

CHAPTER 2: Literature Review

2.1 Introduction

Literature review is undertaken with an objective to explore the current research and knowledge on trade in services, its implication for competition and what are the issues and challenges in case of air transport services and more specifically for the aviation ground handling services. Trade in services has been the economic driver for the growth. International trade in services implies market access to new entrants including foreign entities creating a competitive business environment. Competition is central to the operation of markets, and fosters innovation, productivity and growth, all of which create wealth and reduce poverty. However, markets do not always work well, and uncompetitive markets are often those that matter most for the poor. Godfrey (2008) outlines the direct and indirect, and often complex, linkages between competition, competition policy, private sector development, growth and poverty reduction.

Trade in services and investment flows have been the key drivers of many economies in recent decades. In fact, services have become the single largest sector in many economies (Chaddha and Natraj 2008) Efficient provision of services in a country enhances export competitiveness of its agriculture and manufacturing sectors. Similarly, attracting foreign direct investment (FDI) has become a key part of national development strategies for many countries. Countries see such investments as bolstering domestic capital, productivity, and employment, all of which are crucial for economic growth. It is with this understanding that many of the South Asian countries have made conscious efforts in recent years to liberalize their service sectors and also introduced investment friendly policies including those for FDI (Chaddha and Natraj, 2008).

Services generate more than two thirds of global Gross Domestic Product (GDP), attract over three quarter of foreign direct investment (FDI) in advanced economies, employ most workers and create most new jobs globally. (OECD 2017)

International trade in services is dependent on the market access which in turn depends on the Domestic Regulations, National policies on liberalization and competition. The preliminary literature review areas are as such, identified keeping in view the following questions:

- (a) What is the regulatory perspective for air transport?
- (b) Did liberalization of aviation sector led to development and growth in air transport?
- (c) What is the effect of competition in a network industry like air transport?
- (d) What is the outcome of competitive GHS market elsewhere in the world?
What are the views and concerns of stakeholders on opening the GHS market to competition?
- (e) How the strain on the existing capacity of the airports due to increasing air traffic is being managed globally and what is the possible role of ground handling operations in efficient turn over i.e. total aircraft movement through an airport?
- (f) Can trade in GHS be effected through market access using trade facilitation platform of GATS?

This chapter is structured as under:

The next section presents literature reviewed, in the aforementioned areas. Last section concludes the outcome of the review and presents the gaps identified that are proposed to be addressed through this study.

2.2 Trade in Services

Trade in services differ from that in goods in terms of the variety of modes of supply involved—cross-border supply, consumption abroad, commercial presence in another State and movement of natural persons across border. Services also act as the part of global value chain of production of goods. International trade in services is dependent

on national /domestic regulations, political influence on policies and market characteristics.

A discussion on the drivers for such change towards a liberalized competitive air transport is available in the literature. Sauve and Mattoo (2003) in their book on Domestic Regulation and Service Trade Liberalization', refer to the World Bank Report of 2002, which suggest that putting regulatory discipline in place within the skeletal regime of existing commitments could become a driver for future liberalization of transportation services.

The benefits of services trade reform are huge but services negotiations in the World Trade Organization (WTO) are making little progress. Mattoo (2005) identifies a proximate cause as the current negotiating process, based on an inertial request-and-offer approach rather than a set of goals that would give direction and momentum to the negotiations.

The General Agreement on Trade in Services (GATS) under the World Trade Organization (WTO) was set up as part of the Uruguay Round in 1994. The first attempt, by Hoekman (1995) at quantifying the impact of the commitments made under the GATS was published in working paper form; a year after the GATS was concluded. He derived frequency counts of the services trade commitments that had been signed by the WTO Members — a technique that has survived with various degrees of sophistication since — but then simply imputed a 'guesstimate' of the 'tariff equivalent' of barriers that were deemed to be prohibitive, and allocated lower values to less prohibitive barriers on a pro rata basis. P. Dee in her book, has observed that the simplicity of Hoekman (1995)'s approach reflected the lack of analytical frameworks to measure services trade barriers. He had assessed that the impact of the GATS depends largely on the specific commitments made by members, and Sectoral coverage is far from universal. It was observed that High-income countries scheduled about half of their service sectors; developing countries as a group (including Eastern European countries in transition) scheduled only 11 per cent. The sectors scheduled often continue to be subject to measures that violate national treatment or limit market access. At that time, High-income countries scheduled only 28 per cent of the

universe of services without exceptions to national treatment or market access obligations. For developing countries, that figure is only 6.5 per cent (at the time).

In international trade, the entry of a foreign firm puts pressure on the incumbent firms to cut prices and reduce cost and improve productivity to compete intensively for the resources. Using a rich sample of industry and firm-level data matched with the newly released OECD Services Trade Restrictiveness Index (STRI), the stylised facts presented by Nordas and Rogoussis (2015) suggest a substantive effect of services trade barriers on competition. Competition in services is often based on quality and diversification rather than scale. Diversification is in turn associated with the creation of new markets, monopoly power and hence milder shocks to market structure than trade in goods. (Nordas and Rogoussis 2015)

Pointing out that the General Agreement on Trade in Services (GATS) does not offer a definition of "services", Zhang (2015) addresses the problem of whether (the service is) covered or not covered by examining the Services Classification and Its Implications for Specific Commitments under the GATS. Services classification does not receive enough attention it deserves. Air Transport is classified under 'Transport' in the list of services classification in WTO Document W-120.

Gootiiz and Mattoo (2009) examined applied trade policies in the major services sectors of 56 industrial and developing countries. Authors conclude that two of the most protected sectors, transport and professional services (involving the international mobility of people), are either not being negotiated at all or not with any degree of seriousness. Uruguay Round (UR) commitments are on average 2.3 times more restrictive than current policies. The best offers submitted so far as part of the Doha negotiations improve on UR commitments by about 13% but are still on average 1.9 times more restrictive than actual policies.

Cory and Eizel (2016) observe that by not fully addressing trade barriers faced by technology-based service firms, the international trading system limits gains from efficiency and innovation that have the potential to significantly benefit most consumers globally. To update rules governing the global trade in services for the

digital age, 23 economies¹⁴ have joined together to negotiate a Trade in Services Agreement (TiSA). Authors believe that by upgrading international trade rules for services, which were largely set in the mid-1990s by the General Agreement on Trade in Services (GATS), the Trade in Services Agreement (TiSA) can open markets to greater global trade in services, and in the process, facilitate the innovation that leads to economic growth.

Whether GATS or TiSA, the trade in services will be ruled majorly by domestic regulations, political decisions on market access, competition and policy on foreign ownership. In the succeeding sections, literature is reviewed focusing on these main issues of regulations, market access and competition, especially in air transport and the status of Ground Handling Services.

2.3 National and International Regulatory Perspective for Air Transport and GHS

The regulatory aspect becomes important as it defines the boundaries of openness and market access for trade in services. ICAO has been the leader in the regulatory standards and for overall supervision of all aspects of the civil air transport. GATS, on the other hand, is a trade facilitating global platform providing flexibilities to Member States so as to schedule commitments assuring a type of market access and also have the freedom on domestic regulations. It is found from the repertoire of works of the ICAO that the main focus of the regulatory body was developing the global strategies for the regulation and oversight of the aviation safety, security in civil operation and for environmental protection.

Regulatory reforms in the civil aviation sector have been receiving the due attention of the policy makers as also the stakeholders, researchers and analysts. OECD have been actively studying and bringing out the discussion papers.

