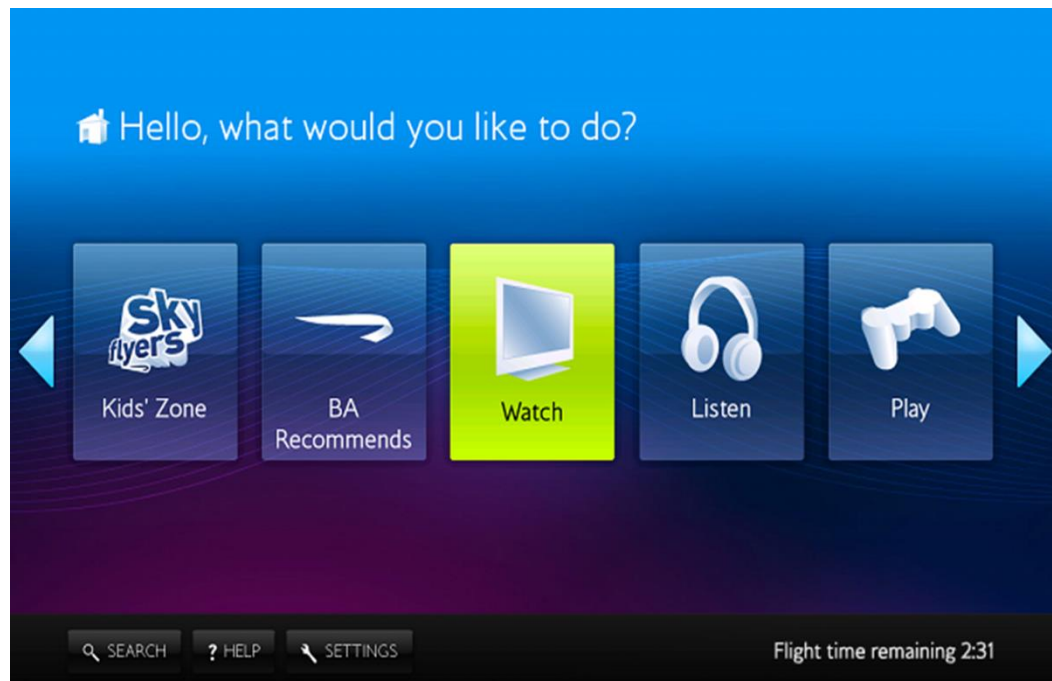


Starting from 2006, the broadcasting system was upgraded to Audio Visual On Demand (AVOD) by replacing the tape players with digital media servers, changing from 18 channels to over 200 choices dramatically. Then, focus was shifted to pursuit of better quality of the devices in terms of the size of the screen, sensitivity of the screen touch technology, volume of server storage and stability of the system and several upgrades were conducted. Rockwell Collins system (*Picture 3*) was installed in 2006, while Thales i5000 IFE system (*Picture 4*) was adopted in 2010, allowing larger screens and media servers for more choices and Panasonic eX3 is the most recent system with new screen touch technology, which is just being used in September 2015.

Picture 3: The Rockwell Collins system



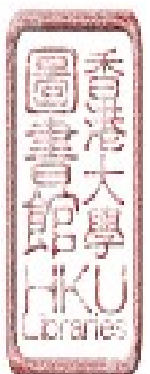
Picture 4: The THALES system



Apart from entertainment, meals were cooked on flight since heating equipment has not been invented and only stove was available, but once steam and dry oven were invented, pre-cooked meals can be re-heated on flight. Besides, the first fully flat bed in business class was launched in 2000, offering a more comfortable sleeping experience for the customers.

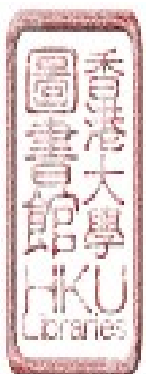
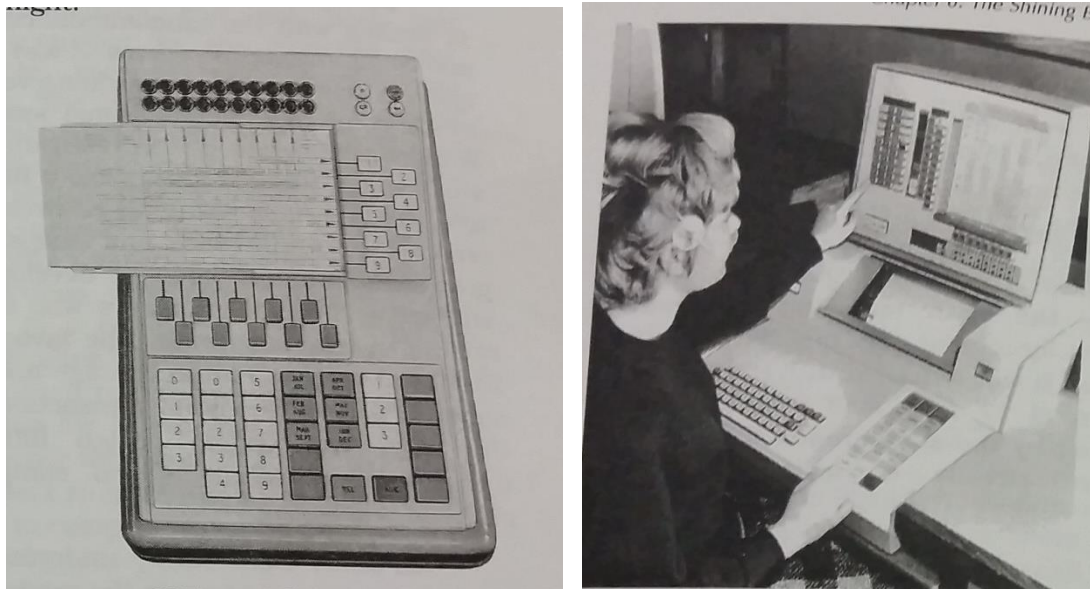
(c) *Ticketing and Reservation*

