

Commercial Aviation Innovation: Evolution, Support Factors, Problems and Obstacles

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Abstract

The year 2014 marked the 100th anniversary of commercial aviation business. All these years, the aviation industry has continually developed its innovation process in many areas, especially in terms of advanced aviation technology and efficient passenger services. The goal of aviation industry is to pursue a thriving business with the main task of providing transportation services by using aircrafts. The income of the business primarily comes from air fares, cargo, mail, and air freight. In this manner, commercial aviation innovation means changes of concepts, methods and forms of business operation of commercial aviation due to changing aviation atmosphere. At present, there are several kinds of aviation innovation that comprise aircraft technology innovation, product innovation, service innovation and management innovation. In Thailand, the new commercial aviation innovation has been adopted and applied to fit in with the local environment. The factors that facilitate the commercial aviation innovation in Thailand are high competition in aviation industry, promotion of more freedom of airspace, needs of passengers, technology development, involvement of the government sector, and inclusion of environmental conservation awareness. However, the obstacles of commercial aviation innovation in Thailand come from volatile political situation, personnel shortage in aviation business, _____

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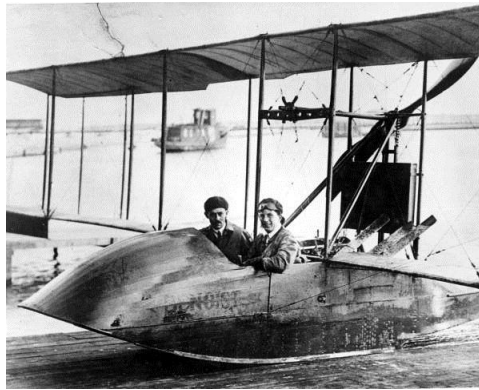
passenger's behavior as well as regional and global economic situations. The development of aviation innovations is a very important strategy to compete in the aviation industry at present and in the future.

ปีพุทธศักราช 2557 เป็นการครบรอบ 100 ปี ของเที่ยวบินเพื่อการพาณิชย์ ตลอดระยะเวลา 100 ปี ธุรกิจการบินพาณิชย์มีการพัฒนานวัตกรรมด้านต่างๆ อย่างต่อเนื่อง นวัตกรรมใหม่ๆ นี้ มีขึ้นอย่างมากทางด้านเทคโนโลยีทางการบิน (Aviation Technology) และการบริการผู้โดยสาร (Passenger Service) ลักษณะของการบินพาณิชย์ (Commercial Aviation) เป็นการทำการบินในเชิงธุรกิจ ภารกิจหลักคือการบริการการขนส่งโดยใช้อากาศยานเป็นยานพาหนะ รายได้หลักมาจากค่าโดยสาร ค่าระวางบรรทุกสำหรับการขนส่งสินค้าพัสดุภัณฑ์ และไปรษณีย์ภัณฑ์ (Cargo, Mail and Freight) นวัตกรรมการบินพาณิชย์ หมายถึง แนวคิด วิธีการ และรูปแบบในการดำเนินกิจการทางการบินพาณิชย์ด้านต่างๆ ที่มีลักษณะการดำเนินงานเปลี่ยนแปลงไปจากเดิม สืบเนื่องมาจากสภาพแวดล้อมด้านต่างๆ ที่มีการเปลี่ยนแปลงไป ปัจจุบันนวัตกรรมการบินพาณิชย์ที่ปรากฏเป็นรูปธรรมอย่างชัดเจน ตัวอย่างเช่น นวัตกรรมด้านเทคโนโลยีของอากาศยาน นวัตกรรมด้านผลิตภัณฑ์บริการ นวัตกรรมด้านกระบวนการบริการ และนวัตกรรมด้านการบริหารจัดการ สำหรับในประเทศไทย นวัตกรรมการบินพาณิชย์แบบใหม่มีการนำมาประยุกต์ใช้ให้เหมาะสมกับสภาพแวดล้อมของประเทศ เมื่อพิจารณาถึงปัจจัยที่สนับสนุนการสร้างนวัตกรรมการบินพาณิชย์ในประเทศไทย ประกอบด้วย การแข่งขันในภาคอุตสาหกรรมสายการบิน เสรีภาพทางการบิน ความต้องการของผู้ใช้บริการ ความก้าวหน้าด้านเทคโนโลยี การสนับสนุนจากภาครัฐ รวมถึงการตระหนักถึงการอนุรักษ์สิ่งแวดล้อม แต่สิ่งที่เป็นปัญหาและอุปสรรคในการสร้างนวัตกรรมการบินพาณิชย์ในประเทศไทยมีสาเหตุมาจาก สถานการณ์ทางการเมือง การขาดแคลนบุคลากรด้านการบิน พฤติกรรมของผู้ใช้บริการ รวมถึงสถานการณ์ด้านเศรษฐกิจในภูมิภาคและเศรษฐกิจโลก การพัฒนานวัตกรรมการบินพาณิชย์นั้นเป็นกลยุทธ์ที่สำคัญอย่างยิ่งต่อการแข่งขันในอุตสาหกรรมการบินทั้งในปัจจุบันและในอนาคต