¹⁴ United States, Australia, the European Union, and 20 other economies, including Hong Kong, Columbia, Costa Rica, Mexico, Pakistan, and South Kora, decided that they wanted to pursue a new services trade agreement. The full list of economies participating in TiSA: Australia, Canada, Chile, Columbia, Costa Rica, the European Union, Hong Kong (China), Iceland, Israel, Japan, Leichtenstein, Mauritius, Mexico, New Zealand, Norway, Pakistan, Panama, Peru, the Republic of Korea, Switzerland, Chinese Taipei, Turkey, and the United States.

Prof Button (2008) has presented the phases in the aviation regulatory reforms every decade since 1910. He categorizes the developments as ‘the Legacy’ from 1910 to 1970s and as ‘Modern Age’ from 1970s onwards. The phases are as under:

‘THE LEGACY

- To 1910 - gentle assistance for innovation
 - 1910-1918 - military importance
 - 1920s --- national integration (mail services)
 - 1930s --- internationalism (esp. Empires)
 - 1940s+--- military development
 - Late 1940s-1970s - economic regulation
- Chicago convention
 - domestic price/ market access controls

MODERN AGE

- 1970s+ deregulation of operations’
- domestic from late 1970s in US
 - international (Open Skies, EU packages, etc.)
- 1980s+---deregulation of infrastructure
 - 2000s+ --- environmental regulations’

The focus of reforms in modern age is now on de-regulation and liberalization, and on environmental conservation and protection regulations. It is also seen that since 1940s, after the objective on military operations and gets diverted to the economic regulations and with the advent of ICAO, on safety, security and environmental protection.

A global overview of the industry trends and developments in the international air transport is provided in a paper (ICAO 2009) by the ICAO Secretariat. A shift in regulatory approach through national liberalization policies and their implications for the competition and consumer protection policies is noted over the years.

Prof Lenka (2012) while noting the developments in air transport and Law, concludes that a great degree of uniformity is needed in national laws to enable mass air transport operate across national boundaries without delay. Air law has to ensure equality of opportunity for airlines of the world as provided in the objectives of ICAO.

A European perspective on the effective regulatory institutions is available (Niemeier, 2010) addressing two research questions a) what parts of the value chain of air

transport are ex-ante regulated? and b) is this ex-ante regulation carried out by effective regulatory institutions or should the regulatory institutions be reformed? Keeping the interpretation of 'regulation' limited to the rules which inhibit the freedom of contract and thereby determines price, quantity, quality, investment and access, the author observes that this might lead to a stalling of infrastructure expansions and high congestion costs.

OECD countries in past two decades have shifted from using public policy instruments, such as regulation or public ownership of enterprises, to a greater reliance on market mechanisms and incentives to pursue consumer welfare, industrial, regional and/or employment objectives (Gönenç, R, Maher Maria and Nicoletti G. 2001).

As the regulations affect the extent of market access, some studies (Gonenc and Nicoletti, 2001) have focused on the regulatory trends with impact on market structure and performance. The impact that different types of regulatory and market arrangements have on the efficiency of supply of scheduled air passenger travel services in the OECD area is presence of strong economies of scale and density related to market and aircraft size, respectively, and a significant impact of market and regulatory environment on industry efficiency: the more the competitive this environment, the higher is the industry efficiency- however measured.

Stricter Regulatory control is advocated by the safety and security regulatory authorities as also by the national flag carriers that are intending to retain their market dominance. However, from the consumers' perspective the demand is for deregulation so as to enable entry of competing Low Cost Carriers –LCCs, non-scheduled air carriers to increase the consumer choice. The major element of International Air Transport Association (IATA) is to regulate the airfare and tariffs through the Traffic Conferences and Committees. However, IATA depends on the costs data reported by the Member air lines and has no control over the entry restrictions nor on allocation of capacity. Doganis (1973) proposed among others, no control over tariff for non-schedule operators and scheduled fares to be regulated through the revised IATA system i.e. the Traffic Conference recommendations based on 'majority' rule rather than 'unanimity' rule. The author argues that the recommendations if implemented *in*

toto should produce a form of international regulation which, while politically acceptable, is economically more justifiable than the present system.

Economic regulation pertains to airline business decisions such as market access, fare control, and cap on the number of flights a carrier can operate. Morrison and Winston (1986) devised a way of capturing the effect of deregulation on airfares by constructing a fare deflator based on the relationship between fares, input prices, and output characteristics during the deregulated years of 1980-82. Since airfares depend on a wide array of global events such as oil prices, the authors used this technique to hold control for these variables and to solely observe the impact of liberalization on fares.

The theoretical model developed by Pukar (2012) while analysing the effect of liberalization on fares showed that in routes that connect a hub to a hub, lead to a fare decrease, whereas on other less lucrative routes, fares tend to increase. Granting market access to more carriers gives them the option to operate or not on routes they desire. Thus, more competition is seen on lucrative routes, which leads to a downward pressure on fares. At the same time, routes where flights were forced to be operated under the regulated regime will witness an increase in fares because fewer carriers will operate there.

Zhang and Findlay (2014) derived policy indices to quantify the restrictiveness of the aviation regimes in the Asia-Pacific region, and use the indices to establish the relationship between people movement and liberalization in policy. Authors found that passenger traffic between city-pairs has been hampered by the restrictive air transport policies

Adler and Liebert (2014) analyzed the combined impact of ownership form, economic regulation and competition on airport performance. They found that while, irrespective of ownership form, regulation is necessary to emulate competitive forces thus pushing airport management towards cost efficiency and reasonable pricing policies, under potential regional or hub competition, economic regulation inhibits airports of any ownership form from operating and pricing efficiently.

The airline industry is the central part of the commercial aviation value and supply chain. Tretheway and Markhvida (2014) discuss the returns in the aviation supply chain and provide several policy recommendations, including increasing vertical competition in distribution channels.

2.4 Liberalization of aviation sector

The difference between liberalization and deregulation is basically that liberalization pertains to market access relaxation in international context as against the deregulation which pertains to relaxation in national regulatory framework. However, both have implications for the competition. The International Civil Aviation Organization (ICAO) present in a study (ICAO Study 2009), a global overview of regulatory trends and developments of international air transport that have taken place since mid-1990. The study looks at the major regulatory movements towards the liberalization of international air transport, including the bi-lateral and regional liberalization, negotiations involving a group of States, multi-lateral initiatives, national liberalization policies, and competition and consumer protection policies. Industry response to an ever changing and more competitive market place, has been airlines alliances and mergers and acquisitions, privatization, airline business models and product distribution. The ICAO Paper states that the liberalization of international air transport regulation estimated, in 2008, resulted in some agreements to begin to build legal and regulatory frameworks to govern the group market as a whole.

The impact of liberalization has been studied extensively in airline industry and its implications for the growth in air transport. Oum *et al* (2009) conclude their investigation into the impact of liberalization in airline industry stating that liberalization has led to substantial traffic and economic growth. Authors argue that such positive impacts are mainly due to increased competition and efficiency gains in the airline industry, as well as positive externalities to the overall economy and liberalization allows airlines to optimize their networks within and across continental markets.

Abate, M. (2014) empirically measured the economic effects of air transport liberalization, mainly on two supply side variables: fare and service quality, measured as departure frequency. The results show up to 40 % increase in departure frequency

in routes that experienced some type of liberalization compared to those governed by restrictive bilateral air service agreements. While the effect of liberalization is substantial in improving service quality, there is no evidence of its fare reducing effect.