During 1940s -60s, flight tickets were ordered by a telephone booking system, which was reserved by phone and purchased face to face at the Airline Ticket Office by cheque. A paper ticket would be issued and had to be taken by the customer in person. A “sell and report system” was adopted internally by using the method of

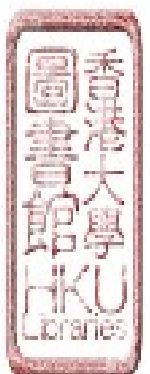


manual bookkeeping to update the seat inventories. However, due to high levels of cancellation and rebooking and also high degree of human errors, the system frequently resulted in low overall load. To eliminate the problem of low accuracy, an Electronic Reservation System (ERS) was introduced using together with the punch card system (*Picture 5*). The ERS was a centralized system that showing the seat inventories status by different colours of lights with green as available, yellow as limited stock and red as sold out. Staff had to update the sale record by input the keys set on the punch card machine to avoid human mistakes.

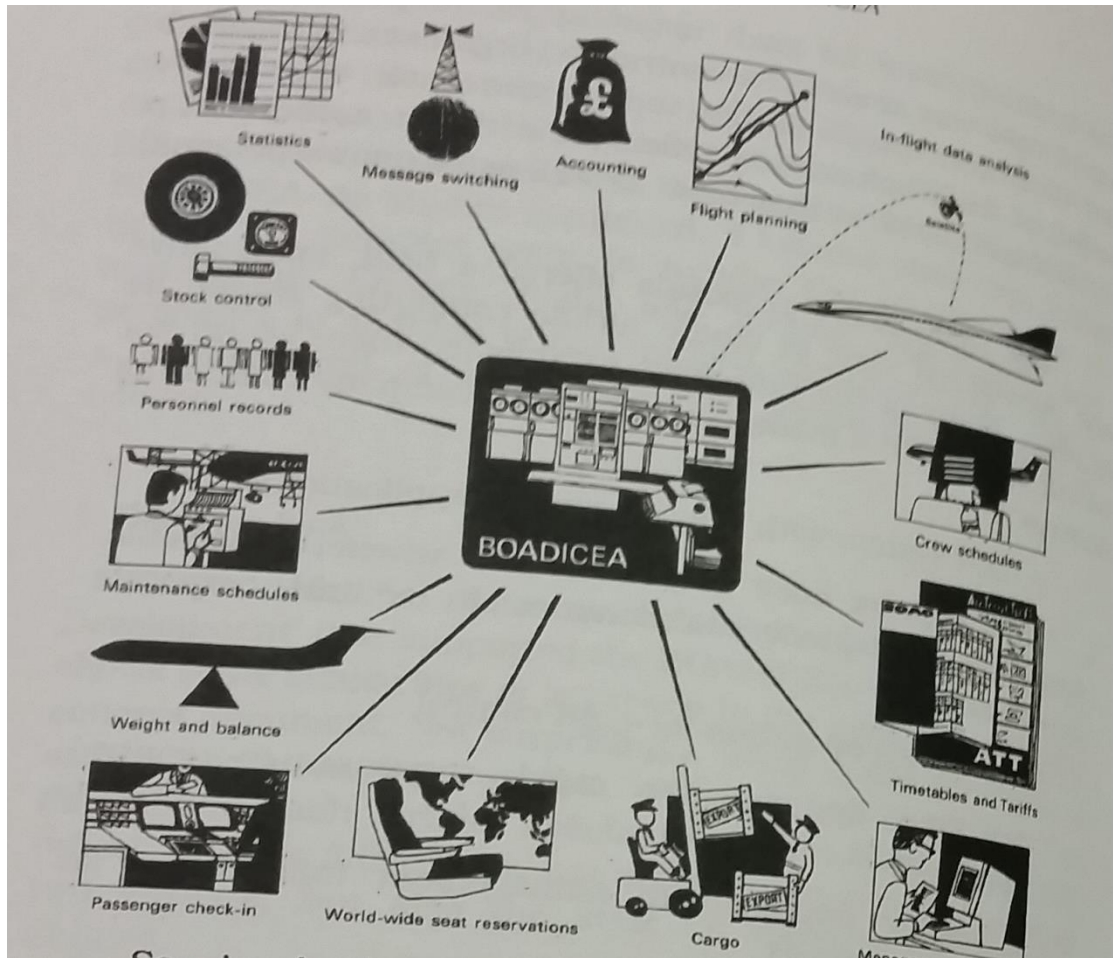
Picture 5: The ERS and Punched Card System



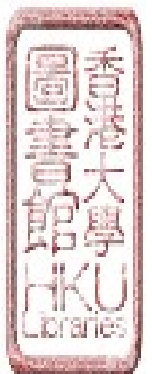
To support the ERS, the British Overseas Airways Digital Information Computers for Electronic Automation (BOADICEA) system was invented by IBM in 1965 (*Picture 6*). With BOADICEA, flight reservation become more comprehensive and ticketing staffs were then working at the centre as controllers rather than direct salesmen (*Picture 7*). Travel agencies took over the retail part of the ticketing process. With the emergence of computer, a Computer Reservation System (CRS), British Airways Booking System (BABS) was invented in 1975 and the efficiency was greatly enhanced. Air ticket was a paper booklet (*Picture 8*) but until 1997, when internet was available, BA started to introduce e-tickets. Starting from 2008, all international flight services are applied the use of e-tickets and booking could be made through internet at BA website by the customer. Recently, when booking record has been successfully made through internet, a physical form of ticket is no longer required. Passenger just need to bring along with the passport to the check-in counter, a boarding pass can be automatically issued.



