

**The Effectiveness of Technological Innovations on  
Customers Satisfaction & their Behavioural Intention  
at Airports, Case Study: Dubai International Airport**

مدى تأثير الإبتكارات التكنولوجية على مستوى رضا و طبيعة سلوك  
مستخدمي المطارات / دراسة بحثية عن مطار دبي الدولي

by

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of the requirements for the degree of  
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## **ABSTRACT**

The research study concentrated on understanding the effect of using technological innovations at airports and aims to recognize the relationship between technological innovations, customers' satisfaction and their behavioural intention toward the airports. The expected results of the research were to enhance the understanding and the readiness of airports management in all over the world to use technological innovations and their impacts on the airports performance in general. On other hand, the research is expected to clarify to airports managers the opportunities to create a stable successful performance and business in this environment.

A case from Dubai International Airport was selected for this research study and a total of 269 questionnaires were gained from the passengers who had the experience of a flight through Dubai International Airport. A total of 15 samples were defused from the population, and a total of 254 samples were returned and were useful.

Many appropriate statistical methods were used to analyze the data gained, in which they show an objective and valid conclusion.

The findings show that the passengers are more satisfied when services are provided by technological innovations. In addition to the positive behavioural intention of passengers toward the airport generated as a result.

The study comprehensively reviews and identifies the factors perceptual correlates that are unique to the airport growth.

## ملخص البحث

تتركز الدراسة البحثية على فهم التأثير الناتج عن استخدام الابتكارات التكنولوجية في المطارات ، كما تهدف إلى التعرف على الروابط بين الابتكارات التكنولوجية ، ورضا العملاء وطبيعة نواياهم السلوكية تجاه المطارات.

حيث كانت نتائج البحث تهدف الى تعزيز إدارة المطارات في جميع أنحاء العالم بالفوائد الناتجة عن استخدام الابتكارات التكنولوجية وتأثيرها على أداء المطارات بشكل عام. من ناحية أخرى ، يوضح البحث لمديري المطارات فرصًا لإنشاء أداء ناجح ومستقر للأعمال في هذه البيئة.

تم اختيار مطار دبي الدولي من أجل هذه الدراسة البحثية حيث تم جمع 269 استبيان من الركاب الذين قاموا بتجربة رحلة جوية عبر مطار دبي الدولي. وقد تم إلغاء 15 عينة من الاستبيانات ، في المقابل تم استخدام 254 استبيان عملو على نجاح هذه الدراسة. تم استخدام العديد من الأساليب الإحصائية المناسبة لتحليل البيانات المكتسبة ، والتي تظهر فيها استنتاجًا موضوعيًا وصحيًا.

في حين تظهر النتائج أن مستخدمي المطار هم أكثر رضا عندما يتم توفير الخدمات من خلال الابتكارات التكنولوجية، في المقابل ينتج عن ذلك طبيعة سلوكية إيجابية منهم تجاه المطار. تستعرض الدراسة بشكل شامل العوامل المرتبطة والفريدة التي تساهم في نمو المطارات.

## **DEDICATION**

*This thesis is dedicated to my parents, brothers and friends  
for their endless love, support and encouragement*

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# Chapter I

## Introduction

### 1.1 Introduction

Nowadays, airport industries provide the countries' economy with high amount of benefits. The air transport and airport can improve the life quality and can enhance the standards of living in any country; that is because the air transport industry has a unique effect on the business growth in the national and global economy.

According to World Airport Traffic Report of the Airport Council International, there are 17,678 commercial airports around the world, and most of them are allocated in Asia, European countries and North America (ACI, 2017).

In the growth of the marketplace, passengers have the freedom to select their destinations among the variety of airlines and airports options. This freedom of passengers increases the level of competitiveness between the airports, and puts the airport marketers under pressure to differentiate themselves by meeting the basic needs of customers and exceeding their expectations. Therefore; airport managers are engaging high efforts to increase and enhance customer satisfaction.

Most airports' customers in all over the world mentioned that all airports are alike; therefore, the best rated airports in the world excel at generating a unique place sense that improves their customers experience and set them aloof from other airports.

These create a challenge between airports to find solutions and ideas that can improve the customer experience. For all industries and also the airport industry, the innovation of today is a new normal of tomorrow. This reality lets the airports to search for constant innovations within the delivery chain of a service that can improve the airport performance. One of these innovations that is powerful enabler is Technology. Technology can quickly change the customer experience.

## **1.2 Background**

Merchant airports are under continuous pressure from both shareholders and customers to remain profitable and maintain prices competitive. Promoting merchant revenues is one technique that let airports to please both. In other hand, factors such as political changes, security developments and consumers trends, have made it more defy for airports to create and improve merchant revenues. Airports should innovate by recognizing new methods of operating in order to overcome some of those challenges, (Graham A, 2009; Luis and Juan 2016)

The study of Yang et al. (2015) revealed that in general most airports do not meet the expectations of travellers. There are many reasons for such failure include long waiting time, inconvenient flight schedules, incompetence of airport staff, lack of information and poor navigation system. Passengers don't simply forgive such failure of services, especially that marketplace is under the umbrella of growing which let the passengers have the freedom to select their choices from many variety of airport options. The increase of competitiveness put the airport marketers in high level of pressure that let them to differentiate themselves by meeting the travellers' needs and exceeding their expectations. Therefore, the managers of airports used to improve

their efforts to enhance passengers' satisfaction, (Fodness and Murray, 2007; Vanja et. a.l, 2017).

Because technology has become complementary part of the travel industry, many benefits have been gained by air travel from the use of deferent technologies such as smartphone applications, wearable technologies, biometrics and self-service technologies to support airport operations. The technological advances provide a great opportunity to create the "intelligent airports" in the future through the complementation with airport IT platform, (Rostworowski, 2012).

Compatibility, complexity and other relative advantages are the characteristics that had consistent correlation to the adoption of innovation. Social media, social networks, mobile and display technology are affecting the behavioural intention of customer, (Huang et al., 2015; Luis and Juan, 2016). The new applications or services of mobiles are not only tools of communication which guide the passengers from gates to check in areas, but they are now used to modify the experience of passengers while developing new merchant revenues, (Munneke, 2014).

### **1.3 Problem statement**

The problem symbolized by the research lies on the lack of picture clarify with the airports managers and airports customers with respect to the services and operations delivery at airports, that create a wide gap between the customer expectation and customer experience. As well as, the awareness on the concept of behavioural intention and its effect toward airports required to be strengthened.

## **1.4 Research Question**

In order to analyse and study the aims and the objectives of this research paper, four questions have been created in which they are premise on the main study's axes of the technological innovations effectiveness on customers' satisfaction and their behavioural intention at airports. As mentioned before, the case study for this research is Dubai International Airport (DXB) that comprises three terminals (Terminal 1, Terminal 2 and Terminal 3).

RQ1: What are the most dimensions of technological innovations that can enhance the airport performance?

RQ2: How does the technological innovation influence the customer satisfaction at airports?

RQ3: How does the technological innovation influence the behavioural intention of customers toward airports?

RQ4: How does the satisfaction of passengers influence their behavioural intention regarding the airports?

## **1.5 Scope & Limitation of Study**

The scope of this research study is the importance of technological innovations at airports, these technologies that change many services implementation of airports' operations in various world parts in general and Dubai as specific.

The importance of the research study lies to improve the skills and knowledge related to the effectiveness of technological innovations to be used in airports.

In general, the focus of the research study will be on international airports, particularly Dubai International airport (DXB), based in United Arab Emirates, to study the impact of technological innovations at airports that aim to enhance the customers' satisfaction and their behavioural intention.

Plentiful limitations were involved during this research study for various reasons in which it was one of the few research studies that concentrated on Dubai international Airport (DXB) to assess the effectiveness of the technological innovations at airports on customers satisfaction and their behavioural intention, and it was one of the few research studies that measured the direct relationship of technological innovations that are provided by all airport entities who represent the airport environment with the two concepts of customer satisfaction and behavioural intention.

## **1.6 Research Aims & Objectives**

### **1.6.1 Research Aims**

The significance and the aim of this research study concentrated on understanding the effect of using technological innovations at airports. Through the economic development in the world, most of companies' managers and leaders have confirmed that most successful companies are those who always implementing new procedures and techniques to create a stable level of satisfaction toward their customers, and that the research aims to recognize the relationship between technological innovations, customers' satisfaction and their behavioural intention toward the airports, that let the airport users recommending the airport to other customers, remain loyal to the airport and saying positive words about the airport.

The expected results of the research was to enhance the understanding and the readiness of airports management in all over the world to use technological innovations and their impacts on the airports' performance in general, in addition to clarify how to enhance customers satisfaction and their behavioural intention and understand the relationship between them. On other hand, the research is expected to

clarify to airports managers the opportunities to create a stable successful performance and business in this environment.

### **1.6.2 Research Objective**

The core objective of this research study is recognizing the technological innovation key factors that can influence the customers' satisfaction and their behavioural intention toward airports.

However, the objective of this research study cannot be carried out without testing:

- i.** The relationship between the four connected dimensions of the key factors provided by technological innovations which are (efficiency, easy navigation, waiting time and streamline experience), customer satisfaction at airports and their behavioural intention toward the airports.
- ii.** Setting a pilot test to establish hypotheses through the data collected from the Dubai international airport passengers who used the airport for the last twelve months.

After analysing and examining the data, the motion will provide recommendations to reflect the vision of Dubai airports management and its desire regarding the satisfaction and the behavioural intention of its customers.

### **1.7 The Structure of Dissertation**

The purpose of this chapter is to unroll the master agenda of this research paper in a structured pattern, can be presented as following:

- i.** Firstly, chapter one exhibits an introduction to the airport industry and the technologies used for its operations and its relation with customers' satisfaction and their behavioural intention, the master goal of the research study, limitations and significance of the research topic.

- ii.** Secondly, chapter two will tool up deep analysis of several literatures with regards to air transportation, expectations and experience at airports, airports performance, airports service quality, customer satisfaction and behavioural intention, technological innovations at airports and Dubai airports fact.
- iii.** Thirdly, chapter three will illustrate the design of the research, the overall methodology and the hypothesis investigation used in this research study.
- iv.** Fourthly, chapter four will illustrate the techniques used in data analysis and provides an explanation of the research study findings.
- v.** Lastly, chapter five will argue on the discussion for further enhancements and the conclusion derived.

## **Chapter II**

### **Literature Review**

#### **2.1 Introduction**

This section emphasizes on existing literature regarding the effectiveness of air transportation and airports and the service quality offered. It also focuses on the believes of airport domains regarding their passengers. In addition, the quality of airport performance is being researched by various performance indicators which were mostly based on the passenger experience. The passenger experience is being judged on the basis of the departure to arrival terminal and also what issues passengers have to face regarding the service on airports.

#### **2.2 Development of Air Transportation**

##### **2.2.1 Historical Perspective and Brief Definitions**

“Air transportation refers to the facilities consisting of equipments and means that are necessary for passengers and goods movement”, (Aako, 2012). In December 1944, when the ratification of Chicago Convention was occurred, a prognosis was pointed on the development of International Civil Aviation (ICA). This creates a view which stated the industry of aviation can extremely assist in setting down the relationships and the level of people understanding and nations all over the world. Currently, this vision is distinctly manifest that air transport is being considered as essential factor for economic and growth affluence, and it is required to our daily lives as

telecommunications, medicine, and as crucial part of society globally, (Holloway, 2002). In addition, the air travel has affected on the expansion of aviation's role by stabilizing social progression internationally and remote communities; due to the change in the affordable prices availability.

Researchers are considering air travel as contributor to economic and social benefits rather than a luxury commodity. It has provided and supported the societies with opportunities to enhance the world economies through improving their trading and tourism capability that contributes in the development of substantial benefits, (Aako, 2012). Air transport is now regarded as international vital industry because of its technical achievements and its rapid development that let it to be one of the best significant developers in the progress of modern civilization.

In 1949, the event of first jet airliner occurred and its arrival resulted a growth in The commercial aviation that expanded the seventy fold. Since the growth of aviation commercialization has become a significant contributor towards economic progress; its rapid growth cannot be measured up with any other transport means, (Dale, 2009). In addition, the requests of air services demands have participated in enhancing the influence of air transport on the local and global economy which provided solutions for transferring different types of resources between different global destinations within a spot, (Holloway, 2002).

The exceptional enhancements of air transportation are vital and have improved frequently and stretched to many islands and especially to Pacific island community who capitalized on the benefits of owning and operating commercial airports at the region, (Aako, 2012). Service quality has been defined by Gronroos (1984) as the level of service delivered that matches the customer expectation. If an organization is offering high quality service, this means the customer expectation is submissiveness

with the service provided. Carman (1990); Bitner & Hubbert (1994); Brady & Cronin (2001); Jevons et al. (2005) confirmed that a company will face a crowd of competitive offerings when it offers a superior service quality. The perception of customers toward the service quality is based on the similarity degree between experience and expectations. If the comparability is plain, the consumers are deemed to be satisfied: yet, it's not enough to create competitive advantage. In addition, Kossmann (2006) mentioned that it is necessary to provide a superior service that exceed the expectations of customers in order to make them delight and satisfy their needs.

### **2.2.2 Air Transportation Entities' Role**

The supplying services providers in air transportation can't operate in isolation; therefore an active environment with essential connections and interactions between different air transportation members is the key of having various activities with diverse resources, (Dale, 2009).

Air transport entities provide several services at different locations to their customers. Those services consist of agencies of booking services, airlines, airport staff, maintenance and operational personnel, and customer service providers. Accordingly, in order to gain customers satisfaction, the airport industry should function with many entities to achieve the objectives of delivering required customers services and needs, (Aako Teikake, 2012). The fundamental role of air transport players is to transport enormous amount of people to serve their needs and attend necessary events such as holidays, business meetings, etc, (Wensveen, 2007). Moreover, nowadays the shipping and delivering of the goods/products is more simple and more rapid by using the air transportation especially for overseas countries. The air transportation is a

reliable and efficient method that enables purchasers to receive their supplies and needs with less time period. Correspondingly, the production companies are facing difficulties to get the advantage of competitive market. Furthermore, the air transportation is playing important role in world's environment economically and socially.

### **2.2.3 Air Transportation Economic Benefits**

In order to enhance the living standards and quality of life, the air transportation should provide an essential solutions in the work of countless amount of people and their leisure, (Sheehan, 2003). In addition, the tourism sector has improved by air transit. As a result, the economic growth increased for many economics by raising the job opportunities production, supporting the secluded communities improvement and improving the tax collection (Doganis, 2006).

Air transportation provides major solutions for other businesses growth that lead to improve the country and global economy. The enhancement of other businesses within the whole economic activity continuum can be visualized by the effectiveness of air transportation.

- i. As a catalyst of world trade:** the benefit of air transportation presence is increasing the access to global markets easily which is enabling the globalization of manufacturing. In addition, various activities can be performed in the country and that's have the advantage of having trades with other regions manufacturing different products and services.

- ii. Air transport's significance for tourism:** tourism is an essential part of world economy, hence for remote communities, the airlines and airport employment can provide great support.
- iii. Air transport's contributions towards global productivity:** in order to expand the markets in the world, many transport links that should be efficient will enhance the work procedure of companies. It enables them to avail economics by reducing the costs and time of the work duty. Air service raises the competition between companies in the new markets which motivates them to proceed their work in an efficient method.
- iv. Its efficiency and efficacy towards the supply chain:** rather than using land or sea freights for goods/products delivery, air freight is more useful in the sake of reducing the time of delivery.
- v. As an enabler of investment locally and internationally:** the presence of air transport links opens a wide range of choices for investors to invest globally.
- vi. As a stimulus for innovation:** to increase the size of the potential markets globally with fixing the costs of innovations and extend over large sales, a well-established transport infrastructure is a sufficient solution to encourage companies to develop and collaborate together in different areas of the world.
- vii. Providing consumer welfare benefits:** according to the increases in local airport communities travel networks, there are many vital and core environmental factors in the airports surrounded areas such as air quality, noise and congestion, (Aako Teikake, 2012).

#### **2.2.4 Air Transportation Social Benefits**

The air transport benefits are not only related to economic activity; however, it also provides the welfare for people and gives better quality of life in several forms away from the economic index numbers, (Dale, 2009). The usage of air transportation has the advantage in expanding the choices of consumers, supporting remote communities and enhance the sustainable development. The widest use of air transportation is in supporting and promoting the international tourism and as a consequence of that the economics of the countries grow and the poverty reduces by providing more job opportunity for people. In addition to that, tourism increases the tax revenue, provides tour guide services and conserves the protected area such as environment and Natural Reserves, (Kane, 2008).

As a real case of air transportation benefits, Kiribati islands where air transport gives an entrance to isolated communities, open them up to contact with other communities and delivering the essential supplies and services. On the other hand, alternative transport modes are limited. The distance between Kiribati islands is wide which makes it complicated for people to reach their services such as hospitals, education, mail services, etc. therefore, as a solution for such a case the air transportation is more flexible and efficient method, (Aako Teikake, 2012).

Some countries with natural disasters are facing more risk in land/sea transportation. Therefore, It's more proper to use air transportation in reaching other countries. Air transport helps in delivering the cargo to provide the humanitarian support for personnel's who live in disaster areas. Moreover, it assists in the evacuation of people and in the transfer of refugee to rescue their lives, (Aako Teikake, 2012). For countries, which are having troubles in direct contact with other countries through

land/sea routes, it's essential for them to have airports and air transportation to access all countries and communities. Furthermore, the same circumstances of natural disasters can appear in isolated areas that needs urgent assistance, so in such a case, the availability of airports and air transportation is too necessary. Air drops are the core agencies that operate in various cases when the airports are failed or damaged. Air drops are the aid agencies who considered to stem and avoid the crisis of humanitarian. The air transportation function for natural disaster countries appears in the rapid of medical supplies delivery, (Wensveen, 2007).

As mentioned previously, air transport plays an important role in tourism sector, where it has positive impact in the growth of tourism industries in the world economy. Also, it allows the tourists to move to the devious parts and difficult accessible areas in the world, (Graham et al., 2008). As a consequence of tourism and interacting with tourists, the communities gain welfare and social benefits. Furthermore, tourism opens the door for every community to understand and exchange various cultures and nationalities that facilitates closer international integration.