Wang, J., Bonila, David and Banister, David (2016) studied and analysed China's air deregulation experience over the last two decades and its impact on airline competition from a geographical perspective. It is revealed that there has been a trade-off between the extent of deregulation and airline competition in China because the central government has tended to strengthen the big three airlines rather than totally open the market to private and locally owned airlines. The study inter alia provides an understanding of the role of the geography of competition in the Chinese airline market.

Dobruszkes, Mondou, and Ghedira (2016) find that the liberalisation of air transport is increasingly being promoted as a means to induce the growth of the tourism business, however, it is striking that there is little evidence to suggest that such liberalisation has indeed led to a growth in tourism. Furthermore, the evidence is usually restricted to the impacts of sole low-cost airlines on tourist destinations newly served by such airlines.

Some concerns are voiced by the national carriers regarding the adverse impact of liberalization and consequent competition like airlines cutting corners endangering the safety and security in operations. Governments' desire to ensure that their domestic airline industry remains as healthy in the liberalized environment, also results in imperfect market competition due to budgetary support and subsidies to national carriers and public sector companies. However, notwithstanding these concerns, it is generally observed that the liberalization has led to the economic growth and has been beneficial to the consumers and shippers.

In case of airline industry, the liberalization is categorized in the IATA Final Report, (2008) into a) Relaxation or removal of restrictions on 'Ownership and Control' and b) The second is product market liberalisation which opens up routes or markets to new entry. This can lead to very significant gains to consumers, especially in cases where competition was either absent or muted prior to liberalization. It is reported that

the overall impact on employment will depend on the interaction between productivity improvements which may reduce the demand for labour, and increased service levels which will increase the demand for labour. Increased service levels may result from market entry or the introduction of new routes, or from increased demand that is generated by fares reductions depending on route-to-route case.

Considering the nature of bi-lateral air services agreements, a study (Study 2015) found that even with today's lower real (inflation adjusted) air fares, driven by improved aircraft economics and economies of higher route traffic, liberalization of air service between two nations will typically increase traffic by roughly 16%. The study results support the argument that liberalization leads to enhancing air traffic and creating a competitive market with increased consumer choice. The study reports that 320 fully or partially restricted country pair markets (Bi-lateral ASAs) via new air service agreements would generate significant increases in traffic and significant gains in employment. In an industry that drives roughly 100 million jobs globally and liberalizing those 320 markets would increase jobs by several million.

The ICAO working Paper (2016) focused on the effect of liberalization in air transport and concludes that Liberalization has led to substantial economic and traffic growth. Such positive effects are mainly due to increased competition in the aviation market, which reduces price and stimulates traffic growth, producing efficiency gains as a result of carriers' ability to optimize their network and pricing strategies. In addition, the increased competitive pressure forces airlines to improve productivity and induces inefficient carriers to leave the market. Moreover, there arise positive externalities to the overall economy from liberalization, including stimulation of growth and employment opportunities, trade promotion, and better transport and logistics though the benefits of liberalization may not have manifested uniformly across the areas.

Liberalization of air transport is underway for the past 4-5 decades. Some of the changes have come through renegotiation of bilateral agreements to remove many barriers to competition. From the early 1990s, 'Open Skies' policy allowed the United States of America and its many trading partners to sign a liberal template bilateral accord, which has led to a common framework of agreements. The US Open Skies

policy is a conspicuous example of bilateral liberalization. (Worldwide Air Transport Conference Paper, 2003)

Piermartini and Rousova (2008) estimated the impact of liberalizing air transport services on air passenger flows for a sample of 184 countries. Authors found robust evidence of a positive and significant relationship between the volumes of traffic and the degree of liberalization of the aviation market. An increase in the degree of liberalization from the 25th percentile to the 75th percentile increases traffic volumes between countries linked by a direct air service by approximately 30 per cent. In particular, the removal of restrictions on the determination of prices and capacity, cabotage rights and the possibility for airlines other than the flag carrier of the foreign country to operate a service, are found to be the most traffic-enhancing provisions of air service agreements.

An important defining characteristic of many services is that they may be costly to trade across borders (under modes 1 and 2 of the GATS), and hence if foreign providers are to enter a market they will most efficiently do so through investment or, in GATS terms, commercial presence (Mode 3). Markusen and Tarr (1999) developed a model to examine the benefits that a liberalized investment regime for intermediate services can have on a domestic economy even when the foreign provider ‘imports’ from its home country much of the services that it supplies, and economizes on labour in the host country.

Decurtins (2007) examining the bilateralism versus multilateralism concludes that further liberalization must first occur in the bilateral realm through an increasing number of common aviation type agreements. Dan C. I. (2011) examines the impact of globalization on airport industry and finds that one of the most important changes that will take place at the airport industry will be the gradual transition to privatization, beginning with various forms of public-private partnership, until reaching the final stage of full privatization. Although a significant number of airports have been privatized, private sector involvement in the airport industry remains small comparing to the case of airlines. In case of major Indian airports like those at Delhi and Mumbai, the management, development and administration of these airports is contracted to a consortium of public and private entities.

2.5 Competition in the regulated network industry- Air Transport

Wolf, Forsyth, Gillen *et al* (2016) in the book on ‘Liberalization in Aviation: Competition, Cooperation and Public Policy’ provide comprehensive assessments of developments and address the three basic questions: (1) What are the forces that have given rise to regulatory reform? (2) What is the structure of the regulatory change which has occurred to date and is likely to occur in the immediate future? (3) What have been the effects on industry efficiency, prices and profits of the reforms which have occurred to date? The chapters deal with aspects of competition in various liberalized markets, the emergence and growth of low-cost carriers, horizontal mergers and alliances, infrastructures, and concluding with economic assessments of liberalization steps so far and proposed steps in the future.

Competition in regulated network industry depends on the market structure. Air transport is a network industry. Economides (2004) has defined the characteristics of the network industry and the competition policy and anti-trust law. According to Prof Economides the crucial defining feature of networks is the complementarity between the various nodes and links. A service delivered over a network requires the use of two or more network components. Thus, network components are complementary to each other. A common and defining feature of network industries is the fact that they exhibit increasing returns to scale in consumption, commonly called 'network effects'. (Economides, 2004).

As liberalization spreads, the question of how to maintain and promote fair competition in air transport is increasingly becoming an issue. About ninety States have competition laws of some sort with a number of bilateral antitrust enforcement cooperation agreements particularly between developed countries.

In a study of impact of air transport liberalization on competition among other effects, Oum, Zhang and Fu (2010) found that the emergence and prevalence of hub-and-spoke network is one of the most common developments in deregulated markets, especially for airlines endowed with access rights to a single large market such as the United States and European Single Aviation Market. The implementation of hub-and-spoke networks enabled carriers to link small markets with their hub airports,

expanding air services to new destinations. The formation of a hub-and-spoke network can affect both demand and cost.

Dr. Abeyratne (2013) poses the questions regarding the role of ICAO in the evolving needs of safe air transport. Drawing attention towards one of the recommendations during the Air Transport World Conference 6 held at Montreal in March 2013, the author argues that ICAO should lead the States into competition.

Abeyratne (2014) mentions the concerns for the intensified competition arising out of liberalization policies in air transport, giving rise to even more dominant and powerful alliances, necessitates a real and tangible need for the governments and regional blocs such as European Community to enforce and regulate anti-competitive conduct. Author recommends that the role of ICAO as the international regulator now needs to be expanded to consider some innovative approaches for facilitating harmonious safety environment to introduce competition in trade in air transport services.