1. Introduction

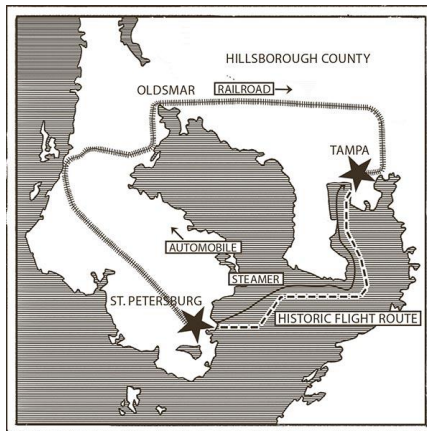
Ten years after the Wright brothers succeeded in inventing and flying a biplane, the commercial flight was first appeared, and it was the 100th anniversary of the commercial

flight schedule in 2014. On January 1, 1914 in Florida, U.S.A., there was a passenger who paid for the air ticket from St. Petersburg to Tampa by taking the Benoist XIV. The aircraft had two seats available for one pilot (Tony Jannus) and one passenger as shown in picture 1 and 2. Therefore, the commercial aviation began since then.



Picture 1: The Benoist XIV, the first commercial aircraft

Source:http://de.wikipedia.org/wiki/Benoist_XIV



Picture 2: The flight route from St. Petersburg to Tampa

Source: <http://airlinesweek.com> .

In the 100-year period of commercial aviation, the evolutionary innovations constantly appeared in many aspects, such as aviation technology and passenger service. In these years, the commercial aviation has been through many important events. Each of

them might be the beginning, the change and the end of some commercial aviation stories. This article will explain the evolution of commercial aviation innovation beginning with the evolution in the 100 year-period, the commercial aviation innovation in Thailand and support factors for the creation of commercial aviation innovation including problems and obstacles in the creation of commercial aviation innovation in Thailand.

2. Commercial Aviation

Commercial aviation is an aviation in the form of business which operated by airlines. The business is established for generating the profit from transportation service by using aircrafts. The revenue comes from airfare, cargo, mail and freight charges.

Commercial aviation has two forms of services:

1. **Scheduled services** means the airlines have got permission to fly on the determined regular routes at the specified dates and times;

2. **Non-scheduled services** means the airlines that do not fly on those routes at those dates and times regularly, but have permission to do so under the request from time to time, such as charter service.

3. Commercial aviation innovation

When mentioning the term "innovation", some people may not understand its meaning. Some may think that innovation means to create new things or to improve efficiency of existing things. In this regard, some important people and organizations defined the word "innovation" as follows.

Jack Andrew Morton (1971) mentioned in the book named "Organizing for Innovation" that innovation means renewal without destroying old things, but improving and developing the potential of the original ones.

The National Innovation Agency(n.d.) explained the term “innovation” as the new thing that obtained from knowledge and creativity which is useful to the economy and society.