Air travel provides ease accessibility between all countries and enhance the interaction and relations between communities which lead to improve the living standers of human life. Moreover, as a part of tourism sector, air transports increase the range of destinations for potential holidays and it enables the communities to share its own leisure and cultural activities with other communities and countries. In addition, for raising the world economy by effective and efficient approach, air transport system offers smooth access to the global markets for all countries and supports remote countries accessibility to reinforce the social inclusion, (Kane, 2008). Air services accessibility can be a critical factor for all communities and especially

isolated communities in promoting the life quality. Isolated islands can't be reached easily as the case of Kiribati Island, it's difficult for them to participate in the modern world due to reason that they are surrounded by a huge expanse of water. And that's lead to affect their life quality badly, (Aako Teikake, 2012).

Furthermore, air services functionality fulfils the social function, connecting communities to essential services for remote regions. The examples of those services are education, better governance and hospitals. The validity of air transportation allows the communities to engage in a lot of other programs that have a positive impact in supporting the social activities. Those programs include local cultural and sporting events, in addition to education and training initiation. Such programs keep the communities connected together. To achieve the target of linking communities and islands, air transport fulfils the purpose of providing the accessibility to the remote islands. In conclusion, at this part of the thesis the benefits of air transport were discussed.

### **2.2.5 Transportation and Importance of Airports**

To organize the air transportation in cities and remote islands, there should be a gateway at any destination, this gateway is the airport. The availability of airports in each city simplify the procedure of cargo and people transportation and it makes the travel more convenient and leisure for people. It's difficult to access isolated islands and cities without the existence of airports, (Doganis, 2001). Lately, the airports are considered in all over the world as primary air transportation infrastructure, due to that the airports existence in the cities/islands is too important. In addition, airports are considered as a critical landmark in the country where the first and last particular country impression is renowned by its airport. It enables the communication between

people from different levels of expertise in various areas around the world. As a consequence of people connection, their expertise can be enhanced and shared among them. To summarize the importance of airports, the growth and functionality of air transport services are related to the availability of airports.

### **2.2.6 Airports Implications**

Airports are deemed as an economical assist to the communities they serve, due to the reason that the airports provide jobs to local residents and enhance business opportunities development for authorities combined in the oriented activities of aviation, (Doganis ,2001). These activities include fuel sales, airplanes rental services, flight training, and aircraft maintenance.

People who have join the air services and live near to airports areas are facing both positive and negative situations that impact their social life. As noticed, having airport in the community allows accessing different national system of air transportation that supports travels of business and personal. Furthermore, the airport provides service of receiving and delivering shipments of goods/products in the community by arranging for suitable location of goods transmission.

As mentioned previously, airports have positive impact in the community economy. Even though, they have also noneconomic impacts for the society which are pilot training, access of emergency transportation for emergency and medical responses, and access the services that help in and guarantee the quality of life improvement. The social impact of airports for a society is going beyond the frontal impacts of the airports operations on their neighbours. Rather than that, the air services accessibility provides wider benefits to the consumers and regional business interests, (Holloway, 2008). Airports are considered as the major infrastructure to support the community

of reaching the air transportation which as a consequence specify the community improvement in addition to being merchant players in their own right. Moreover, it has the capability of generating returns on shareholder investments, stakeholders and to the whole society.

### **2.3 Airports and Expectations**

Researchers and airport managers are focusing on the service quality studies that can enhance different services delivery to diverse customers at airports. As Freathy & O'Connell (2000) noticed, most airports are widely being in the government agencies orchard airports. This allegation is suitable for the Kiribati islands case in which the government is responsible to regulate the airports in which it has low competition levels of provided services. These include many diverse services such as checking in processes or any other services which help in the process of passengers travelling from one region to another.

In addition, making an airport with effortless setting is another contributing factor of the airport quality. In each airport there are few services that don't meet the expectations of customers, lately in many countries they followed a procedure to increase the income to their business which is by providing commercial activities in the airports. In other hand, retailing and operation services can generate higher income when the commercialized destination of airport is involved in the process, (Bitner M., 1992).

For more clarification, the consumers of the airports facilities and services are consisting of concessionaires, passengers, tenants, airline personnel, local residents. Since the airport is gathering several types of customers from all over the world, its

responsibility to understand the passengers and consumers' expectations. Furthermore, once there is a full view of customers the airport will be able to support their needs by implementing high sufficient and quality of services. In this way the airport can gain the pleasure its own customers.

On the other hand, some countries are strengthening their bases by increasing their production activities to attract more customers and get higher profits without working in the studies of customer expectations and gaining their satisfaction. In the world airport week, cited by Fodness & Murray (2007), there was a discussion that passengers do not use the available commercial activities at the airport due to the reason that they stay short periods in the airports that are considered maximum one hour.

For such a case, the designation and operation of the airports to meet divers air travellers' expectations are not obvious. Hence, neither commercialized airports nor traditional ones could reach the target of having clear picture of the way that airports should be followed and operated since the passengers are holding various expectations and needs. Additionally, without paying attention to travellers' type or the trip intent, they are passing from the airport just to move from ground to air, or conveyance from a specific airline to another as Fodness & Murray (2007) claimed. Respectively, airports are considered as a point of conveyance not destinations. Correspondingly, thong to a specific airport is mainly about holding a flight trip to certain destination according to the point of view of Freathy & O'Connell (2000).

This standpoint is taken into account to have valuable background for the authorities who make the decisions to look for the needs of air travellers from a conveyance point. On the other hand, Graham et al. (2008) have different opinion regarding the airport, where they consider the airports as service facilities and a main destination

rather than a transit point for passengers. It's clear that perspective of Graham et al. (2008) is totally new view for the consumers' expectations and needs when airport is considered as a destination. Assuredly, the new generation of leading airports have the tactical look of distinguish themselves and being unique comparing to other traditional airports by being both airline service quality providers and a transfer point.

## **2.4 Airport Passenger Experience**

Popovic et al. (2010) defined airport passenger awareness as interacting different passengers in routine on the airport terminal which undergo different experiences. Passenger experience is really categorized into two large categories: discretionary activities and processing activities. Processing activities are referred as those activities which should be done for every passenger in sequence following arrival at the terminal such as a check in, security screening, immigration, as well as boarding. Discretionary activities, as discussed above, are suggestions and unordered activities based on perception and expectations of an individual passenger (Kirk, 2013; Popovic et al., 2010). These activities create wider room of improvement for the service quality and help in enhancing airport passenger experience.

The above concepts provide a backbone for enhancing the airport passenger experience of the customer at both processing and non-processing terminals. In order to assess the service quality of airport passenger's experience is the most vital ingredient.

### **2.4.1 The Importance of Passenger Experience**

Passengers are key stakeholders of any airport. Without them no airport business can survive. It's their right to express their views and experiences regarding the services of airport.

Their perceptions are important in determining what is essential to them, and precisely how airlines or maybe airports and/ respond to any type of inadequacy (Airports Council International, 2000). The long lasting impression of service on passengers helps in building up the image and reputation of that airport terminal. Martin Cejas, (2006) suggested that airfields provide comfortable and convenient facilities. Kramer et al. (2013) study argued that a competitive advantage could effortlessly be acquired by providing a great passenger experience. Airports like Incheon airport of South Korea, Changi Airport in Singapore, and Indianapolis in North America and many others have gained competitive advantage by providing excellent services to their customers. Kramer et al. (2013) provided five components which have direct impact on a quality of service provided by airport: (velocity of adventure within the airport terminal; cleanliness; a decision of value for money services; a great gate experience; and customer service/courtesy of staff).

Many airport operators work hard in order to provide best passenger experience possible even after passing through security checkpoints. Airports Council International - ACI has designed and applied the Airport Service Quality (ASQ) survey is being conducted every month for passengers, which helps ACI to improve the quality of their services (Airports Council International, 2017).

This survey also helps them to understand the expectations of their customers very well. The ASQ Survey measures the degree of Service by means of a selection of observations, monthly feedback, and a range of deliverables (from management

summaries to databases) that are in fact in the position to exhibit each captured observation (Bogicevic et al., 2013). This survey is driven by the customer pleasure indicators (Airports Council International, 2008).

Many scientists have suggested that passenger experience and their satisfaction level can also be evaluated on the basis of waiting time at check in, waiting time at security, choice of no cost baggage carts, waiting time at immigration, information convenience, and terminal facilities (Bogicevic et al., 2013; W. L. Chang et al., 2008; Chao et al., 2013; Correia & Wirasinghe, 2006; Correia et al., 2008; Fodness and Murray, 2007; Tsai et al., 2011; Yeh and Kuo, 2003).

SKYTRAX (2014) has conducted annual performance reviews for almost all earth airports in addition to airlines after 1999. They surveyed more than 18 million passengers from more than 100 different nationalities by using forty-one KPIs which are being used to evaluate passenger total satisfaction with both the airport of onboard and their services including many tasks from check in to boarding, airport facilities, cabin cleanliness, onboard services, and the courtesy of staff, (SKYTRAX, 2014). Singapore Changi Airport was being selected as the world's best airport for the sixth time in a decade, at SKYTRAX conference which was held on March 2016 (SKYTRAX, 2017). Other airports which have won similar award earlier are Hong Kong International Airport (eight times), Incheon International Airport (twice), and Amsterdam Schiphol Airport (once).

As a frequent flyer and Star Alliance Gold Member between 2010 as well as 2016, it's clear that passengers may well need to compromise the terminal convenience of theirs and comfort because of the growth of LCCs, advanced technology and more tightened security requirements. For example, an overseas flight transiting through Sydney Airport involves passengers to switch terminal, a method that involves gathering the

baggage of theirs from the international terminal and rechecking in at the domestic terminal, (Qantas, 2014). The terminals which are more budget conscious have no aerobridge.

This might seem cost saving but it affects the passenger's experience. Without aerobridge passengers in order to exit the terminal building would have to use stairs to embark and disembark from planes, which can be proved difficult for disable persons. An observation in the Low Cost Carrier Terminal (LCCT) at Kuala Lumpur discovered that a combined airport transfer of a shuttle and transit train bus is necessary for all those passengers with a connecting flight to the primary terminal, Kuala Lumpur International Airport, (Kuala Lumpur International Airport, 2014). For instance, those passengers travelling from Bangkok to Sydney that uses 2 various airlines, specifically, AirAsia (Bangkok, Kuala Lumpur) and Qantas (Sydney), have to clear immigration and then take the baggage of theirs before rechecking in for their connecting flights.

Many Non-Government organizations (NGO's) have spoken about the unwillingness of usage of aerobridges in AirAsia. These organizations argued that aerobridges are not only necessary for the safe mobility of the disabled passengers but also for the safety and comfort of all passengers, (Hamdan, 2014). AirAsia in response to the request of the NGO's clarified that LCCs are dependent on the fast turnaround of aircraft which is facilitated by the disembarked passengers from front as well as back doors of the aircraft which is only possible without using aerobridge. Taking into consideration the dynamics of the business operation of theirs, the Malaysian Airport Authority has given an exemption to AirAsia by which the aerobridge is utilized during extreme weather situations merely, (Malaysia Airports, 2014). Since the closure of the LCCT IN MAY 2014, the Government of Malaysia offers such a

facility (for a fee) in the recently constructed Kuala Lumpur International Airport two (KLIA two), (Puspadevi, 2014). Gold Coast Airport (Australia) is appealing to LCCs and effectively operates with no aerobridges, (Gold Coast Airport, 2012). However, the Gold Coast Airport Authority has been working on supporting the aerobridges by changing the apron stand positions. Many other Civil Aviation Authorities (CAAs) like the Philippines CAA, have applied the necessary use of airport aerobridges by most airlines. They believe that aerobridges are not necessary to provide comfort to passengers rather they are necessary for the safety and protection, (Apolonio, 2013).

Y. C. Chen & Chang (2012b) study's, examined perception and satisfaction level of passengers aged sixty-five and more, with the air transport solutions at Taiwan International Airport. As the majority of aged passengers have a little movement and health issues, re-search discovered they anticipated far more focus on specific services including user-friendly boarding, distinct info of guidance in the airport terminal, as well as the announcement of delayed flights and enhanced staff service attitudes, (Y. C. Chen & Chang, 2012b).

Kramer et al. (2013) reported many customer support problems in several of the surveyed airports. The problems which has been noticed, are mainly related to quality of air services (frequency, destinations, along with price); flight delays as well as cancellations; inadequate revisions of flight info; Wi-Fi that is free; number and cleanliness of bathrooms; ease and signage of method finding; security checkpoint; processing and queuing time; walking distance to gates as well as baggage claim; value for cash for beverage and food; lost luggage; uncommon activities including construction; and services for passengers with exclusive needs.

As the time passes and with more advancement in technology, people's expectations regarding quality of service has also been increased. In this era, the service quality is

crucial for all airports. As the competition only increases with time service quality is becoming more and more concern for airports. Service quality reflects the evolution of airport control from creating a main target on operations and facilities to providing a passenger driven service expertise, (Wyman, 2012).

Even though the energy is being channelled into the terminal passenger experience, still we cannot say much about it because almost nothing is really known about it, (Popovic et al., 2010). The study of Popovic et al. (2010) also claimed that the emerging classes of air passenger pursuits as comprised of: ownership related tasks, individual activities, group activities, and concurrent tasks. This category contributed to the improvement of the Taxonomy of Passenger Activities (TOPA) design, which relates these activities on the style of succeeding airports, (Kirk, 2013).

Briefly, this particular area has elaborated on the benefits of the idea of passenger experience in telling the enhancement of airport service efficiency. Some continuous passenger issues concerning the service provided by LCCs have been discussed.

## **2.5 Airport Performance**

Each airport has to deal with different elements depending upon the statutory needs. The contemporary connectivity widely depends upon these statutory elements. These elements mostly include the stakeholders, procedures and methods opted and the number of aircrafts required to operate a particular airport. Stakeholders of airport includes private entities like Airport owners, different Airlines and Security; Government Bodies like Customs, Quarantine, and Police; Customers including passengers; Regulatory agencies like National Department of Transportation, Status and Local Governments; and the International Air Transport Association (IATA).

Despite the fact that each stakeholder has different goals and interests, it should be noted that without constant cooperation of each stakeholder to continue the operations.

### **2.5.1 Airport Performance Indicators**

Though airports have same functionality as that of public listed companies, but their performance is not measured by the financial measures rather various performance measures.

According to the study of Wyman (2012), six main Key Performance Areas (KPAs) and forty-two possibly Performance Indicators (PIs) also named as observed measures are being identified. This study has been recognized as a guide for airport managers which helps them to understand the key performance areas better.

#### **i. Core Measures of Airport Activities**

There are some core measures that help in determining the airport's fiscal health and its quality. Four major determinants of an airport's total yearly figures are being identified: **(a)** passenger origination in addition to destination, **(b)** number of passengers, **(c)** number of aircraft movements; and additionally, **(d)** amount of freight or mail loaded. One additional indicator is related to the direct flight destinations.

#### **ii. Safety and Security Measures**

These measures are related to the safety and security methods needed to resolve protection issues in airfields. There are six such indicators: **(a)** bird strikes; **(b)** runway incursions; **(c)** runway accidents; **(d)** loss of work time from employee injuries; **(e)** occupational injuries; and **(f)** public injuries.

### **iii. Service Quality Measures**

According to the study, there are eight measures which targets the passenger perception regarding quality and quantity of service: **(a)** baggage delivery time; **(b)** gate departure delay; **(c)** hourly capacity; **(d)** customer satisfaction; **(e)** taxi departure delay; **(f)** check in gate period; **(g)** border control clearing time; and **(h)** safety clearing some time.

### **iv. Cost Effectiveness and Productivity Measures**

Productivity and cost effectiveness measures are necessary to be considered in order to utilize airport resources most efficiently and effectively. There are nine indicators of productivity and cost effective measures: **(a)** Operating cost per Workload Unit; **(b)** operating cost per movement; **(c)** operating cost per passenger; **(d)** total cost per Workload Unit; **(e)** total cost per movement; **(f)** total cost per passenger; **(g)** aircraft movement per gate; **(h)** aircraft movements per employee; also as **(j)** passengers per employee.

### **v. Financial and Commercial Measures**

Financial measures are used to indicate the overall economic performance of the airport. There are eight financial measures identified: **(a)** Debt to Earnings Before Amortization, Depreciation, Tax, and Interest (EBITDA) Ratio; **(b)** revenue per movement; **(c)** EBITDA Ratio per passenger; **(d)** non aeronautical operating revenue per passenger; **(e)** debt service as a tiny proportion of operating revenue; **(f)** revenue per passenger; **(g)** non aeronautical operating income per total operating revenue, **(h)** long term debt per passenger.

### **vi. Environmental Measures**

While operating airports environmental measures are also very important to be taken into consideration. It is obligatory for airports to minimize the impact of their

operations on the environment. There are six environmental measures: **(a)** consumption of water per passenger; **(b)** utilities or possibly energy usage every square meter; **(c)** garbage reduction portion; **(d)** renewable energy portion purchased by the airport; **(e)** waste recycling; and **(f)** carbon footprint.

Niemeier and Forsyth (2011) argued that in addition to quality, benchmarking of costs also plays a major role in determining that how an airport competes with other airfields and clinches to the industry standard. They also emphasized that in order to evaluate regulatory policy benchmarking is an important element. They recommended that there are 3 main elements related to airport performance which should be benchmark. They are as follows:

- i.** Productivity
- ii.** Prices and profits
- iii.** Quality of service

The study of Niemeier and Forsyth (2011) further highlighted that benchmarking can be proven effective in assessing the efficiency of the operation of the all-round Australian technique of light handed regulation for the assessment of airport performance.

Another study of Humphreys and Francis (2002) determined airport indicators and classified them into four vital measures which are as follows:

- i.** Original Measures: These includes earnings per passenger, expenditure per person, income every square meter, revenue to expenditure ratio, capital shelling out per passenger, baggage delivery time, check in waiting period, accessibility of signage and provision of baggage trolleys.
- ii.** Airport Operations Measures: These include air traffic actions per hour.

- iii.** Airport Environment Measures: These include provision of quality drinking water, contamination level, energy consumption, aircraft noise level, and communal complaints.
- iv.** Service Quality Measures: These include the amount of serviced baggage; signage quality; cleanliness of terminals and restrooms; flight delays; and airport congestion quantities.