The WTO Trade Council Secretariat has brought out exhaustive notes/ Documents in the form of the study reports, conference discussion and working papers, background notes, consultation Papers etc. on the subject. It is found that the most of the work focuses on the role of the trade facilitating body- GATS in the context of the opening the markets and providing competitive trading environment to the trade in services.

Identifying the Determinants of Competition in Aviation Ground Handling, it is noted that any gains from liberalization correspond to the regulatory environments of the market. West and Bruce (2001) found that the potential for gains from liberalization of trade in services is tied closely to issues of market regulation and structure. Thus, despite the improved competition that might result from lowering trade barriers at the border, competition can still be restricted inside a country.

Farmer (2008) opines that the European image may appear orderly, proceeding directly from inefficient regulation to market competition, but the actual experience has been less orderly, slower than originally anticipated, and perhaps more contested than expected. However, the author points out that the economic studies agree that de-regulating European markets and opening them to competition has a positive economic effect. The OECD quantifies the benefit as yielding a two per cent to three

per cent annual growth in GDP. In the Commissioner of Competition, EU's view, the airline market has become more competitive as a direct result of eliminating State Aid and opening European markets to competition, including cross-border mergers in this sector.

It is also noticed that Governments initiated the drive to liberalize the air transport with the objective of bringing in competition and consequent efficiency and competitive pricing in the sector. In a note from Infrastructure Economics and Finance department, of World Bank (Juan and Ellis, 2005), a study of air transport infrastructure and the roles of public and private sectors have been carried out. It revealed that economic regulation usually means entry and price regulation. Removal of all government imposed economic restrictions on airlines from either signatory country and implementation of 'open skies' style arrangements has resulted in market expansion, price reductions, and substantial efficiency gains.

Effect of deregulation on competition in the air transport market depends on the pace of deregulation and emergence of competitors. Airport operators themselves are facing competition depending on the geographical distribution and availability of alternate routes, alternate modes of transport.

Malighetti *et al* (2008) analysed the development of the air transport industry in Europe after deregulation. It is found that development of secondary airports increases the chance for competition among airports. It is also seen that the actual geographical distribution of airports in Europe can withstand a high degree of potential competition among them.

Industry structure, especially in aviation needs to be kept in mind while proposing the liberalization policies. There are vertical relationships and complementary services. Polo and Scarpa (2002) point out that the key issues that must be addressed to design a liberalization plan include the horizontal and vertical structure of the industry, the access to the transport facilities, and the organization of a wholesale market and the development of competition in the liberalized segments. The authors analyse the liberalization policies in the EU as a two-step approach: the Directives and the national liberalization plans have focused so far on the goal of *creating a level playing field* for new comers through Third Party Access to the network infrastructure, the

unbundling of monopolized from competitive activities of the incumbent and the opening of demand.

There is ample knowledge and body of research as far as deregulation, liberalization in air transport and its implications for the economy are concerned.

2.6 Competition and safety in Aviation Ground Handling Services

From the review so far, it is seen that trade in services has emerged after global move to liberalization. Apart from the three subsector services of air transport services, other developing subsectors have been gaining attention the world over. While Airport operation services are being easier to liberalize, liberalization and opening the aviation Ground Handling Services markets are constrained by various factors, the main ones being presence of dominant players, monopolistic advantage to airport operator providing GHS and air side space constraints. The ground handling operations play a crucial role in the efficient turn around (From landing to next take off) of an air craft and consequently the on-time performance of an airline. In this section the literature pertaining to the effect and impact of deregulation, liberalization on the aviation GHS is reviewed.

OECD have brought out country-wise reports in case of EU and other member countries, *inter alia*, addressing the regulatory structures, reforms and performance in the realm of ground services vis-à-vis the EU Community Directive 96/67 of 15th Oct 1996 and liberalization of the ground handling markets. These reports are comprehensive and address also the specific issue of the ‘third party ground handling services, including the procedure for limiting the number of suppliers for such third party ground handling at the airports in these countries. It is expected that any airport operator who is providing the third party / ground handling services and making limitation, quantitative restriction on number of service providers may do so out of vested interest in limiting its number of competitors.

As per the Intermediate Report (2006) of the Expert Group on air transport, the charging system in the air transport sector is articulated according to three big cost

areas, i.e. ground handling services, airport services and air navigation services. As per the ICAO (2017) estimates by rule of thumbs, the airline operating cost break up (as adapted from Form 41, used by Boeing, MIT and Aviation Daily for more detailed comparisons) is a) Flight (DIRECT) Operating Costs (DOC) = 50% - All costs related to aircraft flying operations, (Include pilots, fuel, maintenance, and aircraft ownership), b) Ground Operating Cost = 30% -Servicing of passengers and aircraft at airport stations (Includes aircraft landing fees and reservations/sales charges) and c) System Operating Cost = 20% -Marketing, administrative and general overhead items (Includes in-flight services and ground equipment ownership). Thus it is seen that the ground handling services cost form a substantial part of the Direct Operating Cost of an airline.

The airport operator and the main national carrier have been traditionally the supplier of ground handling services. Due to the developments in the management and operations of the airports in the public-private-partnership mode or of privatization, there is a growing competition among the airports and a tendency also to reorganize its various operations, including the ground handling wherever the airport operators are providing the same. Clausen (2010), in his Ph.D. Thesis examines the competitiveness in modern airports as both airports themselves and their ground handling operations are changing to private ownership. The increasing liberalization of the ground handling market prompts ground handling operators to increase cost effectiveness and deliver fast and reliable service. Clausen presents models and algorithms for general optimization and decision problems arising within ground handling.

Airport operators have a monopolistic advantage. They are the owners of the Central Infrastructure and facilities, charging fees for their use, and also more often than not, the providers of the ground handling services. This affects the value chain. Knieps (2013) analysed the liberalization of the aviation value chain and the remaining role of government policy, in particular, the role of sector specific regulation of monopolistic bottleneck components of the air traffic value chain. He observed that for competition on air transport markets and ground handling services to operate efficiently, non-discriminatory access to complementary monopolistic airport infrastructures must be guaranteed.

Deregulation policies of the governments have resulted in definite growth and contribution towards the GDP. Farmer (2008) comments on Competition Policy and Mergers and acquisitions and newly competitive Industries. It is concluded that though the European strategy of deregulation and competition seeks to be organized and deliberate, it has proceeded unevenly and has been more successful in some industries, and some countries, than others.

A study by Gossling, Fichert and Forsyth (2017) revealed that a wide range of subsidies is actually used in aviation, including grants (research and development, exports, investments, loss coverage), equity infusions, loans and loan guarantees, public service obligations, hidden subsidies (reduced infrastructure fees, cross-subsidization, monopoly rights), and no or reduced taxes, including international bunker fuels, value added taxes, and tax exemptions of frequent flyer programmes. The subsidies also influence capacity in global aviation markets, strengthen the market position of individual airlines, and create conflicts between airlines and the countries in which they are based.

In a competitive environment created by the liberalization and deregulation, the effect on the market shares of the services providers indicate that there is a trade-off between the liberalized competition and the fragmentation of market into number of players, affecting the quality of services.