Picture 6: The BOADICEA network



Picture 7: The BOADICEA operation centre

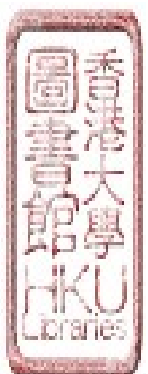


Picture 8: Paper ticket booklet



Check-in and boarding was done manually by calculating the ticket stubs to estimate the number of boarding passengers (Picture 9). Followed by the introduction of e-ticket, self-check-in machine were set up and advanced check-in by internet was allowed. Not only the ticket has become electronic, the boarding pass is now electronic too. Just showing the e-boarding pass by mobile phone for scanning is accepted for boarding nowadays.

Picture 9: Paper boarding pass

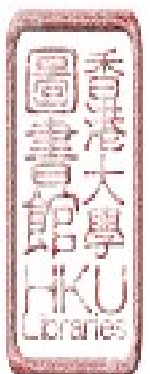


(d) Safety and Security¹

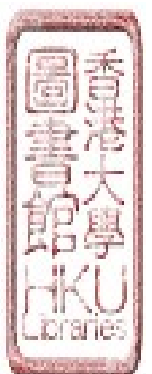
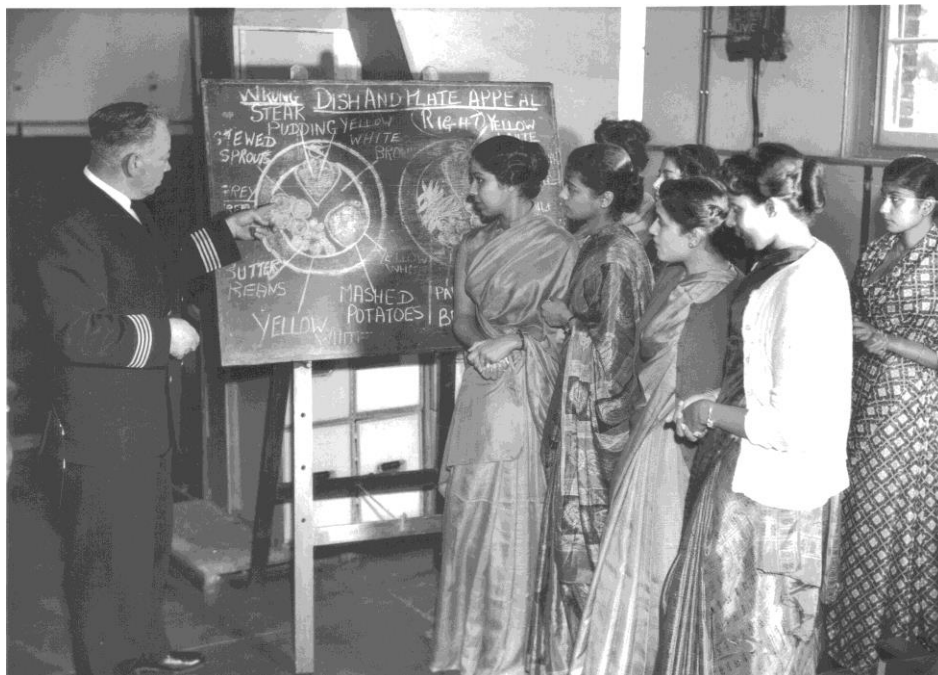
The ratio of crew to passengers was from 1:11 on the Comet IV and to now 1:22 on the Airbus 380. Nowadays, the minimum ratio requirement was set according to the total number of exits of an aircraft. Comparatively, a crew is having higher responsibility than before who needs to take care 22 passengers at once, undermining the safety on flight.

During 1950s, cabin crew training was stressed on customer service more than safety and security, within the 6 weeks training, only 1 week for safety and security but 5 weeks for service and cooking (*Picture 10*). The safety training materials looked raw with hand drawings, using British jokes to explain the contents in a humorous way (*Picture 11*). It seemed that safety was not treated seriously but making the materials to be easily digested looked more important in training. In 1970s, as the aircrafts become more advanced, the safety guidelines were more complicated. The training handbook was well-typed but still with hand drawings (*Picture 12*).

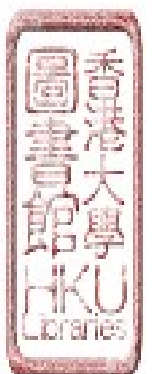
¹ Technology in a board sense is not only limited to machinery but also knowledge and skills, such as fishing, farming, pasturage, which are all technologies invented by the people in the old days to live for a better life. In this research, safety and security is more related to knowledge and skills rather than merely machinery.



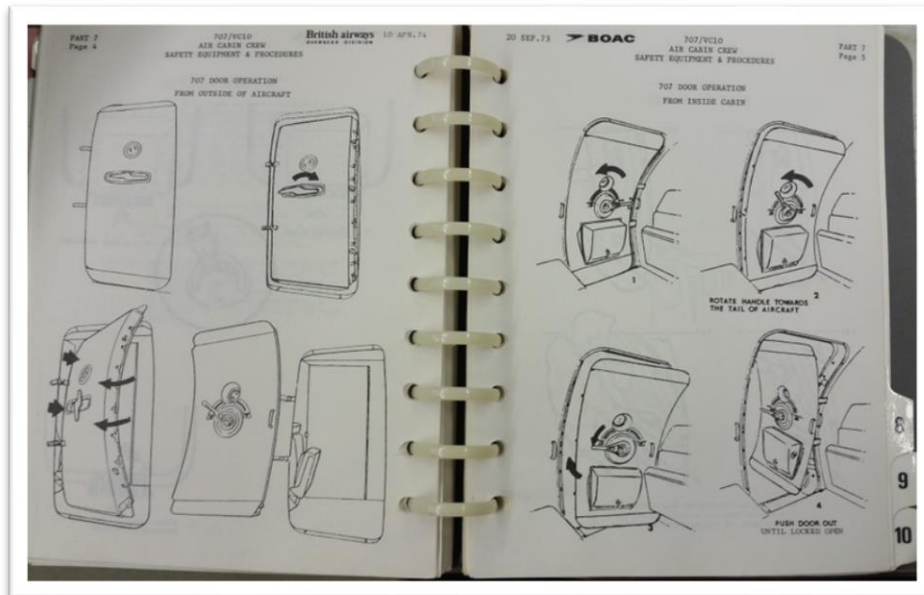
Picture 10: Cabin crew training in the old days