Munoz and Granberg (2013), presented 5 primary factors of airports as well as selected first indicators of each element as follows:

- i.** Airport Operations Aspect: Turnaround times of the apron or maybe gate area; Inbound and outbound efficiency; air traffic movements; runway occupancy; taxiing time; baggage delivery time, choice of runways plus taxiways too.
- ii.** Airport Economy Aspect: Earnings per passenger; non-aeronautical earnings per passenger; staff price per passenger; revenue/expenditure ratio; business earnings per square meter; expenditure per passenger; as well as Contribution of service model.
- iii.** Airport Environmental Aspect: Energy consumption; the quantity of contamination events; squander recycling; aircraft noise; along with the ease of public transportation to the airport terminal
- iv.** Airport Safety and Security Aspect: Choice of aircraft security incidents, number of incidents at security checkpoints; the idle period between shut down and re-opening in the circumstance of the security breach; along with the vital time for emergency evacuation.
- v.** Airport Customer Service Aspect: Examination of processing; waiting times; security management processing and waiting times; number and duration of delays; quality of signage; and baggage waiting period.

A survey was conducted at Swedish and Spanish airports in order to analyze the above mentioned symptoms. In this survey 90 staff members were taken as sample. They were asked to rate indicators for each area of exercise. According to results, Granberg and Munoz (2013) recommended eleven airport indicators in five categories which are important in assessing the effectiveness of an airport, which are as follows:

- i.** Airport Operations: arrival incoming efficiency; departure outbound efficiency; turnaround times of the apron/gate region.
- ii.** Airport Economy: earnings per passenger; car traffic earnings per passenger.
- iii.** Airport Environmental Issues: energy consumption (kWh every square meter); the quantity of contamination events.
- iv.** Airport Service and Security: number of incidents at security checkpoints, selection of aircraft security incidents.
- v.** Airport Customer Service: examination of processing; waiting occasions; security management waiting as well as processing times.

## **2.6 Service Quality**

### **2.6.1 General Definition of Service**

Service refers to economic activity type which is not stored, is intangible and doesn't produce in royalty. Many services can be used and wasted at a point of sale. Service can be goods or any other set of economics components. Services examples including the use of experience or expertise, such a doctor visit by a person, and the goods transfer, such delivering mail by postal service, (Aako Teikake,2012). Based on Kotler (2006), companies provide services and offers to the market place that can be major or minor part of the whole offering. There are five services categories that could be offered by company: **(i)** Pure tangible in which no services escorts the product such salt, sugar, pen, etc. **(ii)** Tangible goods with accompaniment of services

in which the products are accompanied with many services, for example, mobile phones, cars, computers etc.. **(iii)** Hybrid in which it considers many points of services and products equally, a given example: customers of restaurants they need pleasure and food. **(iv)** Core and minor services and goods accompaniment, in this category, the offer consist of major services with further supporting products or services, for example, airline customers buy services of transportation. **(v)** Pure services, it is acknowledged mainly of a service, for example, psychotherapy, baby sitting, (Aako Teikake, 2012).

In addition, services hold four major characteristics that cannot be found in products; **(i)** Intangibility, in which, before the use of a specific services by customers it should able to be seen, tasted, heard or felt. **(ii)** Inseparability, in which, the services are acknowledged as inseparable because they are produced and consumed instantly. **(iii)** Variability, in which, services are acknowledged to be choppy based on the provisioner, in addition to the location and time of providing. **(iv)** Perishability, this refers to the circumstances in which services cannot be stored, (Kotler, 2006).

### **2.6.2 Definition of Service Quality**

The definition of service quality refers to many adjectives such as, the moments of truth, encounters experience with services, price, image, service evidence and so on. None, the less, quality point out the concept that companies should provide services and goods which satisfy the external and internal customers' needs. Quality avails as the bridge between customers and the procedures of services or goods (Kotler & Keller, 2006).

Thus, in contraindication to the concept of customer satisfaction; the concept of service quality acknowledged as the gap level between the expectations of customers

toward a service performance before service fulfil and customers comprehension toward the received service, (Parasura et al., 1988). Bitnerk & Hubbert (1994) theory portends that the client will evaluate that quality is minimal if his or her expectations does not meet the performance, and quality is high if performance exceeds his or her expectations. Hence, the expectations of customers work as the foundation; the service quality will be rated by consumers. This underlying that as quality of service enhances the level of satisfaction toward the service will rise, that could conclude an behavioural intention to reuse the service (Aako Teikake, 2012).

### **2.6.3 Service Quality Development**

For any service provisioner mind-set, providing offerings and proposals which can support any needs of customers is essential to justify their own persistence of economic. To achieve this objective by service providers, it is decisive for them to realize how the service offerings quality is evaluated by customers, and how they select an organization in advantage over the other and on which state of affairs they grant their support for long term.

The core objective for any provider of a specific service is indiscernible to that of tangible goods, (Bei and shang, 2006). Before, service quality researches were orienting their consideration on the disconfirmation /confirmation paradigm and consumer behaviour, (Gummesson, 1991). Depending on this prototype consumers compare the experienced quality to their beforehand expectations when they expend away a product, (smith, 2007). This marks to soulful response settled in dissatisfaction/ satisfaction with the service or product purchased. Consequently, manufacturing services require continues improvement for the quality provided, this

is combined with behaviour of costumers that lead the researchers to improve their efforts in promoting concepts and models of service quality, (Gronroos 1984).

After many extensive researches and efforts setting by researchers on the models of service quality provided, it shows that the evaluation process of quality by consumers is started by comparing their perceptions of the actual performance offers of service provider with their experience, (Gronroos, 1984; Parasuraman et al., 1985; Garman, 1990; Babakus & Boller 1992; Bitner & Hubbert, 1994; Tsaur et al., 2002; AKsoy et al., 2003; Chen & Chang, 2005).

#### **2.6.4 Service Quality and Implications to Business**

During the process of measuring the service quality with the customer satisfaction, it is significant to examine and evaluate each concept factor of service quality and the related dimensions, (Bitner and Hubbert, 1994). Hubbert and Bitners (2009) mentioned that there is a high combination between quality provided and the impression of customer when it is in a high quality region level that helps to fulfil the customer satisfaction degree.

A lot of scholars have highlighted the significance and the effectiveness of the service quality on an organizational firm. For example, Parasuraman et al. (2001) mentioned that assuring good quality in any service industry is known as a critical methodology to guarantee that the offerings of company are especially located in a market place. Chang and Yeh. (2002) underlined the service quality significance and highlighted that any business should be attentive with the issues of service quality in which customer loyalty can be declined by 20% if any problem with service quality occurred. In addition, there is a direct relationship between the service quality and the level of customer satisfaction, in which bad service quality gives poor level of

customer satisfaction; whereas better customer satisfaction generated by high level of quality.

For any business of a service or product, both face and defy in promoting their products in the environment of competition, (Abraham, 2006). However customer attraction is needed to business prosperity. Retaining customer is significant; because of the change in the business, political environment, economic and cultural, customer can head for changes based on his/her preferences.

All these dynamic changes on the dimensions of customer can provide either negative or positive effects on the modern firm, (Aksoy et al., 2003). Based on this, these organizations should create their business plans more effective and comprehensive, and should select appropriate and adequate tools for service quality with less obstructions. Because consumers vary in degree, income, age, educational level, mobility patterns, etc, the marketing managers are responsible to comprehend the consumer group behaviour and provide products which can satisfy their needs, (Jevons et al., 2005).

As a result, this can help managers to get more advantages over the competitors and create predictions to fit the preferences of its customers. Product marketing is varying from service marketing due to the dynamic changes in products when compared to services. Services are "Perishable, variable, intangible and inseparable". Researchers and scholars have determined many approaches to the quality of service for example; gap analysis, service quality dimensions, the direct quality experience application and the design approaches from goods to services. Parasuraman et al. (1985) mentioned that there are ten service quality determinants which are integrated to service: empathy, assurance, responsiveness, access, competence, tangibility, customers analysis, reliability, security, communication. (PZB, 1988) rearranged this model to

finalize with multiple dimensions which are: reliability, tangibility, responsiveness, assurance and empathy.

### **2.6.5 Airport Service Quality**

Many researchers have provided many definitions of service quality and summarized as the service degree delivered which matches the customer expectation (Lewis & Booms, 1983). Service quality can be a comparison of expectations and performance depending on the perception of customers (Parasuraman et al., 1985). The study of Fondness and Murray (2007) concluded that the customer-driven service quality enhancements helps in determining the perception of customers and also help in doing the competitor analysis and how much one's airport terminal is attracted by the customers. Lemer (1992) argued that the perceptions of passengers, airlines and airport operators can be proved helpful in measuring the quality of service provided by the airports.

According to him these airport operators have unique perceptions regarding the airport effectiveness. A study done by Yeh and Kuo (2003), defined passenger total fulfilment as a KPI for airport operations.

To evaluate the quantity of airport service quality they defined six unique service attributes: **(i)** convenience; **(ii)** comfort; **(iii)** security; **(iv)** processing time, **(v)** staff courtesy; and **(vi)** information. In order to determine satisfaction level of passengers, Martin Cejas (2006) put on queue concept to waiting time and proposed time intervals for several airport service processes. He proposed a quantitative model to determine the perception of customers regarding the service quality by proposing two important aspects regarding perception: average waiting time and amount of congestion at airport facilities.

The usual waiting period is driven by check in service time and the usual selection of passengers waiting, whereas, the quantity of congestion depends on the dimension of service area in addition to queue length, (Martin Cejas, 2006). Francis et al. (2002) study highlighted that performance management is vital as the congestion increases in the air transport system it lower yields.

The operational pressures associated with the environmental and social impact of aviation improves as the pressure take down expenses. They also suggested that performance measures may help to improve competition and cost restrictions. For example, the outcome of the minimal cost airlines could possibly better the value placed on turnaround time; aircraft utilization; the function of instant ticket sales by online and call centres; and adaptable labour practices.

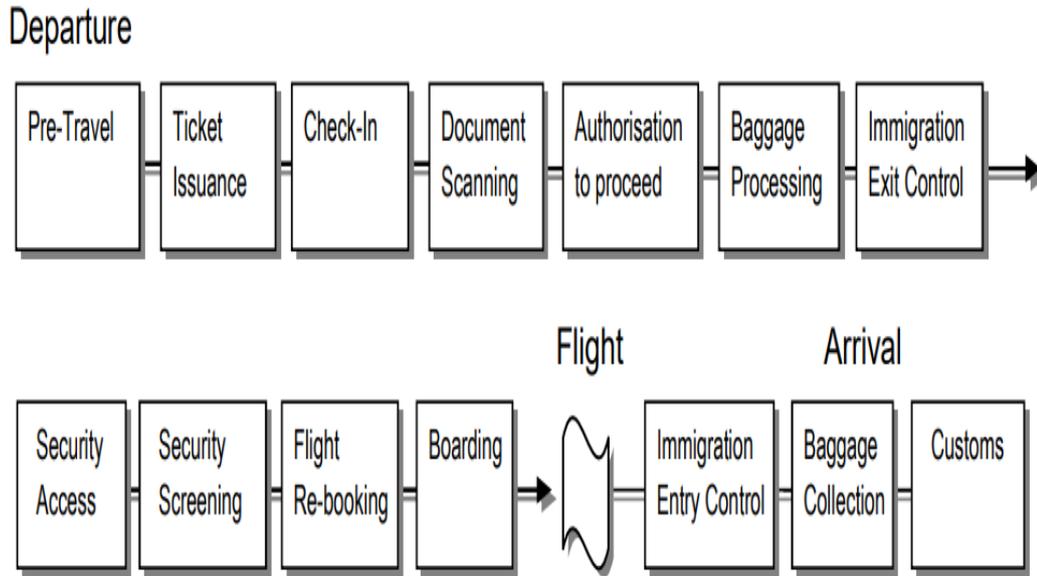
This specific effect might also drive airlines to evaluate the entire price system of the operations of theirs. Humphreys et al. (2002) discussed that there are numerous performance measures which uses paper variables such as quantitative designs which are based on service indicators. They are not difficult to measure and are important in evaluation. Their study concluded that the following aspects are usually considered to evaluate the service performance of airports: **(i)** customer satisfaction; **(ii)** catering in common satisfaction; **(iii)** cleanliness of terminal and restrooms; **(iv)** check in satisfaction; **(v)** friendliness of terminal signage; **(vi)** worth for money of shops; **(vii)** standard of carpark facilities; **(viii)** accessibility of baggage trolleys; also as **(ix)** baggage delivery service. Personalized Airport Systems for Seamless Mobility and Experience (PASS ME) project has been initiated to assess the service quality, with its key objective reduce passenger time at international airports to the E European Union by 60 minutes, (De Lille, 2015; PASS ME Project, 2015).

Additionally, De Lille (2015) incorporated the following essential airport and aircraft areas in the PASS ME project for service improvement: **(i)** arrive at airport, **(ii)** check in and bag drop, **(iii)** disembark in addition to customs, **(iv)** lounge, **(v)** boarding Gate, **(vi)** On-board, **(vii)** security, **(viii)** baggage claim, together with **(ix)** exit airport.

The assessments which are driven by the passengers are effective in understanding the discretionary activities processing of departure and arrival terminals. Different airport passenger terminals are being reviewed in this subsequent region. A handful of airport indicators in assessing service quality at airfields had been introduced by this specific area.

## **2.7 Passenger Activities and Airport Domains**

In order to widen the concept of service performance assessment, airport terminals review passenger activities. The passengers have to pass through airport domain after flight of theirs at departure terminal while some passengers are waiting for their flight at arrival terminal. Based on the IATA definition, Figure 2.1 shows eleven airport domains for departure, together with three airport domains for arrival, (International Air Transport Association, 2014).



**Figure 2.1, Domains of IATA's Airport Processing (IATA, 2014)**

As IATA improves passenger processing by using technology with the help of available passenger data. Popovic et al. (2010) developed a concept of airport domains based on passenger-centred pursuits. This program specifically categorizes passenger duties at international airports in processing' and discretionary' (none processing) tasks. This program has the following six departure domains and five arrival domains:

**i. Departure**

- a. Processing domains: Check in, Security, Immigration Customs, Boarding
- b. Non processing domains: Arrive at Airport, Waiting/Retail Area

**ii. Arrival**

- a. Processing domains: Disembark, Immigration, Baggage Claim, Customs
- b. Non-processing domains: Depart Airport

This program divides into two domains, compulsory and discretionary. The activities which must be finished in an organized manner are compulsory activities. However, discretionary domains referred to several suggestions by passenger pursuits.

Popovic et al. (2010) also developed an idea which helped in checking out similar domains at airport terminals. This plan distinguishes IATA's concept in such a way that, IATA focused on technology to differentiate airport processing stages, whereas, this idea focused on specific examination of passenger congestion to identify similar domains. By focusing on the passenger centred activities, this idea enables security URL to cover activities on IATA's two security-processing stages (i.e. access and security). As shown in Figure 2.1, there are four IATA stages at check in pre-travel, ticket issuance, check-in, and document scanning. Popovic et al. (2010) argued that these four activities at the check in domain might be classified as processing pursuits. For example, the subsequent stage of Figure 2.1 (ticket issuance) can take place for check in, at home with the World Wide Web, or possibly before the initial step (pre travel).

The concept given by Popovic et al. (2010) helps in covering many passenger tasks, such as the option if ground transportation from/to the airport terminal by using various terminal facilities out of the option of ground transportation from/to the airport terminal like ATMs, restrooms, lounges, trolleys, retail outlets, and Wi Fi. To make passenger satisfaction assessment more reliable, many researchers use airport access in addition to airport facilities as two different domains as they have different evaluation criteria. As airport access is related to the infrastructure and linkage of airport to ground transportation which is more accessible for the passengers, airport

facilities are related to the range of facilities available to passengers within the terminal buildings (Bogicevic et al., 2013; W. L. Chang et al., 2008; Mazzulla, 2009; Liou et al., 2011; R Rhoades et al., 2000; Tsai et al., 2011).

Another study of Kirk (2013) analyzed that many other non-processing airport domains such as retail area is also an important domain. In his sample of 71 passengers, though not every made a purchase, but every participant has visited at least one retail outlet of the terminal. Various other scientists also have included show area' as a significant analysis criterion to assess passenger satisfaction, (Atalik, 2009; Bogicevic et al., 2013; Correia, Wirasinghe, 2013; Correia et al., 2008; George, 2013; J.D. Power and associates, 2010; Liou et al., 2011).

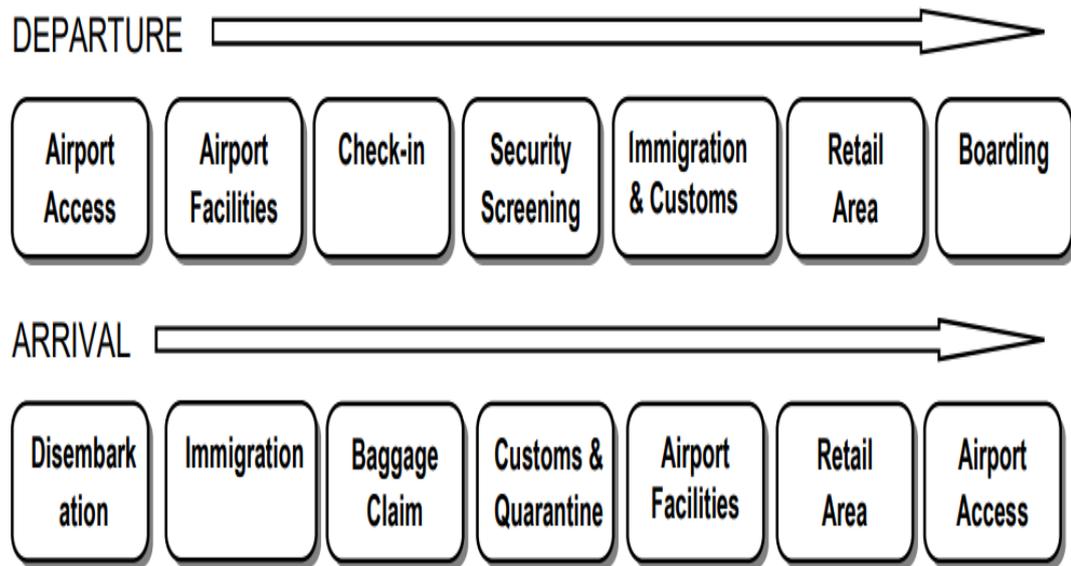
Considering the advantages of airport aces, airport facilities and retail are for both arrival and departure times, Wiredja et al. (2015) included these three non-processing domains of the components of theirs of airport domains (Figure 2.2):

**i. Departure**

- a. Processing domains: Check in, Security, Immigration Customs, Boarding
- b. Non processing domains: Airport Access, Airport Facilities, Retail Area.