Diaz and Cabrera (1997) evaluated measures for safety attitude and safety climate to inter alia, identify the essential dimensions of the safety climate in the airport ground handling companies. The research was centred on ground handling departments. The factor analysis of the safety climate instrument resulted in six factors which explained 69.8% of the total variance and found significant differences in safety attitudes and climate in relation to type of enterprise.

National Business Aviation Association (NBAA) USA safety committee (2002) found that following are the most significant human factors responsible for ground damage to the aircraft: Time pressure- task saturation, Skill based errors, Customer satisfaction, Direct Safety rules violations, Environmental- i.e. Illumination, visual obstruction, Noise level, Communication breakdowns and loss of situational awareness.

Another significant aspect is the safety concerns in a competitive environment. In a Study by ICAO Secretariat (ICAO, 2005), the challenge for States as to how to capture the benefits of economic liberalization without compromising safety and security, is addressed. One of the concerns flagged is of airlines outsourcing their ground handling; sending their aircraft to be repaired and/maintained in foreign countries; and contracting out certain flight operations and/or crew administration to another airline or company. This situation could present challenges for the licensing and safety oversight authorities from both the State issuing the AOC and the State of the outsourced activity on how to ensure that such practice or entity properly meet the safety and security requirements.

Ek (2006) analysed the safety culture in aviation ground handling operations. Author concludes that hierarchical position (in the organization) had little effect on how the different safety culture aspects were perceived and judged, although managers generally had somewhat more positive perceptions and judgments compared to the staff. It was found that the reality regarding operators' reports of safety culture was often poorer than both managers' estimations and lower acceptable limits.

Connor, O'Dea and others (2011) reviewed 23 studies that have examined safety climate within commercial and military aviation. The aviation safety climate surveys reported in the literature were found to have some construct validity (they measure what they intended to measure). However, they found insufficient evidence in support of the discriminate validity (the ability of the tool to differentiate between organizations or personnel with different levels of safety performance) of the surveys. Authors recommend that rather than constructing more aviation safety climate surveys, researchers should focus on establishing the discriminate validity of existing measures by correlating safety climate with other metrics of safety performance.

Use of technology in improving the safety in operations has been examined by Mishra and Mishra (2010). Radio frequency identification (RFID) is one of the ten greatest contributory technologies of the 21st Century. Authors found that RFID adoption planning, architecture and implementation (studied at a major airline) with a special focus on improved services, improved baggage handling, and by integrating RFID

technology together with networking and database technologies, has a positive impact on airport/airline security and on frequent flier program services.

Feng and Chung (2013) observed that statistically, almost 80% of aviation accidents occur at airports. Therefore, how to identify risk items, measure risk value objectively, and establish Risk Assessment Matrix of airports is a major task of airport safety management. Authors developed a fuzzy logic-based Failure Modes, Effect and Criticality Analysis (FMECA) technique and applied to analyse a case study of Taiwan Taoyuan International Airport (TTIA) airside risk using vague, qualitative, or imprecise information. The approach presented resolves the issues of weighting of risk factors and threshold value in risk assessment matrix in traditional methods of risk assessment and conclude that “runway incursion-animal at runway in the landing procedure” is the most critical risk item; “runway” is the most risky area; and taxiing (TXI) is the most risky flight operation procedure.

Yadav and Nikraz (2014) pointed out that the airports and commercial aircraft operators are experiencing a tremendous commercial pressure due to the globalization and liberalization of the industry in recent years. Consequently, the civil aviation industry is moving progressively from prescriptive safety rules to performance based legislation. The authors analysed the significance of this regulatory shift in aviation safety as also the potential safety risks associated with the outcome based legislative framework and deregulation of safety sensitive aviation activities.

CAPA (2014) had reported that the global airport ground handling business is now estimated to be worth over USD80 billion per annum according to its trade association, ASA - while some say USD100 billion. By comparison the airline industry turned over around USD700 billion in 2013. The report points out the disparity in regulatory scrutiny of the Ground Handling services- globally from ICAO, regionally from FAA & EASA, nationally from National Aviation Administration Authorities (NAAs), as well as separately from environment and health, life safety and corporate governance, and mentions that one notable change in the ground handling business is a growing propensity towards outsourcing by the airlines. This is in line with carriers’ desire increasingly to segment the market and processes in order to drive up ancillary revenues (e.g. cabins, baggage), as well as

outsourcing non-core activities (station management, ground handling, especially outside ‘home territories’) and thereby adding greater complexity to ground operations. Ground handling’s status may be growing but this particular business segment has unique issues that need to be addressed.

Literature focus is on safety in operations in a liberalized and deregulated competitive environment.

2.7 Review of the case of opening of Aviation Ground Handling Market in European Union

European experience in air transport liberalization is summed up in a Paper (ECAC and EC, 2003) presented by the Member States of ECAC and the European Community, together with the European Commission, to the Conference. It is reported that while the evidence on impact on fares is mixed, the new liberalized regulations has fostered innovation and enterprise, increase in number of routes served and greater competition. Further, consumers have been benefitted by the wider choices with the emergence of low cost carriers necessitating a competitive response from the longer-standing rival airlines.

EU has opened the ground handling services market vide its Council Directive 96/67/EC (the Directive) on the liberalisation of the ground handling market at Community airports in 1996.

Soames (1997) in a study of Council Directive, observed that the Directive creates some scope for airlines to self-handle and for third parties to provide handling services, but with significant scope for exceptions and, in some cases, long transitional periods. However, the EC competition rules continue to be applicable to abusive behaviour by dominant companies, and may be enforced in this sector by the EC, or invoked by private parties in national Courts.

A study (SH&E Report, 2002) conducted by the European Commission on the quality and efficiency of ground handling services at EU airports as a result of the implementation of Council Directive 96/67/EC, identified certain issues like access

fees and access to central infrastructure of airport, the size of the market available on the ramp (which is where services may be limited) and the degree of competition for the new independent entrants of GHS providers, allocation of facilities- requiring that a distinction should be made between commercially important facilities (e.g. check-in desks, stands and gates) and support facilities (back offices, GSE parking areas, crew rooms etc.), which affect efficiency etc.

Goh (2000) providing a legal commentary on the Directive, quotes that Directive for the liberalisation of ground handling services at Community airports, aimed to secure inter alia greater user choice, product and service innovation, as well as productive efficiency. It is observed however, that the Directive establishes a number of exemptions to the general right of market access and establishes the procedures to be followed when invoking one of the exemptions.

Berli (2003) of Swissport International Limited (a ground Handling Company), in an article on Ground Handling markets, implored a rethink, pointing out that providing the same high quality at lower and lower prices is a tough task to master. It is an issue on which airlines and ground handlers tend to have differing views, too. In such a case, he suggests that instead of airlines negotiating minimum handling prices and ground handlers striving to secure the critical mass they need to survive, it is time for them to focus on what services do we expect to obtain for a certain price? And what services are we able to offer for the price concerned?

In a Study of Impact of the EU Directive opening the ground handling market, the Airport Research Centre, Final Report (2009) indicated that the number of ground handling agencies increased, the impact on the service quality was difficult to assess because other drivers which are varying at airports are influencing significantly, the quality levels, the issues of access to Centralized airport infrastructure remain, market share fragmentation and loss of monopoly of a single large GHS provider (airport or major national carrier) was observed.

Barbot (2010) examining the case of complementary services and vertical relations using the case of airport handling activities finds that the presence of a horizontally integrated firm may lead to market foreclosure. Moreover, regulation may be pointless or even anti-competitive. In particular, author shows that Council Directive

96/67/EC, while intending to increase competition, may lead to anti-competitive situations and consumers surplus decrease.