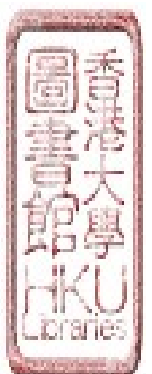
Picture 11: Safety training materials in 1950s



Picture 12: Safety training handbooks in 1970s



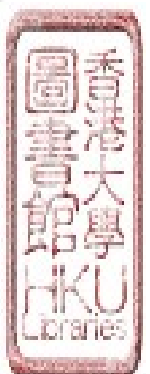
Nowadays, the cabin crew training is consists of 4 weeks on safety and security and 2 weeks for customer service. Obviously, safety and security is given more attention than the past. The training materials are in electronic format and are supposed to be reviewed online. Safety news will be kept updated in BA's sever and cabin crew should read before they start their inflight duty. The training equipments



are modern, with the computerized learning facilities, interactive classroom setting and the advanced flight, including Airbus 380 and Boeing 777 simulated learning and testing environment to reinforce the standard of safety training (*Picture 13*). Reassessment on safety and security knowledge will be taken every year to maintain the quality of cabin crew and retraining will be conducted simultaneously on updated and renewed training materials, especially how to deal with Terrorist.

Picture 13: The cabin crew training centre

Interactive classroom setting



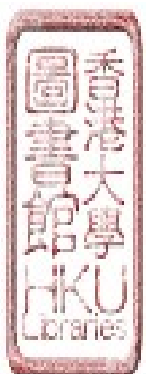
Safety training venue



Simulated flight



Apart from the safety training for handling inflight incidents, the flight plan and load sheet calculation by the ground staffs are also important to boarding safety. During the Kai Tak era, ground staffs were required to have training on learning the influence of wind speed to the flight performance. The weighted restriction was very tight to avoid flight accident caused by overload, by calculating male for 90 pounds and female for 70 pounds, to limit the number of passenger getting on board. The load

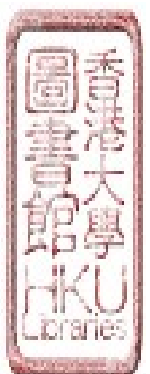


sheet calculation was conducted manually for each flight. A flight plan had to be prepared to show the consumption of fuels corresponding to the flying range by a slide rule. After moving to the Chek Lap Kok Airport, a centralized load control is adopted and the electronic load sheets are directly generated to the aircraft. The slide rule is eliminated since the flight plan is automatically induced by computer. Therefore, the efficiency of the calculation towards the boarding safety and fuel consumption is largely intensified.

Social Change

(a) Social Environment

In order to fit the landing requirement and the increase of cargo and passengers, Kai Tak airport has been improved many times and even a new Chek Lap Kok Airport is developed. Before 1941, since Kai Tak had no paved runways, the civil and military pilots needed to determine the takeoff and landing direction according to the wind and surrounding terrain. During the Japanese occupation, two newly crossed runways, “13-31” with 1,360 metres long and “07-25” with 1,442 metres long were constructed. In 1954, a new terminal was built and in 1956, a new north-south runway with 7,200 feet long was established by reclaiming 60 hectares of land in Kowloon Bay. In 1974, the new runway was extended to 3,392 metres to cope with the new

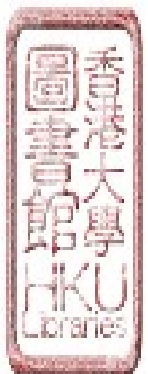
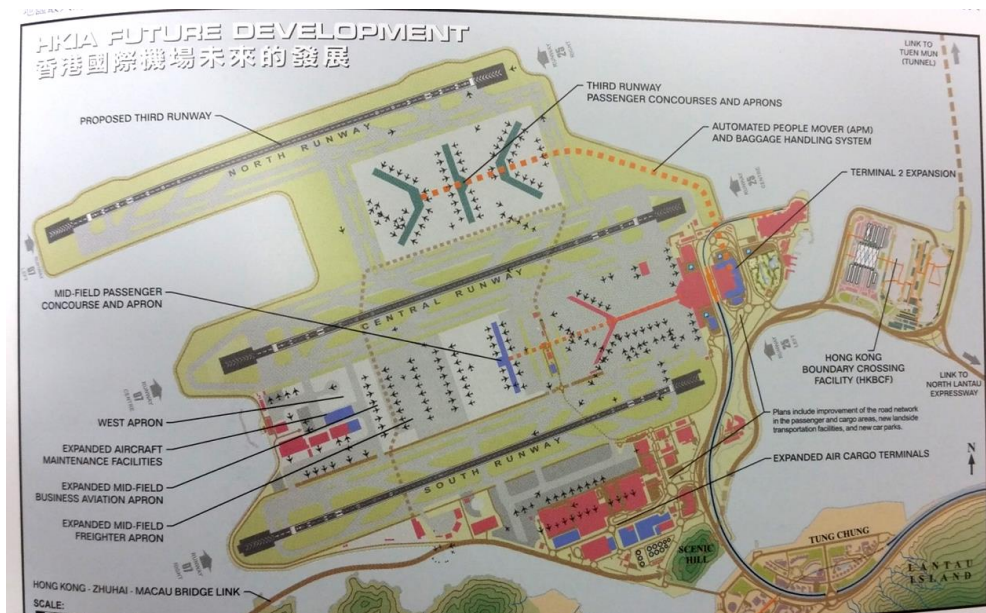


large jets and the aircraft parking area was expanded from keeping 10 planes to 323.

Two years later, the first air-cargo terminal was opened.