**ii. Arrival**

- a. Processing domains: Disembark, Immigration, Baggage Claim, Customs
- b. Non processing domains: Airport Access, Airport Facilities, Retail Area.



**Figure 2.2,** Different Airport Domains of Passenger Experience  
(Wiredja et al., 2015)

To measure the complete functionality and service quality of airport, passenger terminals have been assessed by this specific area. For effective measurement it is necessary to understand passenger tasks and passenger's activities.

## **2.8 Service Performance Airport Determinants**

### **2.8.1 Passenger Profile Characteristics**

Study done by Chao et al. (2013) highlighted that passenger's perceptions and expectations for the quality of service being provided by the airport is related to the profile characteristics of the passenger. Profile characteristic of passenger indicates that whether a passenger is a frequent/non frequent flyer, young or old, a low-income or high earner, or maybe travelling for personal reasons or business. They also argued that passenger's expectations and perceptions are also affected by the travelling elements (such as connecting flights, flight delays, time of departure, and flight

duration); the carrier type (for instance, low-cost or regular); solutions and also queuing time in different airport domains (check in, immigration, security screening, and boarding); and by airport facilities. Study concludes that reducing the queuing time, eliminating the operation of bottlenecks, preparing specific traffic flows raising the range of areas and business services, plus giving greater public facilities are means to provide more appropriate and comfortable services to passengers, (Chao et al., 2013).

According to the ACI World Report 2014, the entire air traffic passengers from December 2012 to December 2013 increased by 4.2 %. This represented a 5.6 % increase for overseas passengers, along with a 3.0 % increase for household passengers, (Airports Council International, 2014). Realizing they are operating inside a small capacity with increased amount of flights, airports worldwide have recognized the importance in order to look at passenger fulfilment and to recognize places where they are able to improve the airport knowledge, (Bogicevic et al., 2013).

Many studies have been done which identified that expectations vary among the different group passengers regarding service quality of airport. These differences were related to passenger's characteristic as discussed above, that whether they are regular flyers or high income passengers etc, (Murray and Fodness, 2007; Liou et al., 2011, Y. C. Chen and Chang, 2012b; Chao et al., 2013).

Other researchers have argued that some elements related to service quality of airport such as the interaction among people of airport staff members plays a major role in effecting the passenger's satisfaction level. This element is also dependent on the passenger's profiles like: **(i)** the travel purpose of theirs, **(ii)** whether they're departing or maybe transit passengers, and **(iii)** their traveling frequency (S anoint, 2011). Another study of Wirasinghe and Correia, (2013) suggested that, it is important to

analyze the socio economic variables of passengers such as gender, age, family income, the intent behind the journey, and frequency of trip to properly evaluate the various expectations of different passenger groups.

Applications of passenger profile attributes are restricted in the prior investigation. Certain airport domains or maybe segment of passenger travel was being address by them, for example departure, transit, and arrival. In the context of assessing total airport passenger practical experience from departure to arrival, these qualities have not yet been resolved thus far.

## **2.8.2 Airport Related Determinants**

If local or state economies are concerned, an extremely active and efficient aviation industry plays an important role. Isaka (2012) expressly highlighted so important ingredients of cohesiveness between airports and airlines. One can say that a well maintained and highly efficient airport does support the economic development of certain community.

Albers and Goetsch (2007) have suggested different variables and other aviation regulation of LCCs to analyze the service performance.

Albers and Goetsch (2007) discovered that both an airport operator and airline forms with very small group of companies, they help each other to obtain competitive advantage in the air business. In order to explain their observation, they conducted a case study considering Munich Airport's (MUC's) Terminal one and Lufthansa (LH). A joint venture between both LH and MUC was established (40% LH's share and 60% MUC's) when LH was facing an issue of overcapacity. Because of such joint venture, a second dedicated terminal was constructed for LH and its Star Alliance partners. In June 2003, such terminal began its smooth operations flawlessly. Such

operations let MUC to have the exposure to biggest website traffic expansion of almost 2,200 weekly flights to 83 different destinations.

Growth of an airport depends on its flawless functioning. And when one starts its sublime operations, it acts as a connector and support system for both local and state airlines. Airports were under great pressure to greatly reduce costs and boost their productivity as deregulation of commercial airline industry and growth of LCCs was observed, (Bottasso & Piga Conti, 2012). This can only be done by joint efforts of both airlines and airports. Choice of air passenger depends on various features such as brand image, airfares and service quality of an airline, (Boksberger, 2011).

For normal LCCs and airlines, huge gap between perceived quality of service-quality and real quality of service-quality has been observed. Ingredients like federal air carrier data acquisition, complaint procedures and reduced buyer expectations of LCCs were the focus of Wittman (Future research, recommended by 2014) to explain such gap.

Passenger convenience was gravely affected by 9/11 terrorist attacks in the United States. Extra security checks for things like laptops, metal objects, and mobile phones along with shoes were introduced on security terminals to reduce such life risks. Additionally, there are allowance limits on quantity of gels, aerosols and liquids (LAGs) to be carried on board, (Caves and Kazda, 2007b).

Passenger travelling has been simplified by the implementation of state of the art technologies like online check-in, biometric passports and the facility of instant immigration systems. Enhancing aviation security, boosting the utilization of terminal space, improving airport passenger experience and minimizing queuing timings and passenger processing are the four highlighted objectives of Simplifying Passenger Travel (SPT) system. Airlines like Virgin Australia and Qantas have allowed

passengers to work with their laptops and mobiles, having flight mode ON, throughout their flight.

The position of World's Best Airport has been kept by Singapore Changi Airport as they continuously upgrade their facilities and other luxuries so that they could provide phenomenal experience to their passengers, (Wong et al., 2008). This attitude is developed by constant fear of competition being developed in the airline industry. Airports in the region such as Hong Kong, Seoul, Dubai and Bangkok are leading the competition race.

Wong et al. (2008) highlighted that various customer focused top class services of their own are introduced by CAAS to provide people worthy airline experiences. For instance, by being people friendly international airport, able to provide assisted check in services for disabled passengers, two hours' city tour for visitors and transit passengers, biometric based immediate immigration process for permanent residents and less queuing time for Singapore citizens are some salient features of Changi Airport.

## **2.9 Concepts and Frameworks of Customer Satisfaction Theories**

### **2.9.1 Customer Brief Definitions**

The end users of a service or a product are defined to explain the term 'customer'. Based on one explanation, the word customer is a generic term which describe the purchase procedure that done by a person or business to a products or services from another person or one company, (Aako Teikake, 2012).

As mentioned previously, commonly the word customers are referring to the users group of either an organization service or a product at the end of related processes.

Mainly, the organization's work is primarily focused by its own primary customers. As an example of this study, the primary costumers or concerned end users are the people who have full view and experienced Dubai International Airport services.

The term customers represented diverse categorizes: internal customers and external customers. The internal customer category indicates to employers and staff who work within company where on the other hand the external customer category is refer to the organization stakeholders. An important notice, primary customers are always a common factor for all organizations, who are primary designed to help in an organization's work and success.

For the goal of enhancing and gaining higher levels of customer satisfaction, it's essential for the managers of all companies to identify and spot initially their elementary customers. However, the importance of customer to an extent, appear in their influence within air travellers' domain. The feedback of customer haven sufficient impact on the airport, therefore, their cooperation is helpful and beneficial for improving the airport services and functions. The management of airlines are responsible to understand the benefit of customers and this requires unique impulses, (Kossmann, 2006).

### **2.9.2 The Importance of Customer**

In any organization, the elementary motifs are the customers, in which they are the core reason behind an organization success. The more customers are related to an organization the better it becomes comparing to other organizations. Therefore, the essential role of the customers in an organization is spotted as following, (Paul, 2005):

- i.** A business organization only exists if there are available customers for it.

- ii. With less customers' satisfaction there is always less loyalty, and that lead to keep organizations losing the customers and stay unprofitable; to avoid such a case, organizations need to develop themselves based on their own customers.
- iii. The essential role of an organization existence is to fulfil their customers' needs and that lead to keep their loyalty to the organization and purchasing from them or continue using the provided services.
- iv. To allow a specific provision of company revenue, analysing the business in the backbone of any organization will enhance the revenue margin.
- v. The business is allowed by customers to achieve their objects.

### **2.9.3 Customer Satisfaction Concepts**

Recently, the domain of businesses is too large in the market, various types and several competitors are competing. Therefore, gaining customers satisfaction has got attention and interest among scholars and practitioners to contribute toward goals and strategies enhancement for any special activity in the competitive market, (Bearden & Teel, 1983). It is significant and important to conceptualize and explain in details the term "customer satisfaction" in this research Study.

- i. Oliver (1997) explained the term customer satisfaction as the response of consumers to the offered products and services.
- ii. Bitner & Hubbert (1994) described the term as the observed and desire culmination.
- iii. Customer satisfaction is the attitudinal judgment of a commodity by the end users as mentioned by Westbrook & Reilly (1983).

- iv. Churchill & Suprenant (1982) introduce the customer satisfaction psychologically in which the consequences achieved by a specific service or a specific product can effect emotionally on the end users
- v. The customer satisfaction is assessment rating of a specific service/ product experience done by one or more customer based on the provided functionality and characteristics. (Parker & Mathews, 2001).
- vi. Customer satisfaction is a description in the way of how the persons feeling either pleasure or disappointment as a result of performance and how it's correlate with the end users' expectations (KotlerBloom, & Hayes, 2002).
- vii. As noticed from Oliver (1997), Satisfaction can be a term that is complex which provide difficulties to be described or to be quantified. Moreover, it's too complex to set up a common definition for all term users. Nonetheless, the studies of term "customer satisfaction" are critically reviewed and revised by scholars, practitioners and marketers who have expressed the term from different points of view.
- viii. Hunt (1977) defined satisfaction as the evaluation of emotion, indicating that satisfaction reflects the degree in which the believes of consumer evoke positive feeling after a service use.

**a. Satisfaction as a Multi-dimensional Concept:**

The connotation of customer satisfaction is deemed by researchers as a multifaceted connotation which relates to several fields of diversified interferences with the products or services provider. Most notions of customer satisfaction in most studies are related to the offered products and services quality (Brady & Cronin, 2001;

Bryceland & Curry, 2001; Kotler & Keller, 2006); however, the definition was explained with other non-quality dimensions by Garland and Westbrook (1989).

These contains the uninterrupted business pertinence with its price performance, service context, or consumed time to get a product or to deliver a service with a unique experience that can affect organization's performance, (Gronroos, 2000; Edvardsson et al., 2005). Since customer satisfaction has a potential influence on the behaviour of consumer and the customer retention, (Oliver and Swan 1989; Oliver 1980; Fornell 1992; Cronin and Taylor 1992; Bolton and Drew 1994; Joseph et al., 2000).

Satisfaction is a core for any service of business, because when customers are satisfied, they will be motivated to purchase a service or a product, (Joseph et al., 2000).

Later research of Westbrook and Oliver (1991) recognizes the cognitive and emotional role of satisfaction.

In addition, satisfaction is recognized to be a major value in understanding customer's evaluation and perception, (R. Oliver, 1997). Perceived performance of service or product is compared with a standard to represent the customer's expectation of the service performance (R. Hallowell, 1996).

R. Oliver (1997) indicated that EDP framework is the most popular consumer satisfaction theory.

The rapprochement of standard result within disconfirmation can be compared with the rapprochement of perceived performance, or the difference between what was received and what was expected, (Woodruff and Gardial, 1996)

Services and products have numerous dimensions. As an example of that, the product offers, the reliability of service or product, timeliness and friendliness of the service

provider organization. As per customers' achievement, they are able to relate satisfaction in various ways of interest depends on his/her opinion of the product or service. In this research study, the connotation of this term can be acquainted to the pertinence between any relative dimension of the service delivery and its quality within Dubai International Airport (DXB).

**b. Satisfaction with Overall Performance:**

The satisfaction as a general concept is related to certain aspects of a service or a product, (Cronin & Taylor, 1992). The satisfaction of customer is a connotation that is linked with the outright performance of a service or product provided by a specific organization. Dealing with satisfaction connotation as a certain merit or an outright performance is constructed based on one's interest, while the attribute-specific is for ones who interest in achieving the market value since it's providing higher advantages insights for engaged people in a way that a specific service dimension helps in meeting their desires. Where on the other hand, for the interest of accomplishing academic values, the measure should converge on the ration of helpful data to scholars and stakeholders to achieve new purposes of recipient research popularization.

Nevertheless, the target of this research is to identify the level of users' satisfaction in relation to waiting time, navigation, streamline experience and efficiency performances at Dubai International Airport (DXB).

**c. Levels of Satisfaction:**

As per the customers' evaluation, satisfaction can be described into different levels. As an example, part of the customers may express negative feelings and give low

evaluation towards a service or a product where on the other hand, some customers express positive feelings and give high evaluation towards the service and products. Various opinions of customers whether positive feeling (highly satisfied) or negative feeling (highly dissatisfied) of a service or product affect the overall evaluation of airport performance. The customer satisfaction is defined as the prevention of customers' complaints by meet or exceed their needs and expectations by Kossman (2006). Therefore, less complaints don't necessarily mean that the end users are fully happy and satisfied with the services and products tooled up by the airport, but rather accepting what they extradited based on radical trait. This research study will use both ways of defining the satisfaction either positively or negatively were discussed.

#### **2.9.4 Measurement and Significance of Customer Satisfaction**

In order to improve the business intelligence, make better decisions, enhance the customers' relations and improve the quality of the offered products and provided services, several organizations have utilized the customer satisfaction measurement, (Grigorousdis & Siskos, 2010). Based on the research of Doole & Lowe (2008), customer satisfaction measurement is considered as a fundamental aspect in business organizations. Moreover, it's included in synchronous innovation in the area of principles that are related to the continuous improvement. In the management science, the measurement of an object is considered as part of the main five functions in relevance with the analysis, improvement and recognition of synchronous innovation. Based on unique philosophy, to understand something and have clear view of it, you need first to measure it. In fact, this connotation needs to be weighted and has interpretation of quantifiable parameters through numbers to indicate about the customer pleasure, (Grigorousdis & Siskos, 2010).

In consequence, it assists the firms to have better understanding of their customer needs and it makes the organization in superior posture to provide unique service quality. Lately, several investigators have claimed and followed the customers' satisfaction theory and linked it with other theories that result the consequence of the connotation dimensions by feedback data for performance enhancement of organizations and that lead to gain and increase the customers' gratification level.

As mentioned previously, the feedback of customers and their contentment assessment are substantial due to the direct, efficient and meaningful evidences that spot their expectations and needs in a systematic way. Accordingly, as the perspective of Kossmann (2006), that the business standards of excellence and performance are the customer satisfaction base. Furthermore, another definition of customer satisfaction, it's the measurement of the pleasure amount resulted by a specific product or a specific service when the situation of expectation is exceeded, (Smith, 2007).

As stated, the psychological factors of any end user can represent the measurement process of satisfaction. The measurement aspect of this connotation plays a major role in the attitude of loyalty purchasing and confinement. Therefore, it's critical for the organizations to gain the satisfaction of customs of their offered products and services. The quantification of customer satisfaction is divided into three main psychological classifications for the experience assessment of a specific product, firstly the cognitive process and it stars by thinking and ends by evaluation, secondly the affective process and controlled by emotions and thirdly the behaviour process that control the future actions.

In the beginning, the satisfaction process was pointed as the end user response as per Oliver's (1993) claimed, which confirm the psychological classifications of customer

satisfaction. On the other hand, Oliver had a further interpretation of satisfaction where it involves situations that don't rely on the unpretentious libertinism.

Recently, in article studies which are related to Oliver, he represented the advocacy paradigm of customer gratification that plainly dissected the fixed interpretation. Accordingly, with the notarized paradigm of customer gratification it was shown that the connotation determinants are divided into affirmative affective and supine affective where the soulful rejoinder and cognitive disconformities are affecting the customer satisfaction, (Vavra, 1997; Brady & Cronin, 2001).

For the importance of customer satisfaction many substantial debates were done in customer satisfaction literature to figure the definition of it. Therefore, customer gratification is necessarily to be outlined as outcome or practicability. Extensive studies made by Parasuraman et al. (1988) and Oliver (1980) examined the concept of satisfaction as a practicability that was fouled up to classical tally by utmost scientists at that time. The concept of customer satisfaction that determined by Khalifa & Liu (2002), was based in assuming that it's the consequence of gratification by the practicability of matching grasp performance, expectations and inclinations. This theory was pointed by one of Oliver (1980) theories which is the expectancy disconformity theory which notifies that the customer satisfaction is dependent on product rendering to which the needs should be equivalent to it, and pointed as affirmative disconformity while on the other hand, if the provided products or services didn't meet his/her expectations and needs, it regarded as negative disconformity. Hence, satisfaction is recommended as a practicability and isn't occupied within this case, however the bands to reach gratification that occurs in the first stage of the delivery process service, (Grigoroudis & Siskos, 2010).

In recent studies, consumer satisfaction is determined as post-purchase experience since it's a consequence within the trajectory of exhaustion of a service or product, (Gronroos, 1984; Leonard & Sasser, 1982). This explains basics in encouragement connotations that hypothesize consumers are obliged by the lust to accomplish their requirements and be satisfied, (Hensel, 1990).

As an alternative to express their satisfaction, the consumers' demeanour is forced by the necessity to obtain pertinent goals. As a summary of this context, gratification is observed as an aim to be accomplished and elucidated as the conviction response of end users, (Gronroos, 1984). Furthermore, it's pointed as a practicability based on a reality that humans' assessments are involved with their real test of the practicability of air delivery service.

In addition to that, a debatable issue presented customer satisfaction literature that consumer satisfaction is considered as a cognitive and affective response. Therefore, an obvious concept of satisfaction as a cognitive response or an effective response needs to be determined. Even though, the major definition of satisfaction examined by many scholar remains unclear which is a process where some authors keep the concept of satisfaction as a cognitive rejoinder which covers an appraisal of provided production by a provisional versus the consumer anticipation. Others deal with the anticipation from emotional perspective or influential event of mind that's constructed by the service delivery process where the consumer encounters the service experiences that influence their feelings and thoughts.