Žabokrtský (2011) explores and analyses the impact of the EU Air Transport Policy on major industry actors: airlines and airports. Findings inter alia mention concerning ground handling liberalisation, that those who had the privilege to supply these services before, without facing any competition, were against the liberalization.

On 16 April 2013, the European Parliament adopted a new, amended airport ground handling Regulation, which will replace the old Directive 96/67 EC on ground handling services. The new Regulation will further open up European airports for competition on the ground handling market. Burghouwt, Poort, Ritsema (2014) investigated the characteristics of the open ground handling market for air cargo at Amsterdam Airport and the lessons that can be learnt from the Amsterdam experience. Authors found that an open handling market brings greater freedom of choice for airlines and lower handling fees. However, they do not see any (serious) market failure for the airport that would justify intervention by the market regulator, by limiting the number of handlers.

2.8 India's Aviation sector and the GHS Markets

There is a very limited research body available on India's aviation ground handling sector. Apart from reports of CAPA, some consultants hired by the Ministry of Civil Aviation and reports of the Committees set up by the Government of India for various policy related matters, legal issues, operations, review of functioning and restructuring of regulatory bodies, there is a scarcity of research.

India's GH Services Market at present is dominated by the Airports Authority of India (AAI), national carrier Air India (AI) and their respective Joint ventures and an independent GHS provider- M/s Cambata Aviations. In 2007, Government came up with a ground handling policy. The policy came in the form of a Circular, giving the safety related regulatory standards, security clearance requirements etc. In this circular itself, was the order for opening the market with restrictions on the ownership i.e. the new entrant can come in only as a Joint Venture (JV) Partner to AAI or AI. Foreign airlines were not given the rights to self-handle. Subsequently Bureau of Civil

Aviation Security (BCAS) the security regulatory authority in India, also issued an order regarding detail security requirements, licensing requirements and clearances and procedures required to be complied with.

In 2010, through another circular AIC No. 03/2010 dated 2 June 2010, the Government issued instructions on the subject of 'Grant of permission for providing ground handling services at airports other than those belonging to the Airports Authority of India'. Clause 1.2 of this Circular provides that in accordance with the Airports Authority of India (General Management, Entry for Ground Handling Services) Regulations, 2000, an airline operator may carry out ground handling services at an airport either by itself or engage the services of any of the following, namely: (i) AAI; (ii) Air India or Indian Airlines; and (iii) any other agency licensed by the AAI.

This circular prevents/prohibits the airlines from providing ground handling services where there is no passenger interface. The Petitioners have challenged this AIC No: 3/2010 dated 2.6.2010, to the extent that it precludes the private airlines from conducting ground handling operations which does not involve passenger interface. It is alleged that the circular is anti-competitive as it creates monopoly in favour of a selected few ground handlers and will lead to cartelization by independent ground handlers. The matter is under consideration in the Supreme Court of India.

A working group set up to look into new initiatives in Civil Aviation Sector during 12th Plan period 2012-2017, in its report *inter alia*, acknowledges that mechanization and modern ground handling processes would be the key to ensuring efficiency and recommended that there should be proper monitoring mechanism to oversee and enforce service level agreements between airlines and ground handling agencies.

Arora, Bishnoi and Atray (2010) have identified the challenges of Indian aviation industry, mainly these are shortage of trained manpower and lack of regional connectivity, gaps in infrastructure, high input costs, rising fuel costs and declining yields.

Pachnanda (2010) in the study of Application of Antitrust Issues to the Indian Aviation Sector, reports that civil aviation industry is most affected by

anticompetitive practices under the India's Competition Act, 2002. Author finds that there are certain factors intrinsic to the airline industry that are anti-competitive such as 'Frequent Flyer Programs' and 'Code Sharing Agreements' that are operated by various airlines and which tend to restrain competition in the market.

Paulus (2011) identified the main issues of the existing ground handling regulation in India and comparisons were made primarily with the European Council Directive that was issued in 1996. It is concluded that the EU Directive is not a perfect model and Indian Ground Handling services require a certain level of ground handling regulation for effective and efficient ground handling operation.

Centre for Aviation (CAPA) has brought out in 2014, an Industry Report on 'Aviation Ground Handling dealing with liberalization, Efficiency and compensation and reviews the consolidation of the ground handling industry and emerging alliances. The report suggests that existing competitive pressures are such that a further opening of the market risks its fragmentation, and in the process jeopardizes the efficiency and quality of ground handling operations at many airports. The report states that any further opening of the (ground handling) market is likely to have the opposite effect as turnaround processes will have been improved and optimized, labour costs and working practices have been squeezed tight and further scale economies will be lost.

Sanyal and Hisam (2016) examined the relationship between airline service quality, passenger satisfaction and preference. The key findings of the study indicate that overall service quality is highly related to both passenger satisfaction and preference. The relationship between passenger and preference toward a specific airline is less clear.

Singh (2016) found that the Low cost carrier model of commercial aviation has opened up avenues for third party independent maintenance, repair and overhaul facilities (MRO). The low cost carrier business model includes only line maintenance to be done in-house and all other maintenance jobs are outsourced to the Independent MROs.

In the Indian context, the questions that emerge from the literature so far are: GHS operations are an important stage in the aircraft trajectory. Can the GHS market be

made more competitive? What are the imperatives for opening the GHS market to competition? How can the shortcomings noted in the EU experience of introducing competition in GHS market be removed?

2.9 Growth, Competition and implications for airport capacity

The review of literature indicates that the liberalization of trade in services, especially air transport is resulting in growing air traffic, demand for aircraft, advancement in technology for efficient, green equipment and aircraft. A considerable growth in air traffic is estimated, especially in Middle East, South Asia, Africa and South American countries. One significant fallout of this is that all around the world the airports are facing capacity constraints. Keeping in view the aforementioned results of continuing liberalization in aviation, a review of literature has also been undertaken to find out as to how the challenges of airport capacity constraints are being handled and what role the ground operations can play in efficient turnaround of an aircraft.

Airport capacity is defined in various ways- Capacity generally refers to the ability of an airport to handle a given volume of traffic (demand)—i.e., it is a limit that cannot be exceeded without incurring an operational penalty. As demand for the use of an airport approaches this limit, queues of users awaiting service begin to develop, and they experience delay.

Gilbo (1997) presented a new approach for improvement of air traffic flow management at airports, which leads to more efficient utilization of existing airport capacity to alleviate the consequences of congestion. He presented a model, which first considers the runways and arrival and departure fixes jointly as a single system resource, and second considers arrivals and departures simultaneously as two interdependent processes. The model takes into account the interaction between runway capacity and capacities of fixes to optimize the traffic flow through the airport system.

Pels and Verhoef (2002) presented a model of airport pricing when the demand exceeds the capacity and congestion follows. Their model reflects inter alia, that airlines typically have market power and are engaged in oligopolistic competition

sub-markets and that different airports in an international network typically not be regulated by the same authority.

Dr. de Neufville and Odoni (2003) point out that all airport facilities can be described as systems of queuing systems, where arrivals at a service facility are randomly distributed, waiting lines form and users are therefore delayed and have to wait before being served.