Up to 6 July 1998, Kai Tak Airport was closed and the next day, a new Hong Kong International Airport located at Chek Lap Kok was opened, covering an area of 1,255 hectares, which contains 2 runways, with 3,800 metres long, and 2 terminals. However, the expansion of airport cannot meet the cargo and passenger growth. A Midfield Concourse has partly opened up on 28 December last year and fully in use in 31 March this year, providing 19 more boarding gates to handle extra 1,000 million of passenger a year. Moreover, a “Hong Kong International Airport Master Plan 2030” is initiated and a third runway is estimated to be constructed by 2023 (Picture 14).

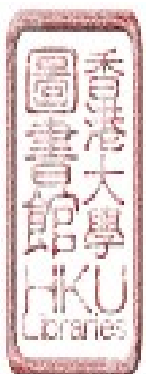
Picture 14: Floor plan of the Chek Lap Kok airport



(b) Social Practice and Value

Back to 1936, the regular aviation service was initially given higher priority to mail over passenger and the large volume of mail simply did not allow a huge number of passengers to be carried. However, one year later, there were already 3,685 passengers due to the great demand on passenger service. Nearly one million passengers a year and was recorded by 1965 and there were over four million passenger a year in 1976. The number of annual passenger keeps rising extensively, with 10 million in 1987, over 24 million in 1995, 48 million in 2007 and 69 million in 2015, showing that more people are affordable to travel and the travel frequency of each person have increased.

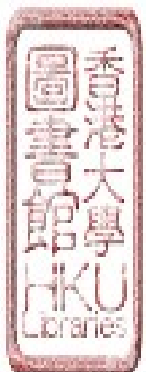
In the early days, travel experience was so precious that only the well-off and privileged class could afford the travel cost. There were more Westerners than Chinese as most of them were wealthier or they may be government officials or businessmen who were sent to Hong Kong. Usually, the purpose of taking a flight was more practical, such as going for work or study and only a small group of people would go for travel. Even for a group tour, especially for a short tour around 10 days, at least 60% of the customers were seeking for illegal immigration to Britain to earn a living during early 1970s to 80s. Those are usually the young and unmarried Chinese,



living in New Territories, who had some relatives moved to Britain already. Later in 1990, when Chinese were getting wealthy and the economic environment in Hong Kong got improved, people seeking for illegal immigration were gradually diminished. More factory owners, Chinese businessmen and professionals would go for travel starting from 1980s.

“During 1970 – 80s, there was a travel agent called Eupoair which particularly form group tour for illegal immigrant and reserved 20 -30 seats for each flight at BA.” – General Manager of EGL

Travelling by plane was regarded as a superior enjoyment and a luxurious experience. Not only the passenger would treat it seriously, who would dress up classically, wearing suit with tie for taking a plane, but also the meals were served decently with starter, main course, cheese, dessert and wine all provided. For people who went for study or work, they did not come back so frequent and normally returned after several years. It was quite often that all family members and relatives would send someone off and pick someone up at the airport. At that time, people were more emotional and some of them might even cry when they were going for departure or seeing someone off.

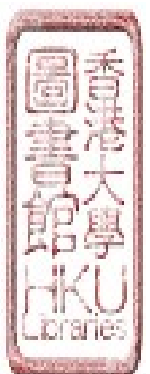


“There was a long corridor at the departure hall of Kai Tak Airport and usually people would keep saying bye until they couldn’t see each other. It was quite touching and I still remember for a scene that a mum holding a young flyer’s hand and getting loosen bit by bit. Both faces were full of tears.” – Cabin Crew Manager

After 2000, travel becomes easily affordable for most of the people and people can travel frequently. Taking a plane is no long treated as a pleasure but just a common practice and merely transportation for sending someone to his destination. Nowadays, leisure travel is more common and people who go for study or work will also come back frequently. Hence, not often to see people come for sending someone or picking someone up. The emotional scene has gone. Even a young flyer is now quite used to travel aboard and feels comfortable to leave their parents. Passengers are getting younger and younger, from a majority of middle age in 1930s – 80s to a substantial group of twenties. People went travel with their family and tended to join tour in the past, while individual travel is more preferred by young couples and students nowadays due to sufficient information available on internet.

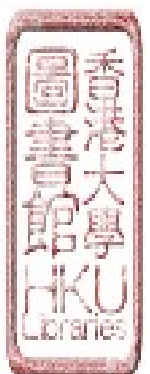
(c) Socio-economic Development

Flight service was just operated twice a week in 1936 and increased to 4 flights per week in 1959 and 10 weekly services in 1970. Starting from 1980, BA



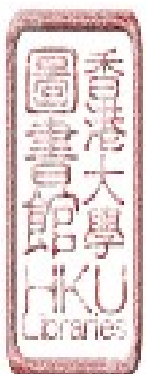
operated daily service and starts its twice daily service from 2000. In 2005, there were three daily services but by 2013, it turned back to twice service a day. The ticket fare was set to £175 (around HKD\$2,000) one way in 1936. At that time, since only wealthy class could afford the travel expenses, there was only one class, and first class service was provided. The ticket fare kept rising to £230 during 1940s to early 50s. In late 1950s, more seats were available owing to the invention of jet plane, the cabin started to divide into first class and economic class with two separated pricing at £305 for first class and £213 for economic class. In 1970s, the fare climbed to £744 for first class and £435 (around HKD\$5,000) for economic class.

Up to 1980s, business class was established which provided one more choice for the frequent flyers who could afford slightly more to enjoy a better service. It brought a more differentiate pricing from first class to other class. Starting from 2000s, one more class was added as premium economy letting more options for customers and the normal pricings were set to £8,179 for first class, £5,091 for business class, £2,206 for premium economy and £1,488 for economic class. However, now during the promotion period, ticket for economy can be purchased at HKD\$5,000 as well which just similar to the price at 1970s, meaning that the ticket fare is getting cheaper. The first class and business class become less distinctive after the invention



of flat-bed, so people who insist to travel in first class may usually contain certain social status.