However, satisfaction is considering as both cognitive and affective by the following group of authors; Oliver, 1993; Gronroos, 2001; Wong, 2004; Edvardsson et al, 2005; Pakdil and Aydin, 2007; and Park, 2007. This consideration is based on customers consuming an offer that is cognitively speculated as well as their involvement within

the service offspring and surrender which permit them to rate the quality of service emotionally.

### **2.9.5 Increasing the Value of Passenger Satisfaction**

Lovelock (1991) summarized the efficiency of service as two pair of activities out of which one is Core Elements and the other one is Supplementary Parts. Sufficient efforts are needed on Core Elements to satisfy the client's need and to also maintain a minimum business standard. Effectiveness on additional elements is based on naturally competitive approach choices, (Lovelock, 1991).

It was mentioned in previously that service quality of airport can be measured from few angels: **(i)** passengers, **(ii)** airlines, and **(iii)** airport operators. Some researchers argued that the scope of client satisfaction and service quality differs from above mentioned points rather they argued that service quality is part of client satisfaction as consumer perception of fulfilment is based on service of quality, (Parasuraman et al., 1988; Oliver and Rust, 1994; Baker and Walker, 2000).

The management of Airport must know how to recognize the improvement opportunities at the terminal service area to maintain customer's satisfaction level high.

Due to deregulation, airport management has changed the business model from airline generated profit to passenger-generated revenue, (Harrison et al., 2012; Isaka, 2012). Same is the case with International Air Transport Association - IATA which implemented the policy where airlines should pay airport charges based on how many passengers carried instead of weight of takeoff and landing (Schuster, 2009). Considering this, the duty of commercial airline passengers will discharge in a much

better way in increasing the terminal efficiency, which will result in much better passenger satisfaction, (Kramer et al., 2013).

Clients satisfaction is not the objective of recommendation given by Airport Performance Measures, (Airports Council International, 2012). The main objective of Performance Indicators is to enhance customer satisfaction using future analysis. A few separate factors including passengers a worker, security-clearing time, check in service time, departure delay, airport facilities and simplicity of method finding, along with terminal cleanliness maybe considered as passenger driven performance methods, (Airport Council International, 2012).

Zonneveld and Noteboom (1998) had given the concept of Customer Value approach, which tries to capitalize the value for the customers and the company simultaneously. They argued that companies with intention of distinguishing themselves by success must start by dealing their customers in a different way, which will produce value for customers beyond the regular delivery of items. While making optimum value for both client and business, it is necessary for business to take some performance actions including customer satisfaction, the quantity of issues, the frequency of repurchase, client retention rate and loyalty. The important step for the company's performance is to create value for its clients

The idea of punctuality for a departing flight (a program measure) as well as increasing the list of revenue (a company measure) was provided by Humphreys et al. (2002). The flight can be postponed by passenger if he fails to check in on time as then it would be considered as a clash between a company measure and program measure. To eliminate these risks, it was recommended that healthy scorecard must be maintained to resolve disputes among company, service, and green goals. Humphreys

et al. (2002) states “it is crucial to obtain proper understanding of the operations to identify relevant risks and their mitigation processes”.

### **2.9.6 Customer Satisfaction and Behavioural Intentions**

The behaviour of consumers influenced by the customer satisfaction in terms of expectation and perception of the provided product and services by the firm. If a customers get satisfied by a service and product, it's believed that this will drive to consumers fidelity and confinement that in other hand helms curativeness and prosperity of the firm, (Kossmann, 2006). The conscious decision making effects are the intention to execute a behaviour, and outline the strongest predictors of factual behaviour, (Davis, 1989). Behavioural intention is moderated by customer's experience, gender and age, (Viswanath et al., 2012).

There is an increase of researchers focus on the area of behavioural intention through the effort implementation to assess the possible associations. These include task and experience (Wober and Gretzel, 2000), subjective norm, task technology fit and self efficacy (Lam et al., 2007), perceived value, service quality, information quality and system quality (Kim et al., 2008), in addition to perceived playfulness (Morosan and Jeong, 2008). A theory indicates that lowering the rate of customer defection, or increasing the customer retention, is a critical key to a service provider ability to generate profits (Joseph et al., 2000). More specifically, Joseph et al. (2000) indicate that appropriate behavioural intentions are linked with the ability of service providers to get its customers to: **(i)** Recommend the company to other customers. **(ii)** Say positive words about the company. **(iii)** Spend more with the company. **(iv)** Remain loyal to the company. **(v)** Pay price premiums.

In diverse studies and researches, customers gratification is linked with repurchase process, probability to admonish, customer loyalty and retention. On the other hand, at some levels customer satisfaction reflect a negative feedback where customers and shifting intentions, (Bearden & Teel, 1983). As a consequence, it's a misguiding of a firm to relay on and use the customer loyalty trends as an indication of an organization customer to be satisfied without appropriate study executed to examine the behaviour or intention of a customer. It's not necessary that the end user fidelity and retention seeks evermore to customer gratification

The reason behind that is the fact that customers can't leave due to some faced circumstances rather than getting satisfied or not with the offered services and products. This issue is primarily popular context of service. Additionally, as Kiribati case, air travellers and customers have only the current airline of Kiribati which means they don't have a lot of choices and availability in the area. Therefore, the air travellers of Kiribati may find some services or products unsatisfied but forced to keep using the airline for the lack of choices. This may be as forced loyalty on the customers and that influenced by monopoly and situation circumstances, (Aako Teikake, 2012).

## **2.10 Technological Innovations at Airports**

“The technological knowledge conversion into a new service, new process or new product introduced in the market as well the significant technological variations in process, service and product”, is the definition of technological innovation by Orfila-Sintes et al. (2005).

Luis and Juan (2016) mentioned that there are two innovations type: The marginal innovations, in which they represent new better ways to do old things; and the real

innovations, in which they facilitate new procedures to do things when in their absence could not happen.

Compatibility, complexity and relative advantage are the characteristics that had consistent correlation to adoption on innovation, (Rogers, 1995).

Self service technologies at airports such as baggage drop, check in, ticketing and information kiosks are highly effective because they can reduce waiting time. Traveller experience can be changed by Smart phones, biometric systems, near field communication and big data. For example, the airport of Trudeau in Montreal has continuously improved the smart phone services by providing free SMS alerts to navigation applications and mobile website.

The next few years will show an increase in the use of the systems of automated bag-drop that is anticipated to attain 50% of all baggage drops. IATA foretells that in the next five years, baggage check in and passenger check will be performed particularly by self service options.

Even sometimes technologies fail due to technical or human errors, using strategies of expedient recovery and backup systems can retain the travellers' confidence in the technologies of the airport.

Thus, the growth of smartphone apps and the availability of the art technologies state make it possible to take experience of passengers to the next level in airports. Since travellers' satisfaction is fundamental for any airport, novel technologies can help airport managers to increase and improve travellers' satisfaction and create positive experience (Vanja et al., 2017). As James et al. (2015) mentioned that there are many services innovations events in the airports, can be presented as in below sections.

### **2.10.1 General Airport Kiosks**

Taking on of self service is obtaining importance for two major reasons, which are to reduce labour and cost and to increase efficiency. Self service transfers control into customers' hand. Researchers observed that consumers are more open to experiences with Kiosks. Many companies and industries such as finance, hotels. Retail are considering the use of self service technologies for the process of books loan. Consumers are able to handle huge transactions with Kiosks, therefore a lot of self service models have been examined, (E. Maras, 2006).

SST is a new technology that called self service technology. Self service technology is a tool that allows consumers to interact with self service software SSS. Like kiosk can be available in many locations and they employ software in a protective and hard case.

The self service kiosk SSK is a computer placed at desk or table in accessible location for the use the customers. Self service access is internet based that should meet special technological information requirements in addition to general requirements related to the access system architecture, (James et al., 2015).

Using self service transaction process by consumers let them to feel spontaneous and enjoyed the experience, (F. Bodendorf, 2009). Yet, other consumers brought their doubts and anxiety when they use service technology transfer process. Therefore, consumers consider the new technology worthwhile and its emotional cost, (J. Bennett, 2009).

### **2.10.2 Airport Security X-ray Inspection**

X-ray scanners have higher waiting time than any other technology, as they should set up the travellers in a specific position, take an image capture, let the image read and

analyzed by security personnel and rely back the results to the security personnel at the checkpoint. This process does not take much time for any given individual, but during peak time at airports, it leads to major delays.

A lot of airports found their security checkpoints immersed with a concern of additional delays may decrease the effectiveness of the security personnel and make them feel more stressed. Medical x-rays used in hospitals are much stronger than the backscatter x-rays that are used in security checkpoints. The backscatter x-ray do not over bones and flesh. Instead, they just penetrate not more than an inch into the body with the clothing, where the rays ricocheted and scattered back toward the sensor by the body tissues, (James et al., 2015).

### **2.10.3 Airport Social Media**

Many airports are increasingly accolade social media as an instrumentation of communication and there are many different examples such as, offering opportunities to like the airport on Facebook, to follow the airport on Twitter and to view photos and videos about the airport on Flickr and YouTube, (James et al., 2015). For the last recent years, the airports are increasingly broadening the social media usage. Yet, it is still biased towards the airports which are located in Europe or North America. There are many differences regarding the way that an airport is gained and operated, that's because the social media use as a driver and a reflection of a business transformation. James et al. (2015) have defined the social media as the group of applications that are Internet-based which can build on the technological and ideological foundations of Web 2, and allow the exchange and the creation of user-generated-content.

According to many respective sites, the usage of social media has been grown and remarkable, in which, the users number on Facebook exceeded 800 million in 2013,

100 million on LinkedIn, and 200 million on Twitter, (James et al., 2015). However, the increase in the businesses number have a presence of social media, that offering lineal links through their corporate websites, and are used to support their creation of brand communities and promote their brands, (A.M. Kaplan & M. Haenlein, 2010).

#### **2.10.4 Airport Micro Hotels**

There is no place to sleep at airport, like any exhausted traveller who want to grab some minutes shut eyes within a layover can attest, (T. Hume & E. Macguire, 2013). However, it may be enhancing, thanks the new short stay breed, pay for the micro hotels appearing in terminals of airports around the world.

Based on the Japanese concept of “capsule hotel”, the boxes and cabins let the sleepy travellers to impress themselves off around 30 minutes from the surrounding commotion in which they can have a solid night sleep or a nap without the need of leaving the terminals for hotels.

Some are containing showers and toilets. In addition, they are spreading out beyond the airport terminals. In London and Amsterdam airports, they are using “Yotel” that operates as short stay cabin; this concept is similarly available in the new hotel of Manhattan.

In other hand, Moscow’s Sheremetyevo Airport has a demonstration model of sleep box, (James et al., 2015). As following, the best five micro-hotels show that the size is not affecting: **(i)** Yotel. **(ii)** Napcabs. **(iii)** Sleep box. **(iv)** Minute suite. **(v)** Snooze cube.

In conclude with, social media, social networks, mobile and display technologies are affecting the customer behaviour, (Huarng el al, 2015). Lin (2015) stated that there is a positive relationship between passenger brand satisfaction and innovative airline

brand. Innovativeness, structure and size are the three characteristics which affect the innovation adoption by organizations, (Frambach and shillewaert, 2002). As mentioned in the paper of “innovation as the core competency of a service organization” by J. Kandampully (2002), that investigation of service innovation effecting concerning services or products at airport is helpful and useful for customer experience.

The adoption research of Pedersen and Ling (2003) studies the decision of organization to adopt a new service or technology at micro level or the individual level of analysis. Technology can change the mode of service delivery, the nature of services, and the practice of service management and service innovation, (Wilson et al., 2012).

## **2.11 Dubai Airports Facts Data**

Dubai Airports is the specified government authority that manages and owns the development and operation of both Dubai International (DXB) and Al Maktoum International (DWC) airports in the United Arab Emirates. In 1960, Dubai International started as the main airline hub that welcoming more than 67 million passengers within a year and serves around 260 destinations, after completion of Al Maktoum International that opened its gates to passengers in 2013, will turn into the largest airport globally with an ultimate capacity that will contain more than 160 million passengers per year.

Dubai International is a core contributor of Dubai economy, in which it employs around 90,000 people, indirectly contributes with more than US\$26.7 billion to the

economy and supports over 300,000 jobs, that shows around 27% of Dubai's GDP (Gross Domestic Product) and 21 percent of Dubai employment. A predicted goal by Dubai's aviation sector is that by 2020, the economic contribution will increase to 37.5%. And by 2030, the aviation economic impact is planned to support 1.95 million jobs and reach \$88.1 billion in Dubai.

This research study will focus on Dubai International Airport (DXB) that comprises three terminals (Terminal 1, Terminal 2 and Terminal 3). The first terminal is serving all airlines, the second terminal is serving special, charter and scheduled flights, and the third terminal is sanctified for use by Emirates airline.

DXB protect its place as world's number one international airport for four years consecutively with 88.2 million passengers as annual traffic in 2017. The Airport traffic is projected to rise to 90.3 million in the current year according to the initial forecast. In addition, DXB named as the world's number 1 airport with international passengers that reach a total number of 70.4 million in 2014. Dubai International has a gross of 526 counters of check in. In 2017, Business Traveller Middle East Awards nominated DXB as the Best Airport in the Middle East. In addition, DXB is within the best 100 airports that provide technological services to enhance their customers' satisfaction, examples of technologies including: Self-service online check-in , Mobile boarding passes, Omni cast camera systems, Self-tagging of baggage and bag drop, Radio-frequency identification, Automated gates, APC kiosks, The Automated Passport app, Self-service channel, Biometrics, Common-use terminal equipment, Common-use passenger processing system, Dynamic signing and digital wayfinding, Flight information displays, Baggage information displays, Mobile apps, Airport

websites, Beacons, Global Positioning System (GPS), Robotics or interactive kiosks. Social media, etc.

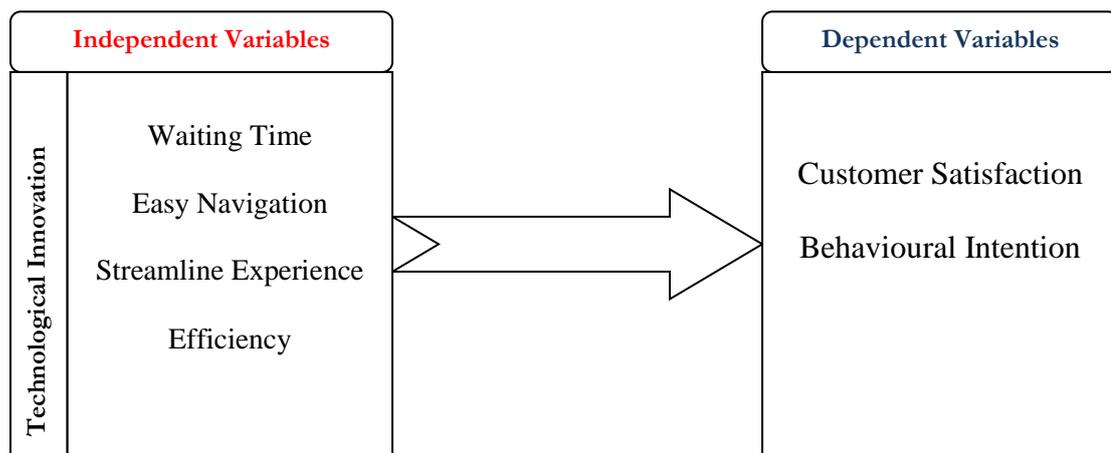
In conclusion, the targeted population of this research was Dubai Airports passengers from various nationalities who took a flight through Dubai International Airport (DXB) in particular, within the last 12 months. In addition to the previous facts, This Airport is chosen as a case study because Dubai is a prospering and flourishing city which experienced rapid development during the past couple of years that let it be one of the best and unique hubs in the world, as well as it is getting ready for the event of EXPO2020 that let the number of its passengers increasing rapidly during the coming years, these create new challenges and put the airport's operators and managers under pressure to engage high efforts to enhance the customer satisfaction in the airport, (Dubai Airports, 2018).

## **2.12 Summary**

Several airport signs at passenger terminals are being used as introduced by this particular chapter. Different concerns of passengers have been brought to light as various passenger experiences have been considered by the authorities. The overview provided an essential period for auditing and checking out the airport service indicators applied to the present exploration in this particular area.

On other hand and based on the previous literature review, it can be observed biases tendencies, in which it is difficult to study the airports security phenomena, and include all the dimensions of airports operations and services, customer experience and satisfaction in this research study. Therefore, this research study will be carried out through testing the technological innovation effectiveness on customers satisfaction in the domain of Airlines operations including (check in and baggage

drop), federal operations including (immigration checks), other entities operations including (shopping) during the process of departure and arrival. The research study has summarized the required factors that should be considered in recognizing the effectiveness of technological innovations on customers' satisfaction and their behavioural intention in airports, with proper justification and finding. At the latest providing deep review and analysis on different theoretical frameworks of significant variables that should be considered to enhance the customer satisfaction at airports.



**Figure 2.3.** Schematic Diagram to Identify the Independent and Dependent Variables of the Research Study

# **Chapter III**

## **Research Methodology**

### **3.1 Introduction**

The Research data will consist of primary data that helps in the analysis of the research results and findings. This data was gathered from the quantitative data of the survey that was conducted within the research.