Senguttuvan (2006) elaborates that the airport airside system consists of airspace around airport called the 'Airport Zone' or 'Terminal Airspace' consisting of the runways, taxiways and apron / gate complex. The airspace provides accommodation for the arrival of aircraft just before landing and the departure aircraft just after taking-off. The runway accommodates the ground phase of landing and taking-off. Taxiways physically link the runway and apron / gate complex and enable the aircraft for taxiing between two complexes. At apron / gate complex, the aircraft perform their ground handling services.

Kumar and Sherry (2009) examined the variability of throughput capacity at the OEP-35 airports during the convective weather season in 2008. The authors established the average costs of delays due to reduced capacity and the average profits per flight at each airport and given the cost of delays and lost profits, determine an optimum capacity at each airport to minimize both the under-utilization of airport capacity and flight delays due to variability in the available throughput capacity. Authors found, inter alia, that 24 of the OEP-35 airports exhibit an average cost of delays per flight in excess of the average profit generated by a flight. Included in this category are JFK, Newark and La Guardia, USA.

(Bubalo, 2010) benchmarking the airport capacity, defines the capacity that represents the limit of productivity under current conditions in a specific time unit, usually per hour, per day, per month or per year. The closer an airport operates towards its ultimate or 'physical' throughput capacity, the stronger delays increase beyond an acceptable level of service. It is indeed always possible for demand to exceed capacity for short periods of time due to fluctuations of demand at the airport. The situation becomes more critical when capacity is utilized more than 100 per cent over a

minimum of one hour and measurable waiting queues and delay develop (Horonjeff, 2010).

The challenges posed by the traffic growth are congestion, delays due to existing airport capacity constraints. EUROCONTROL in its study for ‘Challenges of Growth’ (2013), analysed data of August and September 2012, and found that there were just 6 airports that were ‘congested’ in the sense of operating at 80 per cent or more of their capacity for more than three hours per day. In the most-likely scenario of the 2035 forecast, this climbed to more than 30 airports in 2035. It is presumed that the airlines will react to delays by requesting flight cancellations after applying flight priorities rules according to their policy (e.g. favouring on-time performance or to ensure passengers connectivity) causing additional unaccommodated demand illustrating the constant trade-off that drives the air transport network between demand, capacity and delays.

While the Airport capacity has many influencing variables and can be expressed in different indicator values, the most influencing variables can be assumed as constant within a given operational case that is studied. Arrival to departure ratios in the aircraft movements are most volatile even within one operational case and have thus to be treated as variables in the airport capacity representation.

Federal Aviation Administration (FAA) USA have been assessing the Nation’s future airport capacity needs. This effort, which became known as the Future Airport Capacity Task (FACT), represents a strategic approach to identify the airports that have the greatest need for additional capacity in the future. The reports are available in public domain. FACT 3 report (2015) defines a congested hour at the airport as an average arrival delay of 6.22 minutes per flight or an average departure delay of 6.65 minutes per flight. In order to be considered “capacity constrained,” over 30 percent of the hours at the airport between 0700 and 2259 needed to meet the criteria for either arrival or departure congestion.

Level of Service and quality in terms of delays has a performance indicator of aircraft movement for Airport performance benchmarking. Since variation of scheduled times versus actual times could substantially cause accumulating operating costs for carriers and could furthermore pose the risk and inconvenience of missed connections for the

passengers, Bubalo (2011) examines determinants of flight delays at airports, and thereby developing performance indicators such as slot capacity utilization, queueing time and punctuality.

Romano et al. (2008) suggest a mathematic algorithm that is able to optimize, a posteriori, the flight operation under the delay restraint. The algorithm determines the best sequence of aircrafts that minimizes the delays and it maximizes the runway capacity. The proposed methodology, even if determine an evident improvement of the runway capacity, in the respect of thresholds of acceptable average delays (constrain), represents an initial methodological phase that will desirably conclude in the determination of a dynamic model, that is able to assist the inspectors' job in way real-time, assigning, opportunely, an excellent sequence of the successions of flight operations.

Fricke and Schultz (2009) found that during 2007, 19% of all European flights were more than 15 min late. One contributor to this delay is the insufficient ground operation performance inducing excessive process durations. Authors have recommended a strategy on how to scale gate time to cope with demanding punctuality requirements from the customer's side. With regards to Airport CDM¹⁵ concepts, the dependencies found may be used in decision support tools to trigger ground handling resource (personnel and tools) planner and motivate for strategies specifically for Ground Handling Companies.

Wu and Caves (2003) propose an analytical model to simulate the efficiency of aircraft turnaround operations at airports. The concept of scheduling buffer time into the ground time of aircraft operations is introduced in the model at the expense of reducing aircraft productivity to minimize the system costs from operational uncertainties. Their analysis show that the proper use of schedule buffer time in aircraft turnaround time can minimize the costs by balancing trade-offs between schedule punctuality and aircraft utilization.

A new approach is proposed to investigate the aircraft turnaround operations performance by Wu and Caves (2004), using the simulation model. Authors found

that the inherent schedule punctuality of a flight schedule is influenced by two factors: the amount of schedule buffer time included in the ground time of an aircraft and the operational efficiency of the turnaround. In addition, the proposed aircraft turnaround model is also a suitable managerial tool for airlines and aircraft ground service providers to evaluate the operational efficiency of turnaround operations.

The success of demand management approaches to curbing flight delays is predicated on an accurate and reliable a-priori determination of airport arrival and departure capacity, as revealed in a study (Kumar and Sherry, 2008) of OEP-35 airports in convective weather season. The authors established the average cost of delays due to reduced capacity and the average profits per flight at each airport and determined the optimum capacity of each of the airports to minimize both the underutilization of airport capacity and flight delays due to available through put capacity.

Wu (2008) developed a real-time operation monitoring system – Aircraft Turnaround Monitoring System based on a system framework to monitor aircraft turnaround operations at an airport using Mobile computing devices (PDAs) and wireless network technology General Packet Radio Service (GPRS) are used to implement the real-time monitoring system for an airline. This helps the ground handling staff to take proactive measures to reduce delays, once the risk of delays and potential delay propagation is identified.

Pathomsiri et al. (2008) analyse US airports and include delays as a negative (undesirable) output. Their results clearly indicate that ignoring the quality of airport services would otherwise overestimate technical efficiency gains of airports with higher utilization.

Gomez and Scholz (2009) systematically identify and investigate ideas to improve ground handling operations and determines their influence on Direct Operating Costs (DOC). Authors have made recommendations towards ground handling cost reductions: several new systems can be adapted to the current aircrafts to improve the ground handling operations. Results show that a 3.5 % DOC reduction could be achieved.

There are studies to reduce the turnaround time of an aircraft to bring in efficiency in operation. A short turnaround time of an aircraft is nowadays essential for an efficient and economic operation of an aircraft. Kramer P. *et al.* (2010) in their research project Aircraft Design for Low Cost Ground Handling (ALOHA), show that a significant reduction in turnaround time and costs can be achieved by changing the conditions of critical turnaround processes through an adapted aircraft design. In principal, an improvement in ground handling can lead to an increase in aircraft utilization (conducting another flight) and/or a reduction in ground handling costs.

Ball, Barnhart *et al.* (2010) carried out a comprehensive assessment of the costs and impacts of flight delay in the United States. Flight delay is a serious and widespread problem in USA. The Federal Aviation Administration sponsored the five NEXTOR universities and the Brattle Group to conduct a comprehensive study on the total delay impact (TDI) in the United States. According to Ball *et al* (2010) some delays occur because of the inability of the system to accommodate demands during peak periods. They have stated that it is important to note that there can be trade-offs between throughput and delay and it is virtually impossible and also undesirable to attempt to eliminate all air transportation delay.