In conclusion, commercial aviation innovation means the concepts, methods and form of operating the commercial aviation business that differ from the original ones due to environmental change, such as market condition in the aviation industry,the customers' requirement, global environment and technology advancement. The concrete examples of commercial aviation innovation arethe innovations of aircraft technology, service product, service process and operation management, for example, the appearance oflow cost airlines, the sale of tickets through an electronic process, the aviation alliance assembly, biofuel engine aircraft technology,the development of aircraft structure for the safety and convenience of customers, entertainment services on an aircraftincluding an organization structure of business unit.

From the appearance of the commercial aviation innovations, the author has classified their types into 4 categories as follows:

3.1 Aircraft Technology Innovation is an improvement of aircraft for better efficiency in passengers transportation, for example, improving an airplane's structure to absorb and withstand the friction in the air, choosing light materials to be a body of anairplane to reduce the fuel use, or improving transportation efficiency to be able to fly further and carry more loads as well asdeveloping the biofuel aircraft to reduce the air pollution.

3.2 Product Innovation is the development of product services in aviation business from cabin, class of services, seating configuration, entertainment in flight, food and drinks including the sale of airlines souvenirs. The examples of product innovation are as follows:

- Low cost airlines is one of the product innovation that differs from the traditional airlines;
- Aircraft painting makes the Nok Air's aircraft similar to a bird as shown in picture 3;
- Singapore Airlines provided the suites class service as shown in picture 4;
- The Thai Airway International Public Company Limited introduced the new class of service called premium economy class by adding some extra services that differ from economy class, which is suitable for passenger who wants to travel in economy class but requires more comfort during the flight;
- Cabin layout and cabin interior design make the passengers relax and feel comfortable during the flight;
- Replacing the traditional demonstration of safety device by a cabin crew with the demonstration by videos;
- Food services on flights that relates to the characteristics of the flight destination;
- The WIFI services and the improvement of entertainment media for passengers to be able to choose on their own choices as shown in picture 5.



Picture 3: The outside aspect of Nok Air's aircraft

Source: <http://www.nokair.com>



Picture 4: The suites class service of Singapore Airlines

Source:<http://www.airbus.com>



Picture 5: The personal entertainment media

Source: <http://www.thaiairways.com>

3.3 Service Procedure Innovation is an improvement of service procedures including access methods to safety services and customers' comfort, for example, the airlines website development for public relation purpose, air ticket sale, online check-in, food order services on board, seat selection and awards redemption from mileage. Moreover, the various air fare payment methods including payment by credit card or payment at the convenience store as well as E-ticket are the examples of service procedure innovation.

3.4 Management Innovation is the new concept of encouraging all airlines to efficiently compete with the others. The management also includes the specification of policy, vision, mission, organizational structure, human resource management, marketing and selling, for example, applying business unit in the organization management or generating revenues from other services besides ancillary revenue of low-cost airlines, such as food and drinks service on board, seat selection fee and excess baggage charge. For human resource management aspect, there have been changes in the employment conditions from the retirement condition at 60 years to short-term employment and outsourcing instead of hiring employees directly. This includes the creation of new forms of promotion to suit with customers' lifestyle, being ally with other businesses or organizations for customers' benefits, such as being ally with banks, cinemas, hotels and restaurants.

4. Commercial Aviation Innovation in the 100-year period

The revolution of commercial aviation in the 100-year period has been continuously developed. The author separates the 100-year revolution into 3 periods as follows:

4.1 The period of creating a form of commercial aviation (A.D. 1914 - A.D.1945) was the beginning period of commercial aviation. The revolution in this period focused on creating a form of air transportation from the ticket sale, freight process, routing-flight, station and airport construction including specifying regulations for the air transportation. However, during the Second World War, the commercial aviation had to stop their operations because the planes were used for military purposes. In this period, there were some important events of commercial aviation that can be concluded as follows:

A.D.	Important events
1914	The pilot, Tony Jannus, flew from St. Petersburg to Tampa to transport a passenger.
1919	KLM Airlines was first operated. The flight route was from London, England to Amsterdam, Netherlands. KLM Airlines is also the oldest airlines that still in operation at present.
1922	Aero Marine Airways of which the headquarters located in Cleveland, Ohio was established as the first airlines ticketing agency company.
1926	The Congress of the U.S.A. voted about an airfreight by giving the Minister of Trade the power of specifying flight routes, developing the air transportation system and issuing the pilot license and the certificate of airworthiness of aircraft. Lufthansa Airlines started its operation of air transportation in Germany.
1929	The Warsaw Convention, the first international agreement, was formed to set the regulations of air transportation of passengers, cargo and mail between countries. Pan American Airways had the inaugural flight from Miami to San Juan.
1930	Boeing Air Transport Airlines (the United Airlines at present) hired female flight attendants for the first time.
1936	Pan American Airways provided services in the route across the Pacific Ocean, which flew from San Francisco to Manila, for the first time.
1940	The commercial aviation had stopped their operations during the war; therefore, the aircrafts were used for military missions.
1944	There was a signing in the Chicago Convention on International Civil Aviation to set fundamental rules and regulations of international aviation with equal opportunities.
1945	The International Air Transport Association (IATA) was established and aimed to promote safety of air transportation and complied with the economics.

4.2 The golden age of commercial aviation (A.D.1946- A.D.2000) was after the end of the Second World War.Commercial aviation grew rapidly due to the development of science and aviation technology during the Second World War. The aircrafts were

developed and had better transportation capability. Moreover, many new airlines were established all over regions, so the airlines had to create its uniqueness concerning safety, comfort, entertainment in flight and service process to be able to compete with the others. In this period, there were some important events of commercial aviation that can be concluded as follows:

A.D.	Important events
1952	The DH106 Comet, manufactured by de Havilland company, was the first jet aircraft that used in commercial aviation.
1959	The jet way/jet bridge/air bridge was used in customer service for the first time to help passengers in getting on and off an airplane conveniently.
1961	Motion pictures were used by TWA Airlines to entertain passengers for the first time.
1970	Boeing 747, the wide-body aircraft, was used by Pan Am Airlines to transport passengers for the first time.
1971	Southwest Airlines, the low cost airlines, was first set up in the U.S.A.
1972	The central organization was established to facilitate the sale of tickets by using the Billing Settlement Plan system (BSP).
1976	The supersonic aircraft was used in commercial aviation for the first time. The flight routes were from London to Bahrain and from Paris, France to Rio de Janeiro, Brazil. It helped the airlines decrease flight time.
1978	The U.S.A. enacted the Airline Deregulation Act to control the air fare, flight routes and the establishment of new airlines to create free competition which would be great benefits for customers.
1979	Texas International Airlines adopted the Frequent-Flyer Program (FFP) to persuade customers to travel with this airlines.
1994	Electronic Ticket or E-Ticket was first appeared in commercial aviation, but this was adopted only by some airlines.
1995	Twin engine aircraft, developed by Boeing Company, was first appeared.
1997	The aviation alliance named Star Alliance was formed by five major airlines companies from three continents to support their commercial operations.

1998	Rules or regulations to prohibit inflight smoking were first appeared.
1999	Each airlines developed its own website to provide the checking-in service and issuing boarding pass.

4.3 The period of cooperation in aviation industry (A.D. 2000 - present) has started after the 9/11 sabotage. The incident was the worst terrorist attack ever happened to commercial aviation. In addition, the climate change, global warming and the other accidents that happened to commercial aviation have resulted in an international cooperation in many aspects starting from setting rules and regulations for air transportation, promoting global warming awareness, forming new agency to take care of safety issues of air transportation, developing aviation technology to prevent possible danger in the future. In this period, there were some important events of commercial aviation that can be concluded as follows:

A.D.	Important events
2001	Transportation Security Administration (TSA) was established due to the 9/11 incident, mainly aimed to take care of safety issues of air transportation.
2007	Airbus Company developed the airplane series A380 to the commercial aviation market. The plane could transport up to 850 passengers.
2008	All airlines replaced traditional ticketing system with E-Ticket.
2011	Lufthansa performed flight test using biofuel from Hamburg to Frankfurt. This was the first time of using biofuel in commercial aviation.
2014	Airbus Company presented the airplane series A350 to the commercial aviation market. The aircraft has efficiency of passenger transportation, passenger's comfort and environmental friendliness.