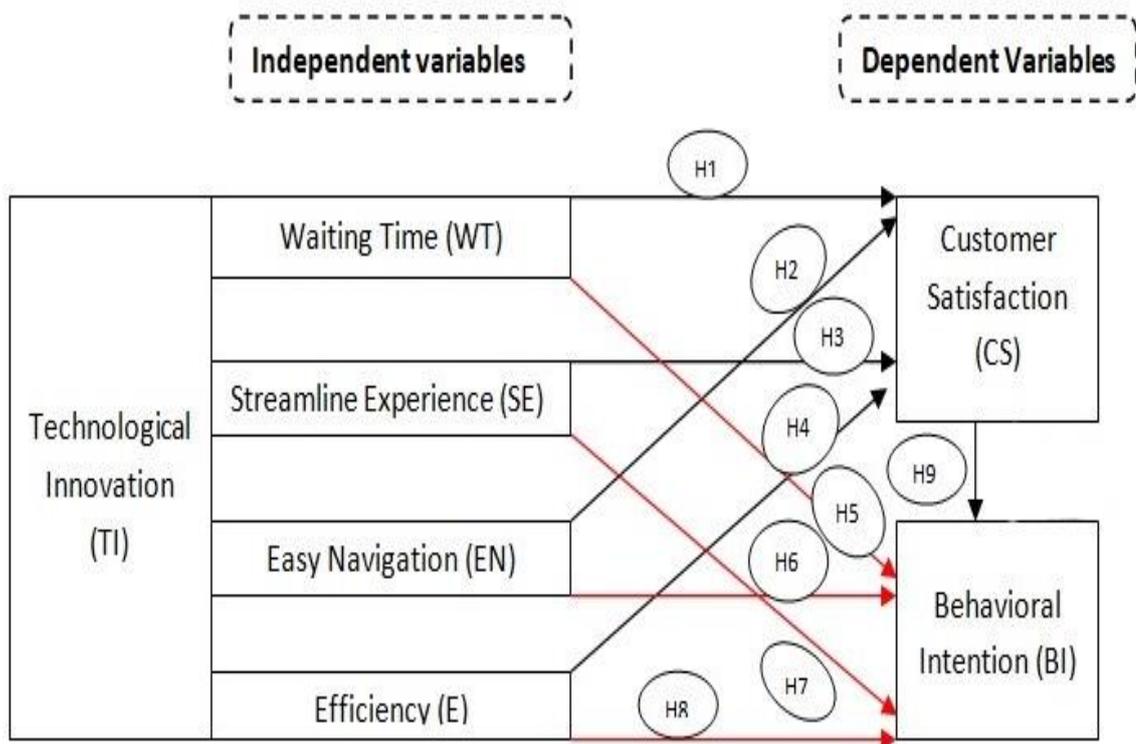
Deductive approach will be implemented in this research through a survey that has a structure of questionnaires to identify the research core objective. By using this approach, researchers will be offered with simple and systematic method to identify and evaluate the previous theoretical research.

The methodology of this research is Positivist Approach – manipulative and experimental methods, in which a study on human behaviour should be conducted similar to the natural sciences studies. Sekaran and Bougie stated in the Research Methods for Business (2009), that positivist approach provides identification, measurement, evaluation and rational explanation for any phenomena.

### **3.2 Research Variables and Hypothesis**

Based on literature review, the theoretical framework of (fig.3.1) below is proposed to test relationships significance through their theoretical statements in Dubai International Airport. Based on the purpose of this research and the theoretical

framework, nine hypotheses are proposed to answer the research questionnaires which are described in the research Appendix.



**Figure 3.1,** Theoretical Framework of Hypothesis Development

### 3.2.1 Types of Variables

From a scientific research perspective, the variable can be dependent variable or independent variable. Therefore and based on the literature review, the theoretical framework constructed as following: (i) Dependent variables are customer satisfaction (CS) and behavioural intention (BI). (ii) Independent variables which are waiting time (WT), easy navigation (EN), streamline experience (SE) and service efficiency (E) as a measurement scale of technological innovations at Dubai International Airport (DXB).

### **3.2.2 Hypothesis Development**

In order to achieve the purpose and the objective of the research, it should carry out two regression models and one correlation model that are constructed as the following:

**i. Technological innovations and customer satisfaction regression model 1:**

Null Hypothesis: Technological innovation has a statistically significant influence on customer satisfaction at Dubai International Airport.

Hypothesis Alternative 1: Waiting time as a measurement scale of technological innovation has a statistically significant influence on customer satisfaction at Dubai International Airport.

Hypothesis Alternative 2: Easy navigation as a measurement scale of technological innovation has a statistically significant influence on customer satisfaction at Dubai International Airport.

Hypothesis Alternative 3: Streamline experience as a measurement scale of technological innovation has a statistically significant influence on customer satisfaction at Dubai International Airport.

Hypothesis Alternative 4: Efficiency as a measurement scale of technological innovation has a statistically significant influence on customer satisfaction at Dubai International Airport.

**ii. Technological innovations and behavioural intention regression model 2:**

Null Hypothesis: Technological innovation has a statistically significant influence on Customer's Behavioural Intention at Dubai International Airport

Hypothesis Alternative 5: Waiting time as a measurement scale of technological innovation has a statistically significant influence on Customer's Behavioural Intention at Dubai International Airport.

Hypothesis Alternative 6: Easy navigation as a measurement scale of technological innovation has a statistically significant influence on Customer's Behavioural Intention at Dubai International Airport.

Hypothesis Alternative 7: Streamline experience as a measurement scale of technological innovation has a statistically significant influence on Customer's Behavioural Intention at Dubai International Airport.

Hypothesis Alternative 8: Efficiency as a measurement scale of technological innovation has a statistically significant influence on Customer's Behavioural Intention at Dubai International Airport.

**iii. Customer satisfaction and behavioural intention correlation model 3:**

Hypothesis Alternative 9: Customers' satisfaction has a statistically significant influence on their behavioural intention at Dubai International Airport.

### **3.3 Research Data**

The meaning and the value of this research refer to the scientific research nature, in which it desires for an anonymous, extends researcher with valuable information through the research field, exploration for and examines the gathered information to clarify what is not relevant to it and should be removed.

Therefore, the study outcome was positive approach that examined with different hypothesis.

The approach used in this research is quantitative method toward the questionnaire. This type of research approach assumes the social facts existence individually and objectively, isolated from the humans beliefs and feelings, and depend on statistical methods during the data collection and analysis, (Sekran and Bougie, 2009).

The quantitative methodology used in this research to generalize the results from Dubai International Airport passengers sample and measure the opinions and the views that reached to 269 respondents, and to explore the findings.

For any research, primary data plays a core role when research is carried out for the first time. Naturally, it improves the research value and ensures the accurate and precise findings. Primary data is collected by the interaction with people through meetings and questionnaires, and then inferred by statistical analysis that has précised structure and aimed at measuring the preferences of the consumers.

### **3.3.1 Questionnaire Details**

The questionnaire of this research has four sections. Section one consists of six questions on Dubai International Airport's passengers which provide demographic information such as terminal and flight type used by the passengers with in the last 12 months, gender and age group, as well as the purpose of trips and the highest level of education.

Section two has twelve questions in total arranged into four sets, each set has three questions that were represented the indicators of the independent variable which is the technological innovations (TI). Section 3 and Section 4 have nine questions in total that are arranged into two sets, each set represented the dependent variables which are Customer Satisfaction (CS) and Behavioural Intention (BI).

### **3.3.2 Random Sampling**

The targeted population of this research was Dubai Airport passengers from various nationalities who took a flight through Dubai Airport within the last 12 months. This Airport is chosen because Dubai is a prospering and flourishing city which experienced rapid development during the past couple of years that let it be one of the best and unique hubs in the world, as well as it is getting ready for the event of EXPO2020 that let the number of its passengers increasing rapidly during the coming years, and it is one of these airports in the region that are leading the competition race for the position of world best airport. The questionnaire was published through online website, Emails, social media and hard copies for 2 months. 269 samples of response were gained and 15 samples were defused from the population, and a total of 254 samples were retained and useful.

### **3.3.3 Ethical Consideration**

Difficulties are involved within the creativity of anything new, and so the availability of ethical principles and values are required in all fields of a scientific research. Due to the emergence of many unethical behaviour cases in various researches during the sixties and seventies, ethics have appeared and arise as a core issue in all scientific and medical research fields. Therefore, researchers must know the values and standards that assist in defining the process of dealing with humans and their rights that should be maintained from any unethical behaviour.

In general, the main purpose of any research is to provide the society with benefits and avoid any harm creation to them. In addition, researchers should take into their account the scientific research ethics during the process of any research, these

include: Beneficence, Non-maleficence, Justice, Autonomy, Honesty, Fidelity, Utility and Privacy. In fact, all these concepts are considered in this research paper.

#### **3.3.4 Validity and Reliability**

The research effectiveness and credibility generate from the extracted information gained from the latest journals and articles and rest upon this research. In addition to that the main part of the research study relies on the reaction extrapolations that have relation with the research topic by a questionnaire.

# **Chapter IV**

## **Research Results**

### **4.1 Introduction**

A statistical analysis was accomplished to show the effectiveness of the technological innovations used in airports on the customer satisfaction and their behaviour intention.

A case from Dubai International Airport was selected for this research study.

A total of 269 questionnaires were gained from the passengers who had the experience of a flight through Dubai International Airport. A total of 15 samples were defused from the population, and a total of 254 samples were returned and were useful.

Many appropriate statistical methods were used to analyze the data gained, in which they show an objective and valid conclusion. The software that was used for the data analysis is SPSS 23, (Statistical Package for Social Sciences, version 23).

Significance testing and explanatory statistics were used in this research study. Explanatory statistics consist of the process of descriptive statistics and mean values that work as prerequisites of any data analysis. The significance testing includes correlation test and regression test.

Regression test used to identify the significant relationship and the direct correlation between dependent variables and independent variables. However, correlation test used to identify the significant relationship and the direct correlation between continuous dependent variables or continuous independent variables. In which the independent variables are (waiting time, easy navigation, streamline experience and

efficiency) as measurement scales of Technological Innovations, and the dependent variables are (Customer Satisfaction) and (Behavioural Intention).

## **4.2 Data Analysis**

There are many software tools that can provide data analysis through presenting, examining, converting and tidying the existing data. The softwares that were used in this research study are SPSS 23 (Statistical package for Social Sciences, version 23) for statistical analysis system and Microsoft Office Excel. Sekaran and Bougie (2009) stated that the aim of using such software is to create valuable information that can help in decision making, and form suggestions and conclusion.

In addition, Beca and Cozmei, (2014) Declared that quantitative researches help to expose the real motivation and the people thoughts involved.

Thus, the quantitative analysis of this research was relied on the primary results gained from questionnaires that were distributed on the passengers of Dubai International Airport. Subsequently, the research questionnaire was arranged into four main sections that generate a part of study hypotheses, including:

**Section 1:** Demographic Information.

**Section 2:** Technological Innovations indicators: **a.** Waiting time, **b.** Easy Navigation, **c.** Simple Experience, **d.** Efficiency.

**Section 3:** Customer Satisfaction

**Section 4:** Behavioural Intention

### **4.3 Results Presentation**

The data of this research topic was gained from a sample of 269 respondents, In addition, the data analyzed by SPSS (Statistical Package for Social Sciences) to obtain the best valuable, meaningful and readable information using statistical tools such as well illustrated bar charts and pie charts combined and plot charts with a brief findings description. Moreover, presenting the gained information in a readable and clear manner is important, (Cohen et al, 2014). Presenting data needs excellent communication and arrangement skills that help the audience understanding the targeted value.

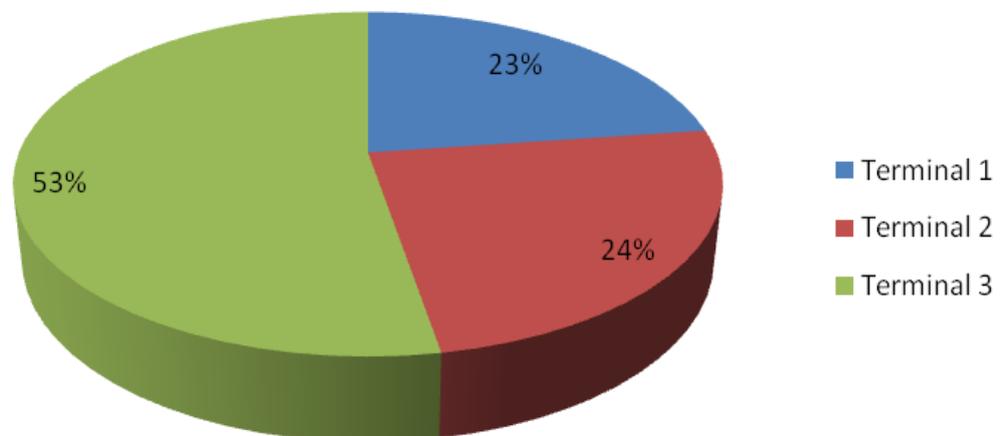
### **4.4 Section A – Statistical Results of Demographic Information**

In this section, the results gained from the sample respondents of Dubai International Airport passengers' demographic information will be briefly discussed. The demographic information includes terminal and flight type used within the last twelve months, purpose of trip, passenger gender, group of age and the highest level of completed education.

**i. Frequency Results of Dubai International Airport Terminals Used by Passengers**

**Table 4.1:** Overall Statistics of Dubai International Airport Terminals Used by Passengers

	Frequency	Percent	Valid Percent	Cumulative Percent
Terminal 1	58	22.8	22.8	22.8
Terminal 2	62	24.4	24.4	47.2
Terminal 3	134	52.8	52.8	100.0
Total	254	100.0	100.0	



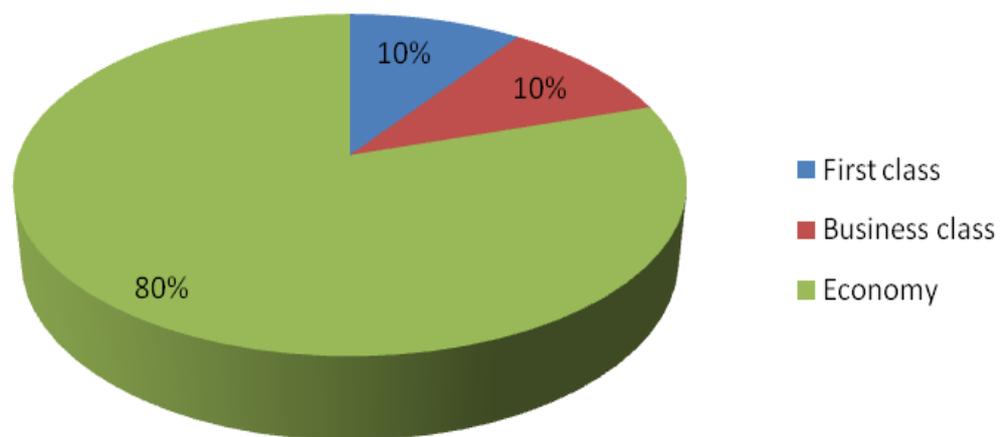
**Figure 4.1,** Overall Statistics of Dubai International Airport Terminals Used by Passengers

The figure summarized the table and shows the sample of terminals used by Dubai International Airport’s passengers that consists of 254 respondents, 23% of respondents used Terminal 1, 24% of respondents used Terminal 2, whereas 53% of respondents used Terminal 3. The distribution of terminals used by respondents in this study spread quite normal distributed with being Terminal 3.

## ii. Frequency Results of Flight Type Used by Passengers

**Table 4.2:** Overall Statistics of Flight Type Used by Passengers

	Frequency	Percent	Valid Percent	Cumulative Percent
First Class	25	9.8	9.8	9.8
Business Class	26	10.2	10.2	20.1
Economy	203	79.9	79.9	100.0
Total	254	100.0	100.0	



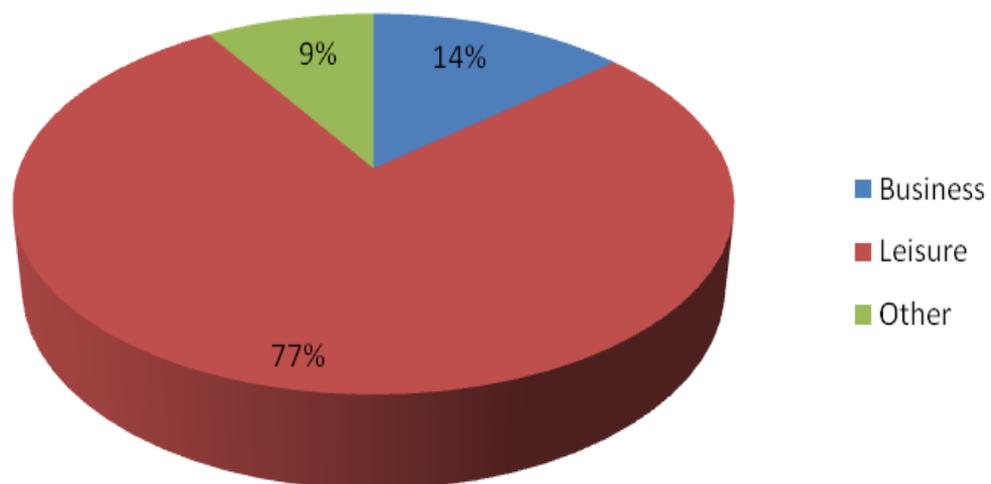
**Figure 4.2,** Overall Statistics of flight type Used by Passengers

The figure summarized the table and discovers that majority of the respondents at 79.9% have selected the economy flight type whereas 10.2% their flight type was business class. Meanwhile, only 9.8% respondents have used the first class flight type.

### iii. Frequency Results of Passengers' Trip Purpose

**Table 4.3:** Overall Statistics of Passengers' Trip Purpose

	Frequency	Percent	Valid Percent	Cumulative Percent
Business	35	13.8	13.8	13.8
Leisure	196	77.2	77.2	90.9
Other	23	9.1	9.1	100.0
Total	254	100.0	100.0	



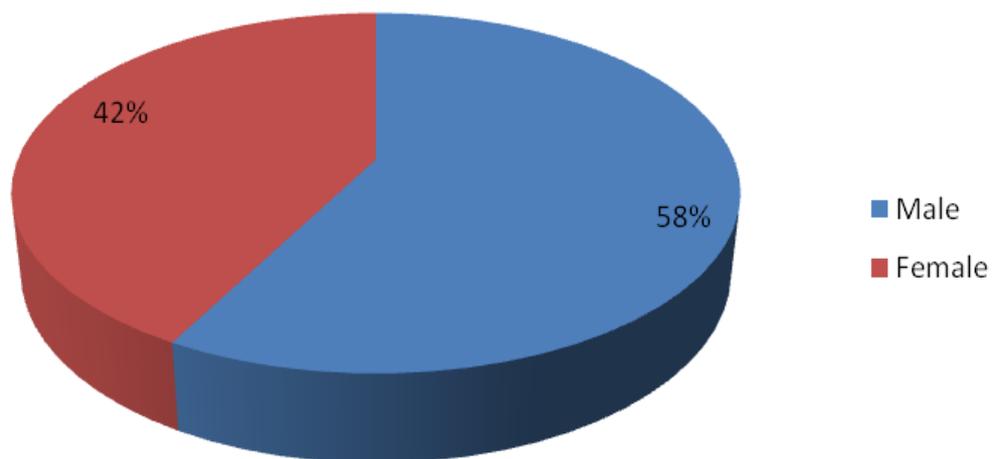
**Figure 4.3,** Overall Statistics of Overall Statistics of Passengers' Trip Purpose

The figure summarized the table and shows the purpose of trips sample of 254 respondents, 77.2% were traveling through Dubai International Airport for leisure. On the other hand, 13.8% of the respondents were traveling through Dubai International Airport for business. Whereas, 9.1% were traveling through Dubai International Airport for other purposes.