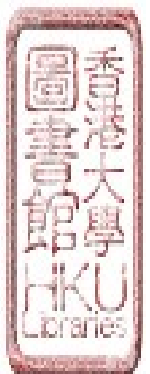
In the past, peak seasons were obvious, usually during public holidays or the opening and closing of a semester. Nowadays, it is hard to notify a peak season and passengers are normally distributed throughout the whole year. Since the pricing for traditional peak season is still high, people tend to go travel during the promotion period. Travel agencies have to readjust their market model to develop package tours rather than forming group tours to meet the changing travel behavior of individual travel. As many online travel agencies occur, the traditional travel agencies are forced to develop it online platform in order to keep its competitiveness.



Interaction between Aviation Development and Society

By reviewing the findings from both of the technological change and social change, it is clear to show that both aviation technology and society are mediating each evolution and they are failed to be singled out from each other during the evolution process. For example, for technological side, aircraft is getting advanced due to increasing demand for aviation service; inflight facilities are enhanced to maintain its competitiveness; ticketing and reservation system turns to be electronic to minimize human errors; safety and security training is stressed due to the sensitive social environment. For social side, airport keeps changing to meet the minimum landing requirement of the newly invented aircrafts; travel frequency is increased by the higher speed of aircrafts; ticket price is getting cheaper because of the raise in aircraft capacity. When both of them are mutually influencing each other, definitely, both *TD* and *SD* cannot explain the changing tendencies of both sides from just a linear flow of deterministic approach.

Only *ANT* can view technological factors and the social factors equally in explaining a new happening. When technological change and social change are putting together, some new implications can be driven by their interactions. Those new implications can be regarded as new networks formed by a group of actants. The

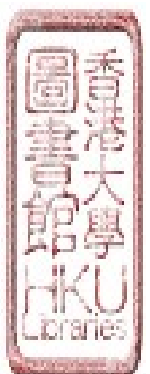


corresponding actants will be identified under each new implications discussed as below -

(a) Urban Globalization

Airports in the world are getting similar and being standardized. As most of the informants said the Chek Lap Kok Airport looks no difference with the airports in London, Frankfurt, Taipei or Singapore. The urban globalization was brought to happen by 4 main actants: the advanced aircrafts, socio-economic development, the changing social practice and social environment (*Figure 2*). The basic landing requirements across the world would be the same for at least 3,800 metres as the Airbus 380 required, as all airports are serving the same kind of aircrafts. There should be no exception for any places. To cope with the more frequent operation of aviation services due to huge increase in number of passenger and cargo, a spacious area and more terminals and boarding gates are needed. Airports in the world are established in the rural area for easy further expansion.

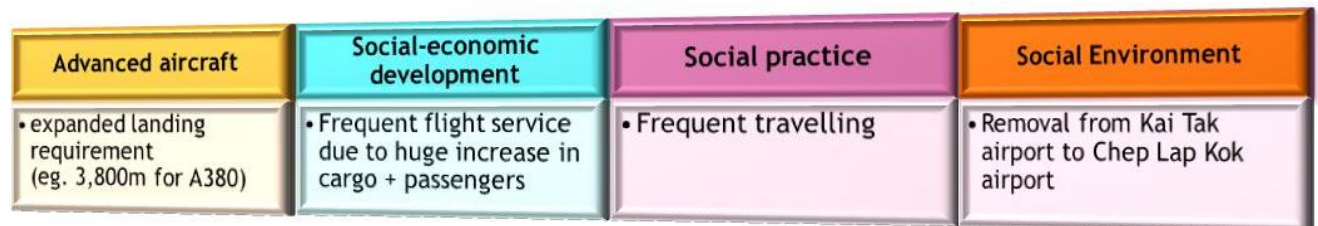
Hong Kong, as an international hub, even taking further improvement, the Kai Tak Airport was still not sufficient to accommodate the changing environment brought by the advanced aircraft and the dramatic raise in aviation service. The



removal to Chek Lap Kok was inevitable. In order to catch up with the global trend, Kai Tak Airport located at city centre, having very distinctive characteristics, which was classified as one of the ten dangerous airports in the world, was forced to close. Following the global trend, the regional features always served as a tradeoff for the sake of urban development and the unique Kai Tak Airport can only become a collective memory among Hong Kong people.

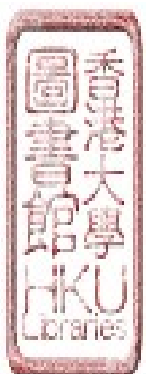
“I could smell ‘Hong Kong’ every time when I was approaching Kai Tak. It was a special polluted sea smell only appeared in the Kai Tak Airport. Every time, when I got that smell, I knew that I was near to my hometown” – A loyal BA customer

Figure 2: Actants regarding urban globalization



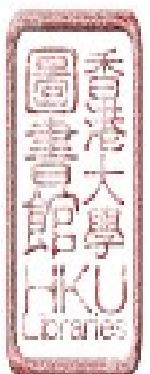
(b) Higher Autonomy in Travel

Higher autonomy in travel is offered by the transparent information regarding the travel arrangement, a more individualist transaction in ticket buying, extensive choices for inflight entertainment and class of services. Actants can be



identified as the electronic ticketing and reservation system, digitalized inflight facilities, the changing social practice of individual travel, and socio-economic development of online platform of travel agencies and package tour (*Figure 3*). In the old days, customer knew nothing during the ticket buying process and information was given by the staff of airline or travel agency. However, with the emergence of internet, information is available on the airline or travel agency website. Now, customer can buy ticket on their own without relying on anybody, who has transformed from a passive buyer to an active agent, in charge of the whole purchasing process.