5. Form of passenger services

The form of passenger services have been continuously improved and altered by placing importance mainly on customers. At present, the form of passenger services which becomes the standard of commercial aviation can be classified into 3 periods of service as shown in picture 6 below. The details of which are as follows:

5.1 Pre-flight service means the period when passengers contact the airlines before their travels, such as communicating the call center for flight information, seat reservation, purchasing tickets, airport check-in, lounge service and boarding service. This service period ends when passengers are on board.

5.2 In-flight service means the period when passengers are on board. During a flight, the flight attendants will provide services for safety and comfort of passengers, such as safety demonstration procedures, food and drinks service, entertainment services including movies, music, books, magazines and games, flight information service and providing advices. This service period ends when the plane lands at the airport and passengers get off the plane.

5.3 Post-flight service means the period when passengers arrive at the destination and get in the airport. In the airline business, the passenger services are still not ended, because when passengers get off the plane, they have to receive their bags and luggage which is still in the airlines' responsibility to deliver them correctly. The airlines also has to keep passengers' mileage record systematically for awards redemption. The redemption process should be convenient and easy to access, and the awards should be attractive and meet the requirement of passengers. The services also include customer retention management.



Picture 6: Airline Business Service Ring

Source: International Aviation College NakornPhanom University

6. Support factors for the creation of commercial aviation innovation in Thailand

Commercial aviation in Thailand started in 1919 when the Department of Army Aircraft at the time began a trial of conducting airpost between Don Mueang Airport and Chantaburi Province, and consequently started passenger transportation in this route. It can be considered that Thailand has started commercial aviation before other countries in this region (Historical Archives Archdiocese of Bangkok, n.d.) Commercial aviation in Thailand has been grown and developed constantly up to the present time. The important incidents can be concluded as follows.

In 1925, Department of Civil Aviation of the Ministry of Commerce and Transport was established to take responsibilities of civil aviation (Wikipedia, n.d.).

In 1930, the Siamese Airways Company Limited was established to conduct local air transport and to represent the foreign aviation companies that flew into Thailand, but their businesses had to be stopped due to the World War 2. After the end of the war, they continued their businesses again under control of the Royal Thai Air Force (Wikipedia, n.d.).

In 1947, the Thai government at the time co-invested with private sector of the U.S.A. to establish the Pacific Overseas Airlines Siam Limited (Airline History, n.d.).

In 1951, the Siamese Airways Company Limited was merged with the Pacific Overseas Airlines Siam Limited (Wikipedia, n.d.).

In 1960, the Thai Airways Company Limited co-invested with the Scandinavian Airlines System Company Limited (SAS) to establish a new company under the name of Thai Airways International Company Limited which conducted an international airlines transport. This can be counted as the beginning of modern commercial aviation in Thailand; meanwhile, the Thai Airways Company Limited conducted a local airlines transport.

In 1988, the Thai Airways International Company Limited was merged with the Siamese Airways Company Limited, and became the national airlines which has conducted its business up to the present time under the name of Thai Airways International Public Company Limited.

In 2002, after an enactment of the Open Sky Policy, Thai people got to know a new form of airlines which was called the low cost airlines. Its business model was different from before, for example, air tickets started to be traded through website system of airlines including the sale of food and drinks instead of the traditional services.

Commercial aviation in Thailand has been developed constantly. When considering the factors that promoted and supported the creation of commercial aviation innovation in Thailand, it can be concluded that those support factors consist of:

6.1 Competition in the Airlines Industry. This factor is very important in the creation of commercial aviation innovation in Thailand. The competition in airline business has gotten higher since the assembly of the airlines alliance or the appearance of the low cost airlines. The pricing strategy plays a very important role in the competition. Traditional Airlines need to adapt to survive in the market. However, it is impossible to compete just only in pricing; therefore, we can see new innovations of service in the airline business, such as an air ticket, a procedure of using services and a method of passenger services. These new innovations are all for the benefit of passengers, for example, buying tickets and checking in

through an electronicsystem, choosing seats automatically by yourself, choosing entertainmentsin flight andthe increasing privileges for passengers.