#### iv. Frequency Results of Passengers Gender

**Table 4.4:** Overall Statistics of Passengers Gender

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	147	57.9	57.9	57.9
Female	107	42.1	42.1	100.0
Total	254	100.0	100.0	



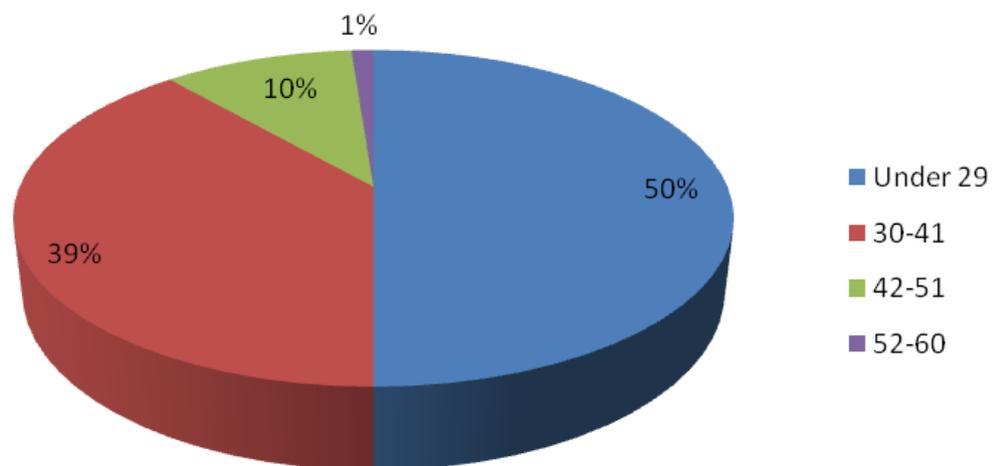
**Figure 4.4,** Overall Statistics of Passengers Gender

The figure summarized the table and shows that majority of the respondents at 57.9% were males. Whereas, 42.1% of the respondents were females.

## v. Frequency Results of Passengers Age Group

**Table 4.5:** Overall Statistics of Passengers Age Group

	Frequency	Percent	Valid Percent	Cumulative Percent
Under 29	127	50.0	50.0	50.0
30-41	98	38.6	38.6	88.6
42-51	26	10.2	10.2	98.8
52-60	3	1.2	1.2	100.0
Total	254	100.0	100.0	



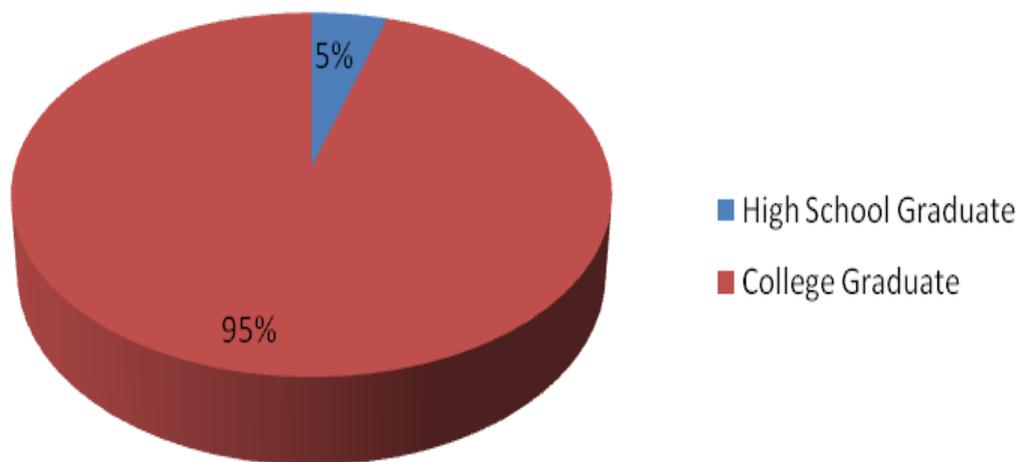
**Figure 4.5,** Overall Statistics of Passengers Age Group

The figure summarized the table and shows the sample of age group of Dubai International Airport passengers that consists of 254 respondents, 1.2% of respondents were in the group of 52 years old to 60 years old, 10.2% of respondents were in the group of 42 years old to 52 years old, and 38.6% of respondents were in the group of 30 years old to 41 years old. Whereas the majority of respondents by 50% were under 29 years old.

**vi. Frequency Results of Passengers Education Level**

**Table 4.6:** Overall Statistics of Passengers Education level

	Frequency	Percent	Valid Percent	Cumulative Percent
High School Graduate	12	4.7	4.7	4.7
College Graduate	242	95.3	95.3	100.0
Total	254	100.0	100.0	



**Figure 4.6,** Overall Statistics of Passengers Education level

The Figure summarized the table and shows that majority of the respondents at 95.3% have graduated from colleges. Meanwhile, only 4.7% respondents have graduated from high schools.

#### **4.4.1 Conclusion of section A- Demographic Information**

The first section can be summarized that demographic data showed an actual representation of the reality of Dubai International Airport's passengers, which is the core objective of the data sampling.

In addition, the diversity of the information gained from three different terminals of Dubai International Airport added a paramount factor that lead to understand the efforts provided by the airport management, as well as the passengers details which are consist of passenger age group, passenger age, and the highest level of education completed by the passenger that will assist greatly the data credibility related to the following sections.

#### **4.5 Reliability Analysis of Research Results**

The reliability of a study defined by Sekaran and Bougie (2009) as the stability and the consistency ability of a tool to give similar results when the measurement is repeated many times in similar circumstances.

In addition, the correlation coefficient represents the stability, and it meant how the readings linked over the repeated results can. If the tool is highly credible, the results of any time will be similar to the results of the first measurement. Moreover, stability relies on the internal consistency.

Many statistical methods are created to measure the stability, and Cronbach's Alpha is one of these methods that measures the consistency and relies on the internal consistency of each question and with all questions in general.

In general, Cronbach's Alpha test summarized as the following: **(i)** Reliability considered as poor if the Reliability Coefficient is lower than 0.6. **(ii)** Reliability considered as acceptable if the Reliability Coefficient is in the range of 0.7. **(iii)** Reliability considered good if the Reliability Coefficient is greater than 0.8. In general the best results of Cronbach's Alpha test are the nearer to 1.0. Therefore, the reliability of the internal consistency of the (efficiency) measures of this study can be considered acceptable and the rest can be considered good as it shown in the following table.

**Table 4.7:** Reliability Statistics of Independent and Dependent Variables

<b>Variables</b>	<b>Cronbach's Alpha</b>	<b>N of Items</b>	<b>Consideration</b>
Waiting Time	0.76	3	Acceptable
Easy Navigation	0.84	3	Good
Streamline Experience	0.89	3	Good
Efficiency	0.953	3	Good
Customer Satisfaction	0.925	5	Good
Behavioural Intention	0.937	4	Good

## **4.6 Hypotheses Testing**

In this section, a statistical analysis was accomplished to show the effectiveness of the technological innovations used in Dubai International Airport on the customer's satisfaction and their behavioural intention.

As previously mentioned in the research methodology, that the research study will carry out two regression models and one correlation model.

Regression test used to identify the significant relationship and the direct correlation between dependent variables and independent variables, the models are presented as bellow:

- i.** Technological innovations and customer satisfaction regression model 1.
- ii.** Technological innovations and behavioural intention regression model 2.

However, correlation test used to identify the significant relationship and the direct correlation between continuous dependent variables or continuous independent variables, the model is presented as bellow:

- iii.** Customer satisfaction and behavioural intention correlation model 3.

In which the independent variables are (waiting time, easy navigation, streamline experience and efficiency) as measurement scales of Technological Innovations, and the dependent variables are Customer Satisfaction and Behavioural Intention.

#### 4.6.1 Technological Innovations and Customer Satisfaction Regression Model 1

**Table 4.8:** Regression Model 1 Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.935	.874	.872	.24690

**Table 4.9:** ANOVA Analysis of Regression Model 1

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	105.269	4	26.317	431.726	.000
Residual	15.179	249	.061		
Total	120.448	253			

i. Null hypothesis of technological innovations and customer satisfaction regression model 1:

Table 4.8 shows the coefficient of multiple correlation R that in this state is 0.935 denotes a strong prediction level of customer satisfaction in correlation with waiting time, easy navigation, streamline experience and efficiency as measurement scales for technological innovation used in Dubai International Airport. In addition, table 4.8 shows the determination coefficient  $R^2$ , which is 0.874. This indicates that the measurement scales of technological innovations illustrate variability with 86.2% in customer satisfaction in Dubai International Airport. However, table 4.9 shows the F-value of 431.726 is significant from zero, and the associated P-value is less than 0.05 which indicated that customer satisfaction was significantly predicted by waiting time, easy navigation, streamline experience and efficiency. Thus, there is a significant positive relationship between the customer satisfaction and waiting time, easy navigation, streamline experience and efficiency as measurement scales for

technological innovation used in Dubai International Airport; and the Null hypothesis was supported and accepted ( $p < 0.05$ ).

ii. This study empirically evaluated the technological innovations dimensions used in Dubai Airport, in addition to the relationship through dimensions including four independent variables (waiting time, easy navigation, streamline experience and efficiency), and one dependent variable (customers' satisfaction at Dubai Airports). Table 4.10 shows the hypotheses testing results for the research study, among the estimated unstandardized coefficients and the associated p-value for the hypotheses. As Thumb's rule, a B coefficient is statistically significant if the associated p-value is less than 0.05.

**Table 4.10:** Unstandardized B Coefficients Analysis of Model 1

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta		
(Constant)	.378	.107		3.535	.000
Waiting Time	1.084	.044	1.057	24.380	.000
Easy Navigation	-.189	.047	-.192	-4.064	.000
Streamline Experience	-.042	.037	-.039	-1.132	.259
Efficiency	.072	.027	.087	2.612	.010

Hypothesis A1:

Based on the estimated unstandardized coefficients B of 1.084 and the associated p-value of .000, this indicated that customers' satisfaction was significantly predicted by

the consumed waiting time at Dubai international airport when technological innovations are used. Thus, this hypothesis was supported and accepted ( $p < 0.05$ ).

Hypothesis A2:

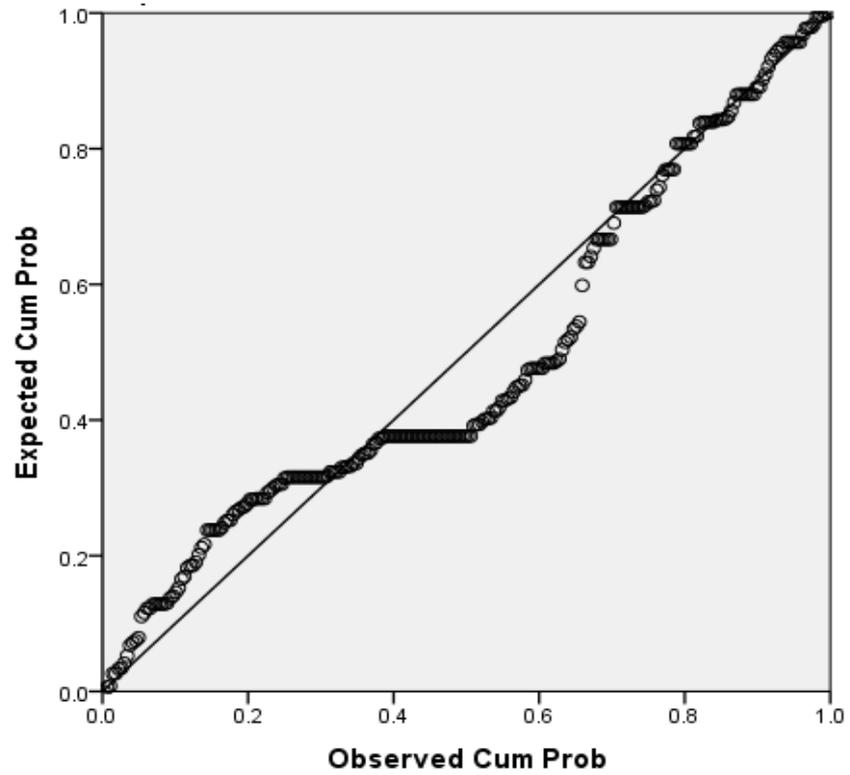
Further, the customers' satisfaction was significantly predicted by the easy navigation services provided by technological innovations in Dubai International airport, this was supported by ( $B = -0.189$ ,  $p\text{-value} = 0.000$ ). Thus, Hypothesis A2 was accepted ( $p < 0.05$ ).

Hypothesis A3:

On the other hand, based on the estimated unstandardized coefficients ( $B$ ) of 0.042 and the associated  $p$ -value of 0.259, this indicated that customers' satisfaction was not significantly related to the streamline experience provided by technological innovation at Dubai airport. Thus, hypothesis A3 was not received empirical support ( $p > 0.05$ ).

Hypothesis A4:

Based on the estimated unstandardized coefficients ( $B$ ) of 0.072 and the associated  $p$ -value of 0.010, this indicated that customers' satisfaction was significantly predicted by the efficiency provided at Dubai International airport when technological innovations are used. Thus, this hypothesis was supported and accepted ( $p < 0.05$ ).



**Figure 4.7,** Normal P-P Plot of Regression Standardized Residual of Dependent Variable: Customer Satisfaction

Figure 4.7 shows the plot pattern of the regression model 1, in which the residuals plots are not deviated from the diagonal line and they are normally distributed.

#### 4.6.2 Technological Innovations and Behavioural Intention Regression Model 2

**Table 4.11: Regression Model 2 Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
2	.891	.794	.791	.34850

**Table 4.12: ANOVA Analysis of Model 2**

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	116.529	4	29.132	239.864	.000
Residual	30.242	249	.121		
Total	146.771	253			

i. Null hypothesis of technological innovations and behavioural intention regression model 2:

Table 4.11 shows the coefficient of multiple correlation R, that in this state is 0.891 denotes a strong prediction level of customer's behavioural intention in correlation with waiting time, easy navigation, streamline experience and efficiency as measurement scales for technological innovation used in Dubai International Airports. In addition, table 4.11 shows the determination coefficient  $R^2$ , which is 0.794. This indicates that the measurement scales of technological innovations illustrate a variability with 79.4% in behavioural intention of customers at Dubai International Airport. However, table 4.12 shows the F-value of 239.864 is significant from zero, and the associated P-value is less than 0.05 which indicated that customer's behavioural intention was significantly predicted by waiting time, easy navigation, streamline experience and efficiency. Thus, there is a significant positive relationship between the customer's behavioural intention and waiting time, easy navigation,

streamline experience and efficiency as measurement scales for technological innovation used in Dubai Airports; and the Null hypothesis was supported and accepted ( $p < 0.05$ ).

ii. This study empirically evaluated the technological innovations dimensions used in Dubai International Airport, in addition to the relationship through dimensions including four independent variables (waiting time, easy navigation, streamline experience and efficiency), and one dependent variables (customers' behavioural intention toward Dubai Airports). Table 13 shows the hypotheses testing results for the research study, among the estimated unstandardized coefficients and the associated p-value for the hypotheses. As Thumb's rule, a B coefficient is statistically significant if the associated p-value is less than 0.05.

**Table 4.13:** Unstandardized B Coefficients Analysis of Model 2

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta		
(Constant)	.017	.151		.112	.911
Waiting Time	.559	.063	.493	8.900	.000
Easy Navigation	.381	.066	.349	5.793	.000
Streamline Experience	-.004	.052	-.003	-.073	.942
Efficiency	.102	.039	.112	2.633	.009

Hypothesis A5:

Based on the estimated unstandardized coefficients (B) of 0.559 and the associated p-value of .000, this indicated that customers' Behavioural Intention was significantly predicted by the consumed waiting time at Dubai International airport when

technological innovations are used. Thus, this hypothesis was supported and accepted ( $p < 0.05$ ).

Hypothesis A6:

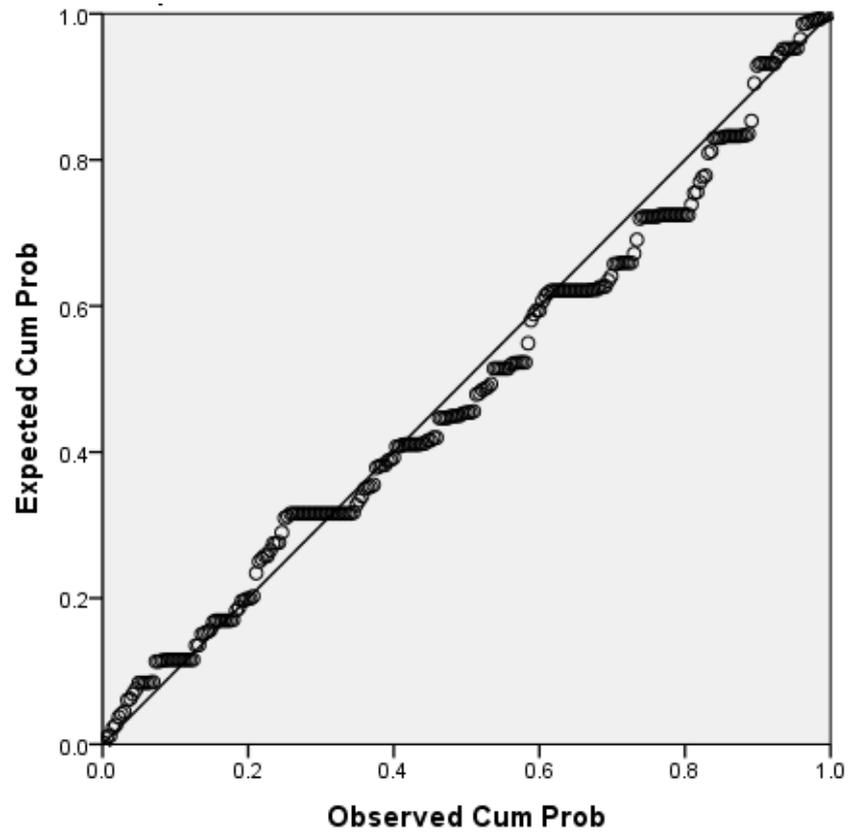
Further, the customers' Behavioural Intention was significantly predicted by the easy navigation services provided by technological innovations in Dubai International airport, this was supported by ( $B = 0.381$ ,  $p\text{-value} = 0.000$ ). Thus, Hypothesis 6 was accepted ( $p < 0.05$ ).