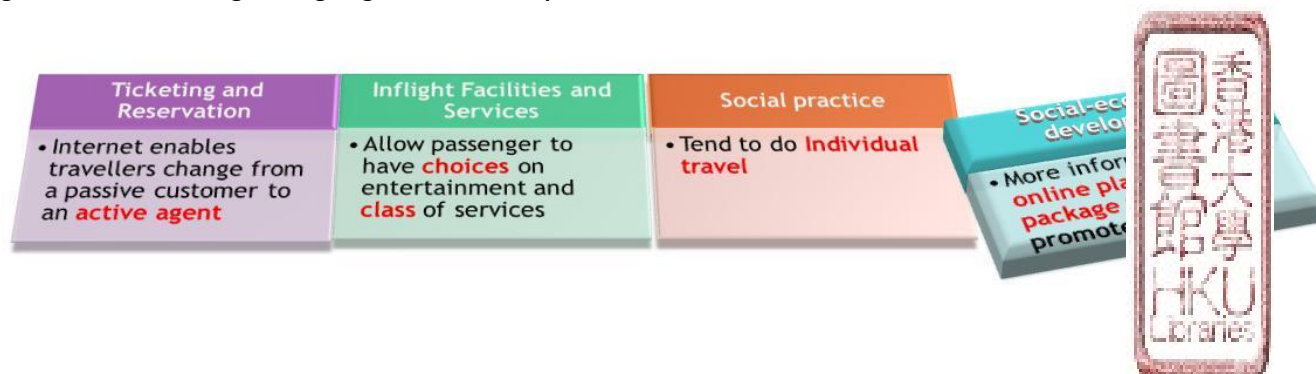
In the old days, only one shared screen with a central broadcasting movie, no choice is provided for customer. Although newspapers and playing cards would be given, those are restricted to what the airline could provide to a customer and a customer still remained as a passive receiver. When more channels were developed, more movies can be watched by switching across different channels. Choices started to appear but still limited to the selected movies by BA and definitely, English movies. Until the digital sever appeared, passengers are not given only plenty choices of movies but having also their own freedom to start watching a movie at anytime, or pause, resume, stop, fast forward, rewind a movie as they like. Now, passengers no



longer ask for entertainment from the airline, they may bring along with their laptops, iPads or even a mobile with the movies downloaded according their own preference for self-entertaining. The only thing that airline needs to provide is a plug for recharging the devices which becomes an essential inflight facility than other any other forms of entertainment.

In the early days, travel is only limited to the privileged few since only first class ticket was available, while nowadays, choice of first, business, premium economy and economy classes are provided. Passengers now can decide and choose the class of service according to their needs and affordability. Individual travel allows more flexibility than group tour. Travellers can plan whatever itinerary they want. The package tours offered by travel agencies actually further encourage this changing travel pattern. True autonomy in a sense that people are in control of themselves and when all those actants come together, people are getting closer to this aim.

Figure 3: Actants regarding higher autonomy in travel

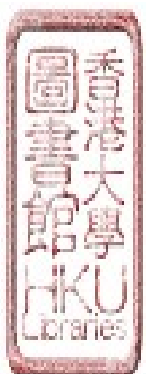


(c) *Increase in Social Connection but Decrease in Human Attachment*

Human relationship are strengthened in term of quantity but not quality.

The advanced aircraft, the social practice of frequent travel, the aviation service arrangement and changing environment of the airport are regarded as the main actants.

(Figure 4) Increasing speed, flying range and capacity of the aircraft has shortened the time needed in travelling and enable to carry more people at once, so frequent flight services can be operated and the ticket fare is gradually reduced by the increase of supply. Frequent flying really enhances the physical connection between people stationed at two places but meeting each other tends to become less precious than before. People can seldom have strong emotion when seeing each other since it becomes a usual practice. In contrast, when taking a plane was a rare experience, people would come to the airport to send someone aboard or greet someone back with tears and the leaving person or the returning person also had strong feeling towards departure and arrival. At that time, although physical connection was hard and less frequent, human attachment was deep and their relationship was tight. Ultimately, frequent flying may just increase the quantity of human connection but undermine the quality of human relationship.

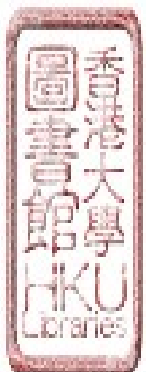


Besides, the Kai Tak airport was small and dense, so everything was located more concentrated. The environment setting helped generate stronger human attachment to the staffs. The Kai Tak airport had curfew and would close at 12 midnight. With a stable working schedule, staffs would easily get together to have drinks at Regal² after work, forming a strong community and close bonding between all staffs in aviation industry. Office doors were open all the time and staffs might easily see the colleagues working for another department or even another airline. They all knew each other and would willing to provide assistance based on their close personal relationship.

“The Kai Tak Airport closed at 12 mid-night every day and we usually went to have a drinks with the colleagues after work. It was important to us since we could release our stress through having conversation. We build a strong community network and it was easy to call for help from other airlines.” – The Airport Manager

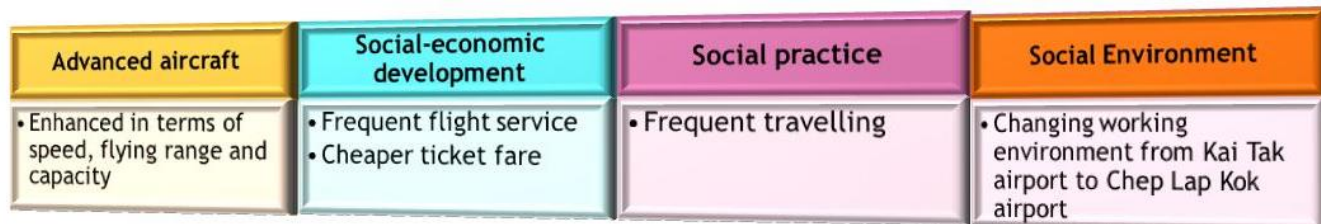
Unlike the Kai Tak airport, the Chek Lap Kok airport is big and spacious, so everything is scattered at the airport. As the airport now works for 24 hours, staffs are required to work on shift and they are difficult to gather for any after work activity. All offices are isolated and the doors are all close. Nowadays, with the expanded aviation industry, more staffs are employed. A staff may meet many other colleagues

² The name of a hotel nearby



at the airport every day but everyone is alienated, without high association and only concentrated on their own task. Assistance is hard to be sought due to the weak human relationship.