6.2 Transport Liberalization. After an enactment of the Open Sky Policy in 2002, the new form of airlines (low cost airlines) appeared and grew constantly in Thailand. Foreign airlines have entered the market in Thailand which resulted in high competition. Each airlines has broughtnew innovations of service into the market to create its identity and to gain market share. Theremarkable issue after an appearance of low cost airlines is that the competition is not only limited to the air transport, but there is a competition between the air transport and the ground transport,which consists of passenger transportation by train, by car, by bus and by high-speed rail. Sincethe gaps between ticket prices are not much different; therefore, the ground transport needs to developnew innovations of service to maintain its customer group. This can be seen from the development ofan air – conditioned bus to a VIP bus to make it more comfortable with services, such as food and drinks,entertainment en route and electrical massage chair. In 2015 when Thailand participatesin ASEAN Economic Community (AEC), aviation market in ASEAN including in Thailand will be a free aviationmarket. The rights to transport passengers by using the Third, Fourth and Fifth Freedom of the Air will be granted unboundedly between the cities in ASEAN. The airlines can fly to the city that has an internationalairport, and use the rights to do air transport between the cities in ASEAN and between capital cities ofASEAN Member States. The similar rights and freedom will include the services between other cities of ASEAN under the ASEAN Multilateral Agreement on the Full Liberalizationof Passenger Air Services (MAFLPAS) (Knowledge of Asean Economic Community: n.d.).To understand about Freedom of the Air, the author will explain briefly as follows:

Freedom of the Air means that when the states exchange their privilege of scheduled international air services, that exchanged privilege is called Freedom of the Air(Department of Civil Aviation, n.d.). Therefore, if any plane wants to enter in and depart from any country to transport passengers and freights, it needs to get permissionfrom that

country to protect its interest or exchange the rights for their reciprocation and for equality between countries. The details of Freedom of the Air are as follows:

The First Freedom is the right to fly from its country passes the territory or the country that grants the rights without landing, for example, Thaiairlines flies from Thailand passing Malaysia to Singapore.

The Second Freedom is the right to land in the territory of the country that grants the rights by a technical reason, not by a commercial reason or topick up passengers. For example, Thai airlines fly from Thailand, stop to refuel in Japan, and then fly to USA.

The Third Freedom is the rights to carry passengers and freights commercially from the owner country of the plane to the country that grants the right. For example, Thai airlines carry passengers and freights from Thailand to South Korea.

The Fourth Freedom is the right to commercially carry passengers and freights back to the country that owns the nationality of the plane. Forexample, Thai airlines carry passengers and freights back from South Korea to Thailand.

The Fifth Freedom is the right to commercially carry passengers and freights of the airlines of the first country that fly to and land in thesecond country, and carry passengers and freights from the second country to the third country. For example, Thai airlines carry passengers from Bangkok to the USA - Los Angeles,but land to transit passengers and freights in Japan - Tokyo before flying to USA.

When the aviation market in the region is free, the competition gets higher and the price of air ticket gets lower. The airlines need to create services innovation to be their competitive strategies, for example, opening a new route, a development to bemade convenient in using services, providing an interesting promotion and creating added value to products and services of airlines.

6.3 Customer. In this article, the term customer means a passenger who uses airlines servicesand a common person who communicates with an airlines, even without travelling withthe airlines. Customers have different personal characteristics and differ from

the past, such as education, learning, attitude, belief, value, the increase of middle-class population and the lifestyle that changes from before. Nowadays, the innovation of technology is very important to the lifestyle of customers. Because of that, an information is easier to reach, and a knowledge, attitude, belief of customers have changed. Aviation businesses need to develop their services to respond to the change of customer characteristic. Customers nowadays are ready to try something new when they get the chance if that service innovation has the required quality, and a reasonable service fee will make it easier for customers to try using the new services. An airlines' application program in mobile phones is another example of service innovation that responds to the change of the customer's lifestyle.

6.4 Technology Advancement. The technology plays an important role in the creation of aviation innovation. It causes the confidence in safety, the expedition of services and the convenience in using services.