Hypothesis A7:

On the other hand, based on the estimated unstandardized coefficients ( $\beta$ ) of  $-0.004$  and the associated  $p$ -value of  $0.942$ , this indicated that customers' Behavioural Intention was not significantly related to the simple experience provided by technological innovation at Dubai International airport. Thus, hypothesis 7 was not received empirical support ( $p > 0.05$ ).

Hypothesis A8:

Based on the estimated unstandardized coefficients ( $B$ ) of  $0.102$  and the associated  $p$ -value of  $0.009$ , this indicated that customers' Behavioural Intention was significantly predicted by the efficiency provided at Dubai International airport when technological innovations are used. Thus, this hypothesis was supported and accepted ( $p < 0.05$ ).



**Figure 4.8,** Normal P-P Plot of Regression Standardized Residual of Dependent Variable: Behavioural Intention

Figure 4.8 shows the plot pattern of the regression model 2, in which the residuals plots are not deviated from the diagonal line and they are normally distributed.

### 4.6.3 Customer Satisfaction and Behavioural Intention Correlation Model 3

**Table 4.14:** Correlation Analysis Between Customer Satisfaction and Behavioural Intention

	Customer Satisfaction	Behavioural Intention
Pearson Correlation	1	.889**
Sig. (2-tailed)		.000
N	254	254
Pearson Correlation	.889**	1
Sig. (2-tailed)	.000	
N	254	254

\*\* Correlation is significant at the 0.01 level (2-tailed).

The Sample correlation coefficient  $r = 0.889$

The p-value  $p = 0.000 < 0.001$  [refer to Table 4.14].

Customers satisfaction has a strong positive correlation and statistically significant on their behavioural intention. Based on the sample correlation coefficient of 0.889 and the associated p-value of .000, There is sufficient evidence from the sample to support the research hypothesis 9 ( $p = 0.000 < 0.001$ ).

## 4.7 Summary

The results of this research study show that hypothesis 3 and hypothesis 7 were not received empirical support ( $p > 0.05$ ); yet they are rejected. In addition, only seven hypotheses lead to assure the effectiveness of technological innovations on the customers' satisfaction and their behavioural intention in Dubai Airports. With reference to the questionnaires accomplished by 254 respondents from the passengers who had the experience of a flight through Dubai International Airport, the study has

discovered that the relationship between technological innovations, customers' satisfaction and their behavioural intention was interrelated.

Furthermore, it is recognized that the main analysis accomplished on the variables that shows the effect of technological innovations on the Airport services performance. Thus, the next chapter will explore further discussion on the key findings that generated from chapter four.

## Chapter V

### Research Results Discussion

#### 5.1 Discussion

The outcomes of analysis in table 4.8 and table 4.9 prove that there is a relationship between the measurement scales of technological innovations and customer satisfaction in Dubai International Airports as a final decision on the null hypothesis of regression model 1. In addition, the coefficient of multiple correlation  $R$  and the determination coefficient  $R^2$  further present the relationship extent and the effect amplitude of the independent variables (waiting time, easy navigation, streamline experience and efficiency) on the dependent variable (customer satisfaction). The coefficient of multiple correlation  $R$ , that is 0.935 indicated that the degree of relationship which occurs between technological innovations and customer satisfaction in Dubai International airport is positive and strong, while the determination coefficient  $R^2$  which is 0.874 indicated that technological innovations explain only 87.4% of the variability that takes place on customer satisfaction at Dubai International Airport.

further that, even though there is a relationship between technological innovations and customer satisfaction in Dubai International airport, hypothesis 2A that states (easy navigation as a measurement scale of technological innovation has a statistically significant influence on customer satisfaction at Dubai International Airport) was significantly predicted and has a negative effect, this was supported by ( $B = -0.189$ ;  $P = 0.000$ ). The main reason beyond this could be the variables combination that

represents the regression model, and other factors, such as airport traffic and passengers background. In addition, hypothesis 3A that states (streamline experience as a measurement scale of technological innovation has a statistically significant influence on customer satisfaction at Dubai International Airport) was not received empirical support and rejected ( $p > 0.05$ ).

A descriptive statistics carried on customers responses received regarding measures of their perception of (waiting time, easy navigation, streamline experience and efficiency) as measurement scales of technological innovations in Dubai International airport, shows Beta (standardized regression coefficients) that are significant from zero, a measure scale used to code how strongly each predictor (independent) variable influences the criterion (dependent) variable. Table 10 shows that waiting time as a measurement scale of technological innovations has the highest impact on the creation variable (customer satisfaction) in Dubai International Airport, this was supported by (Beta= 1.057). In addition, efficiency as a measurement scale of technological innovations has the lowest impact on the creation variable (customer satisfaction) in Dubai Airports, this was supported by (Beta= 0.087).

As a summary, the regression equation of model 1 is:

$$CS = 0.378 + 0.314 WT - 0.26 EN + 0.096 E$$

The outcomes of analysis in table 4.11 and table 4.12 prove that there is a relationship between the measurement scales of technological innovations and customer's behavioural intention at Dubai International Airports as a final decision on the null hypothesis of regression model 2. In addition, the coefficient of multiple correlation R and the determination coefficient  $R^2$  further present the relationship extent and the effect amplitude of the independent variables (waiting time, easy navigation,

streamline experience and efficiency) on the dependent variable (behavioural intention). The coefficient of multiple correlation R, that is 0.891 indicated that the degree of relationship which occurs between technological innovations and customer's behavioural intention in Dubai International airport is positive and strong, while the determination coefficient R<sup>2</sup> which is 0.791 indicated that technological innovations explain only 79.1% of the variability that takes place on customer's behavioural intention at Dubai International Airport.

Further that even though there is a relationship between technological innovations and customer's behavioural intention in Dubai International airport, hypothesis 7A that states (streamline experience as a measurement scale of technological innovation has a statistically significant influence on customer's behavioural intention at Dubai International Airport was not received empirical support and rejected ( $p > 0.05$ ).

A descriptive statistics carried on customers responses received regarding measures of their perception of (waiting time, easy navigation, streamline experience and efficiency) as measurement scales of technological innovations in Dubai International airport shows Beta (standardized regression coefficients) that are significant from zero, a measure scale used to code how strongly each predictor (independent) variable influences the criterion (dependent) variable. Table 4.13 shows that waiting time as a measurement scale of technological innovations has the highest impact on the creation variable (behavioural intention) in Dubai International Airport, this was supported by (Beta= 0.493). In addition, efficiency as a measurement scale of technological innovations has the lowest impact on the creation variable (behavioural intention) in Dubai International Airport, this was supported by (Beta= 0.112).

To conclude by, the regression equation of model 2 is:

$$CS = 0.017 + 0.559 WT + 0.381 EN + 0.102 E$$

The outcomes of analysis in table 4.14 prove that there is a relationship between the customers' satisfaction and their behavioural intention at Dubai International Airport as a final decision on hypothesis 9 of correlation model 3. In addition, the coefficient of Pearson correlation presents the relationship extent and the effect amplitude of the independent variables (customer satisfaction) on the dependent variable (behavioural intention). The coefficient of Pearson correlation that is 0.889 indicated that the degree of relationship which occurs between customer satisfaction and their behavioural intention in Dubai International airport is positive and strong. This is a great sign to the airport management that the reputation of the airport will be improved when passengers say positive things and recommend the airport to others, as well more loyal customers will engaged.

To conclude with, the correlation equation of model 3 is:

$$BI = 0.889 CS$$

Specifically this research study has made the following contributions that related to literature. First of all, it provides a questionnaire model that is relevant and applicable for measuring any airport performance under specific dimensions toward technological innovations services, customer satisfaction and customer's behavioural intention. Second, the results which assure that technological innovation is a correlate of customer satisfaction and their behavioural intention, and assure that customer satisfaction is a correlate of customer's behavioural intention; have made empirical contributions.

## **5.2 Managerial Implication**

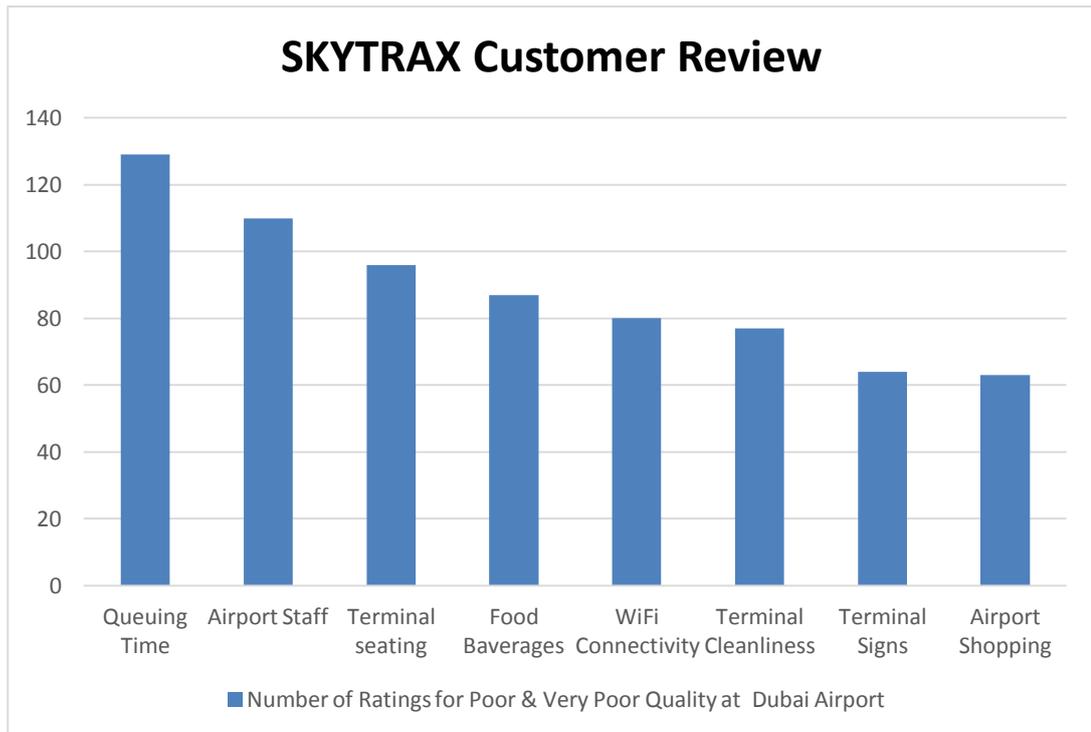
Results and findings of this research study propose some implications for the managers and operators of the Dubai international airport. It is not sufficient to recognize that a relationship exists between technological innovations, customer's satisfaction and their behavioural intention.

The orientation of the relationship, that in this case extends between the measurement scales of technological innovations from high to low, call for serious awareness and attention by the managers and operators of Dubai international airport.

It is required to create and implement new programs of service quality improvement for the airports. The sorting provided within the conclusion above must be a useful directory to identify where to start from with regards to the programs of improvement. It will also assist in the resources allocation to enhance the performance and service quality at the airports to boost the customers' satisfaction and their behavioural intention.

It is needed to pay more attention by the managers and operators of the Dubai international airport under new benchmarking of improvement programs and tools with the best rated airports in the world, who are using the technological innovations to generate a unique place sense.

For example, by using the SIX SIGMA methodology that aims to improve the quality of a service using techniques from (DMAIC) point (define, measure, analyze, improve, control), and by integrating the results of this research study with the data provided by the official SKYTRAX website as followed:



**Figure 5.1, SKYTRAX Customer Review**  
(SKYTRAX, 2017)

Using the data provided by the official SKYTRAX website to measure the performance of the service quality for the eight categories (Airport staff, terminal setting, queuing time, food beverages, WIFI connectivity, terminal clearness, terminal signs and airport shopping) that are related to Dubai International Airports, and from the point of DMAIC by using the Pareto chart analysis to identify any opportunity characteristics, Figure 5.1 shows the number of complains and votes of poor and very poor quality for each service category at Dubai International Airport. The figure indicated that the most three categories that got higher rates of poor and very poor service quality are queuing time, airport staff and terminal setting. And from the orientation of the relationships that provided in this research study, in which waiting time as a measurement scale of technological innovations has the highest impact on the creation variables (customers' satisfaction and their behavioural intention) in Dubai International Airports, this is great evidence that increasing the use of

technological innovations can be a solution to enhance the queuing time at Dubai International Airport when compared with other international airports. These call for serious awareness and attention by the managers and operators of Dubai International airports, to search and benchmark for new technologies and recognize the related implementation requirements. Singapore Changi Airport is a serious benchmarking indicator; that has been selected as the World's Best Airport for the sixth consecutive year at 2018 SKYTRAX World Airport Awards, and its Terminal 4 is the first intelligent airport that most of its services are provided by technological innovations rather than humans.

The airports' managers and operators therefore have to be more aware to the services that will bring value and improvement to customers' comfort and convenience. They may select to follow the ranking order of the conclusion above. Yet, to implement the improvement programs and to use new technological innovations need to cut across human factors and infrastructure. Generally, when customer is satisfied with the services quality provided by the airport, he/she will remain loyal customer, and will encourage friends and relatives to select the airport, and the unique place sense generated will not let him/her to look forward to any other airports. In return, these will interpret to improve the airport revenue and customer retention.

## **Chapter VI**

### **Conclusion**

#### **6.1 Conclusion**

To conclude with, this research study has precise all the required factors that are necessary to be considered in recognizing the effectiveness of the technological innovations used in airports that assist in enhancing customers' satisfaction and their behavioural intention toward the airports with proper justification and finding.

The previous findings that show technological innovations as a correlate of customers' satisfaction and their behavioural intention, and the customers' satisfaction as a correlate of customers' behavioural intention aligns with findings of some previous researchers such as Abdelaziz et al. (2010); Lin and Hsieh (2011) who show that Self service technologies at airports such as baggage drop, check in, ticketing and information kiosks are highly effective because they can reduce waiting time; Kalakou et al. (2015) who demonstrated that traveller experience can be changed by Smart phones, biometric systems, near field communication and big data; Vanja et al. (2017) demonstrated that Since travellers' satisfaction is fundamental for any airport, novel technologies can help airport managers to increase and improve travellers' satisfaction and create positive experience; E. Maras (2006) which found that Self service transfers control into customers' hand. Researchers observed that consumers are more open to experiences with Kiosks; (Oliver and Swan 1989, Oliver 1980, Fornell 1992, Cronin and Taylor 1992, Bolton and Drew 1994, Anderson and Sullivan 1993, Anderson and Fornell 1992) who show that customer satisfaction has a potential influence on the behaviour of consumer and the customer retention.

Specifically this research study has made the following contributions that related to literature:

- i.** First of all, it provides a questionnaire model that is relevant and applicable for measuring any airport performance under specific dimensions toward technological innovations services, customer satisfaction and customer's behavioural intention.
- ii.** Second, the results which assure that technological innovation is a correlate of customer satisfaction and their behavioural intention, and assure that customer satisfaction is a correlate of customer's behavioural intention; have made empirical contributions.

## **6.2 Recommendations of Future Researches**

The scope of the research study was limited to passengers' survey of Dubai International Airport to realize if technological innovation is correlated with customers' satisfaction and their behavioural intention. However although the survey was carried across all Dubai International Airport's terminals, it is restricted to Dubai as a city. Therefore:

- i.** The future researches should focus on other international airports in different regions within same subject.
- ii.** The recognition of the implementation requirements such as areas needed, power supply, interior designs, marketing procedures, to use new technological innovations within the airport could be additional future research focus.
- iii.** Finally, the realization of other customers' categories such as security & immigration guards, ground service providers, on using new technological innovation at Dubai International Airport and their satisfaction impact could be additional future research focus.

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# APPENDIX

## Questionnaire Design

(Scaling from “Strongly disagree” to “Strongly agree” on a 5 point scale)

Constructs	Items
	<p>WT1: TI gives me faster baggage drop and check in services at Airport.</p> <p>WT2: The time I spend waiting for immigration checks at Airport is minimal.</p> <p>WT3: TI lets my shopping with less time consuming at Airport.</p>
	<p>EN1: TI allows me to move fluidly through the Airport facilities.</p> <p>EN2: TI allows me to discover Airport facilities easily.</p> <p>EN3: TI allows flexibility in shopping.</p>
	<p>SE1: I find self-service innovations easy to use at Airport.</p> <p>SE2: A lot of mental effort is required to use self-service technologies at Airport.</p> <p>SE3: TI allows easy shopping.</p>
	<p>E1: Using TI enhances my efficiency in completing procedures of baggage drop and Check in.</p> <p>E2: Using TI enhances my efficiency in completing procedures of Immigration Check.</p> <p>E3: Using TI improves my shopping efficiency at that Airport.</p>

Constructs	Items
Customer Satisfaction	<p>CS1: I am satisfied with the overall waiting time at Airport.</p> <p>CS2: I am satisfied with the overall efficiency at Airport.</p> <p>CS3: I am satisfied with the overall streamline experience at Airport.</p> <p>CS4: I am satisfied with the overall navigation services at Airport.</p> <p>CS5: I am satisfied with the overall services provided by Dubai International Airport..</p>

- BI1: I plan to increase my use of that airport in the future.
- BI2: I encourage and recommend friends to use Dubai International Airport.
- BI3: If I had to do it over again, I would say make the same choice.
- BI4: I say positive things about my experience in Dubai International airport.

The following questions are asked for **Demographic** purposes:

1. Did you use Dubai International Airport within the last 12 months?

Yes No

2. Which Terminal did you use?

Terminal 1 Terminal 2 Terminal 3

3. What type of flight do you usually use?

First Class Business Class Economy

4. What is the purpose of majority of your trips?

Business Leisure Other

5. What is your gender?

Male Female

6. What is your age group?

Under 29 30–41 42–51 52–60 Over 60

7. What is the highest level of education you have completed?

High school graduate College graduate