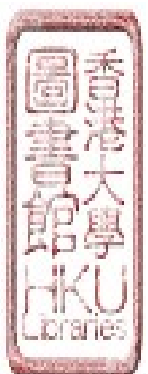
Figure 4: Actants regarding social connect and human attachment



(d) Elimination of Labour Intensive Exercises

Machinery has taken over lots of manual tasks in the old days, including the ticketing and reservation, the flight safety and guiding a tour and actants can be identified from the electronic ticketing and reservation system, electronically generated load sheet and computerized navigation, the changing travel pattern to individual travel and the popularity on package tour (Figure 5). During the period from 1960 – 90s, travel agencies had to take series of manual tasks to issue a single ticket.³ Now, only a few button, everyone can purchase a ticket online without the

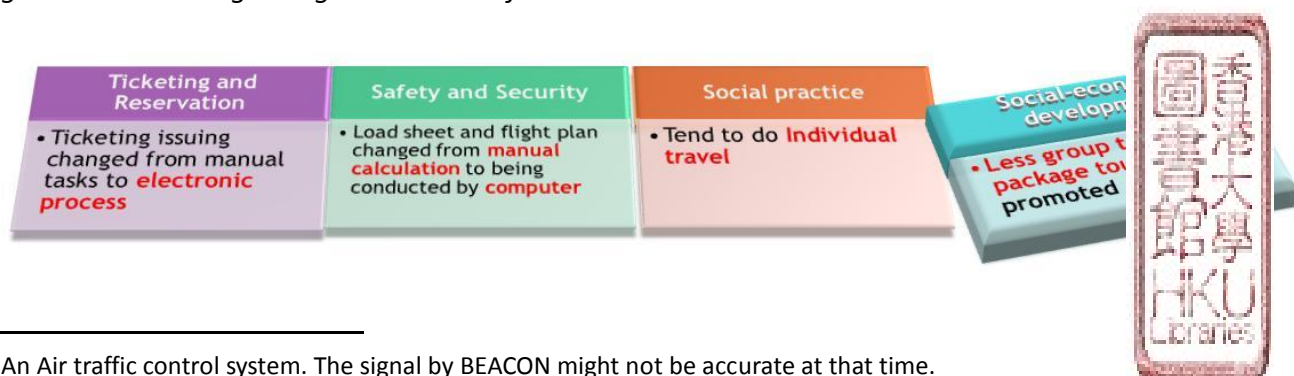
³ For each booking, the agents had to call up the airlines to check the availability. A booking card should be made as a record for the ticketing staff to follow up with the customer. Travel agencies kept a number of paper ticket stocks with sequence assigned. Ticketing staff had to enter certain code, programme and formula into a machine in order to print out the customers' details on the ticket booklet. Each ticket booklet contained 4 sectors coupons and if it was a round trip ticket, meaning that only 2 sectors would be used. The extra coupons needed to be removed by staff manually as void coupons so that money would not be over charged by airline as every ticket valued a certain amount.



help from any agent. The complicated ticketing issuing process can be easily done by computer, replacing the intensive human efforts.

The load sheet and flight plan were prepared by the ground staff through manual calculation. One staff was responsible for one load sheet or flight plan per flight, which required lots of labour to complete the task. There were 4 operators on flight, including the captain, first officer, flight engineer and flight navigator. The flight navigator helped to double check the signal sent out by the BEACON⁴, to reconfirm the exact location of a flight and direct the air traffic. Now, everything is executed by advanced computer system, replacing lots of manpower. A large amount of ground staffs were laid off and the position of flight navigator does not exist anymore. Similar to the tour guide, people tend to travel by themselves, and consequently, less group tour can be formed and more package tours are promoted. The excess supply of tour guides is eliminated.

Figure 5: Actants regarding elimination of labour intensive exercises

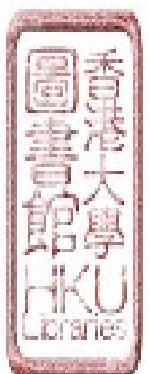


⁴ An Air traffic control system. The signal by BEACON might not be accurate at that time.

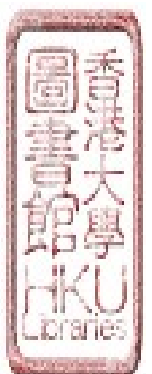
5. Conclusion

The relationship between aviation development and society is interconnected. Taking either one side of *TD* or *SD* is insufficient to fully illustrate the complexity between technology and society and provide a comprehensive evaluation to their interaction. Whether ignoring the social factors or the technological parts, both of them are intrinsically problematic subject to its oversimplification in a cause and effect association.

ANT is fully applicable to the study of interaction between the technological change and social change and can successfully draw new implications by the different coordination of actacts, illustrating a relational transformation between technological sphere and social sphere. *ANT* can successfully show that every single factor has its own contribution to the creation of a corresponding new phenomenon. However, *ANT* somehow is criticized for its explanatory power as it just digs out the related actants without explaining how the interaction works in between. Indeed, it allows free association for its user to form casual relations by different actants. This analysis is conducted along with the *ANT*'s theme work and incorporated with the collected data for explanation.



Due to the small scale of this research project, the evaluation is more concentrated on society rather than aviation development, but some initial findings are gathered. Regarding the expectation on the development of aircrafts, people usually concern about its speed, wifi service, or being more environmental friendly. There may be a polarization in aviation industry since more people tend to minimize their spending on taking a plane. Under this tendency, the aircraft development may not always move forward but may go backward as a low cost carrier. Further research can be conducted to explore these mentioned areas.



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