6.5 Contribution from the Government Sector. Contribution from the government sector in various aspects is very important in carrying forward the creation of aviation innovation. The details of which are as follows:

6.5.1 The development of the main infrastructure of Thai aviation industry, such as the development of airports to support the growth of aviation industry and the development of transportation systems that connect with airports;

6.5.2 The development of aviation personnel to meet the international standard;

6.5.3 The adjustment of rules and regulations of air transportation to be in accordance with and to be at the same standard as other countries in this region;

6.5.4 The agreement of visa exemption. Normally, a foreigner who wants to travel into Thailand has to apply for a visa or requests a visa from the Royal Embassy or the Royal Consulate that locates in his/her country of residence or from the assigned Royal Thai

Embassy. If there is visa exemption in ASEAN, it will be more convenient for passengers in the member countries.

6.6 Environmental Conservation Awareness. Global Warming is a major problem that affects all over the world, and the aviation business is the business that causes pollution to the Earth's atmosphere by an emission from an engine. Because of that, the innovation of green airplane manufacturing has been developed, and the Europe Union has stipulated the carbon tax regulation for airlines. Furthermore, environmental conservation will promote good image of airlines, and will be a presentation of environmental and social responsibilities.

7. Problems and obstacles in the creation of commercial aviation innovation in Thailand

The creation of commercial aviation innovation in Thailand has been developed constantly by many support factors as mentioned above. However, it could not be developed in full potentiality because of some existing obstacles which caused problems to the creation of commercial aviation innovation in Thailand. Those problems and obstacles can be concluded as follows:

7.1 Political Situation. The political unrest situation in Thailand has affected the economic system and the image of country. The income from tourism industry has been decreased because tourists were not confident in their safety, which led to the decrease of tourists and passengers that travelled into Thailand. Furthermore, the development of infrastructure had to be paused or delayed because the circumstance was not good for investment in creating new innovation, and the investors slowed down an investment because it was not worthy to invest for developing the new commercial aviation innovation.

7.2 Personnel Shortage in Aviation Industry. Personnel are an important resource in the aviation business, but the problem is aviation personnel with the skills, knowledge and abilities that meet the international standard are not sufficient for the growth of business,

especially the technical personnel. Even though various institutions have cooperated to produce aviation personnel, still this matter needs times for practicing to get skills and competencies that meet the international standard. Moreover, the existing personnel lack constant development, and it affects the creation of new innovation, or they lack the abilities to apply the new innovation properly.

7.3 Customer's Behaviors. Nowadays, the demand, expectation, satisfaction, belief and attitude of customers have changed. Therefore, the airlines entrepreneurs need to understand those changed behavior of customers; otherwise, the created innovation may become an obstacle if customers do not give a good response or reject the new aviation innovation. This may cause that new aviation innovation to be disappeared from the market, and the entrepreneurs may lack motivation to develop their services.

7.4 Global and Regional Economy Situation. Boeing Company, the leading manufacturer of commercial airplane, forecasted that the commercial aviation business in Southeast Asia will grow highly and will have the World's highest amount of increasing passengers (Civil Aviation Training Center, n.d.) and the base of the world aviation industry will be relocated from the regions of America and Europe to the Asia region in 2015 when the ASEAN community is assembled completely. Such forecast will be positive for the creation of commercial aviation innovation in the Asia region. However, the creation of new commercial aviation innovation may be delayed from such forecast due to an obstacle that appears.

8. Lesson Learned

Over the 100-year period of commercial aviation, the technology and development of aviation in various aspects have never been stopped; on the contrary, they have been developed constantly. The changed situations will be the major factor that encourages the development of commercial aviation innovation, such as the world economy, politics, state of society, culture, technology and the world circumstance. Therefore, the development

of commercial aviation innovation will still be based on the basic of service, i.e., the safety and convenience in passengers' flight.

In Thailand, the aviation industry tends to grow constantly due to the increase of travelling demand and the opening of new airlines as well as the flight route expansion. The airlines need to create new service innovations to be the competing strategy in the market. However, they still have to consider the risk management and other circumstances that may affect the success of business, for the satisfaction and sensation in the new service innovations of customers, and the most important thing is the customers' benefits from the development of commercial aviation innovation.

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