Clausen (2011) in his doctoral thesis presents models and algorithms for general optimization and decision problems arising within ground handling, and reviews a series of optimization problems from the specific perspective of airport ground handling. These problems range from generalized approaches to workforce planning, to highly detailed scheduling problems arising in the highly dynamic environment of airports.

Nugroho, Riastuti and Iridiastad (2012) identified baggage handling, passenger handling, or aircraft interior cleaning as the critical path in ground handling operations to ensure an efficient ‘on time performance’ (OTP) of the airline. Authors then identified the activities that did and did not add value to these three important ground handling operations and suggested performance improvement measures based on lean manufacturing principles of *heijunka*, *Poka Yuke* and *5 S*¹⁶.

¹⁶ *Heijunka*: (pronounced hi-JUNE-kuh) is a Japanese word that means “levelling production.” It is part of the lean methodology of process improvement. When implemented correctly, heijunka elegantly helps organizations match

Zhuo et al. (2013) in their study of the efficiency benchmarking of the American airports state that regulatory, geographical, economic, social, and political constraints all tend to hinder competition between airports. Therefore, the authors point out that unlike airline markets, competitive pressure cannot be relied on to exert enough pressures for airport managers to pay serious attention to improve productivity and efficiency. However, by exposing inefficient airports to their stakeholders, the public and their regulatory authorities, airport benchmarking helps spur competitive forces and shake up conventional thinking on airport efficiency performance.

Benchmarking operating cost performance across airports can be a valuable tool in the quest for efficiency. However, the analysis needs to account for the inherent differences in airports' operating environments. For instance, local labour costs can vary across comparator airports, and a terminal infrastructure design can give some airports inherent operating cost advantages (or disadvantages) over the short and medium terms. (Potter and Medeiros, 2015)

As per the Future Airport Capacity Task (FACT) reports (FACT-3 of January 2015)¹⁷, of the US Federal Aviation Administration (FAA), NextGen¹⁸ is helping to manage delays resulting from increasing congestion at many airports, but NextGen alone cannot create sufficient additional capacity at some of the largest and busiest airports. The FAA has also acknowledged that new runways and other solutions will be necessary to address traffic growth and reduce delays.

unpredictable customer demand patterns and eliminate manufacturing waste by leveling the type and quantity of production output over a fixed period of time and helps the organizations meet demand while reducing wastes in production and interpersonal processes.

Poka Yoke: [poka joke] is a Japanese term that means "mistake-proofing" or "inadvertent error prevention". The key word in the second translation, often omitted, is "inadvertent"

5S: 5S was developed in Japan and was identified as one of the techniques that enabled Just in Time manufacturing. These are five 5S phases: They can be translated from the Japanese as "Seiri=sort", "Seiton=set in order", "Seiso= shine", "Seiketsu=standardize", and "Shitsuke=sustain".

¹⁷ In 2003, FAA convened a team to assess the Nation's future airport capacity needs. This effort, which became known as the Future Airport Capacity Task (FACT), represents a strategic approach to identify the airports that have the greatest need for additional capacity in the future.

¹⁸ The Next Generation Air Transportation System (NextGen) is the FAA-led modernization of America's air transportation system to make flying even safer, more efficient, and more predictable. This modernization effort is one of the most ambitious infrastructure projects in U.S. history. Instead of making minor upgrades to aging infrastructure, the FAA and its partners continue to implement major new technologies and capabilities in shaping a modern, resilient, and secure National Airspace System that moves more than 2.5 million passengers and 26,000 commercial flights per day.

A system dynamic approach in the modelling of the aircraft ground handling process is presented by Kierzkowski and Kisiel (2017). The aim of the article is to use the developed simulation model to determine the operational ability of the aircraft. The article identifies subsequent activities performed during the ground-handling process and presents them in the form of graph and defines the dependence between them.

It has been found that from the airport operators' point of view, the management of delays to reduce the turnaround time of aircraft when resulting in increased number of aircraft movement is not only an indicator of the operational efficiency but enhancing the revenue and profitability for itself and the airlines due to increasing revenue through the increased aircraft movements paying landing, communication and navigation, parking and other such user charges to the airport.

It is noticed that so far the attention of the researchers has been on addressing the congestion and delays through various methods and the airport benchmarking is undertaken by developing models with air traffic management, aircraft design improvements, ground delay management and recently, by NASA trying to have a Flight deck Interval Management System (FIM) along with Terminal Sequencing and Spacing (TSAS) thereby strategically absorbing delay in this way to relieve congestion.

These are the complex works and require high-end technology, training and meticulous collection, coordination of data.

2.10 GATS and Air Transport Services, Commitments for Air Transport and the Air Transport Annex- Issues identified

2.10.1 Market Access and Trade in Services

The crux of the trade in services is the extent of market access available to the new entrants. Discussing the suggested pro-active role for the developing countries, Mattoo (2000) criticizes certain policy choices made by developing countries, often under negotiating pressure, which are not likely to maximise domestic welfare. Example given is of "Market access" concessions that allow increased foreign ownership of existing firms rather than new entry, and guarantee the privileged status

of foreign incumbents. Furthermore, author emphasizes that where the immediate introduction of competition was not feasible, too little advantage has been taken of the GATS to lend credibility to future liberalisation plans and concludes that persistent barriers to services exports of developing countries are depriving the world of substantial welfare gains.

Findlay (2007) observes that the system therefore imposes a set of country-specific quotas in each market, where markets are defined in terms of routes between pairs of countries and in terms of the two-way traffic flow.

Taneja, Mukherjee, Jayanetti and Jayawardine (2004) have pointed out that the GATS has identified two broad categories of barriers: market access barriers and national treatment barriers. The market access restrictions encompass barriers such as, limitations on the number of foreign service suppliers, the value of transactions or assets, the total quantity of service output, the number of natural persons who may be employed, the type of legal entity, and the extent of foreign capital participation in terms of equity share or absolute value. The national treatment restrictions would include discriminatory taxes against foreign service providers, residency requirements, registration and licensing for foreign service providers, etc.

WTO Trade Council, Economic Research and Statistics Division in its staff working Paper (Roy *et al*, 2006) provides a comprehensive overview of services liberalization commitments in the new generation of preferential trade agreements (PTAs) as compared to prevailing GATS commitments and Doha Round offers. The authors examine in more detail the GATS+ commitments undertaken in a number of key sectors (audiovisual, distribution, education, financial, professional, and telecommunication services). In many cases, the GATS+ commitments secured in PTAs roughly match or go beyond the plurilateral requests that have been made in the WTO for the sectors reviewed.

Domestic regulations is another concern of the member States. In a case study of Indian Professional Service providers and their costs and benefits from stricter disciplines on domestic regulation, Karmakar (2007) concludes that While regulation is an essential development tool and regulatory requirements ensure that domestic consumers get qualitatively the best services, the very same tools become

insurmountable market access barriers for developing country service providers in the WTO regime of MFN.

The World Trade Organization's Hong Kong Ministerial had set out ambitious goals for Services but the analysis (Gootiiz and Mattoo, 2009) shows that much remains to be done to achieve them. Doha promised greater security of access to markets but not any additional liberalization. Authors find that the Uruguay Round commitments were on an average 2.3 times more restrictive than current policies. Their survey reveals that developing countries have significantly liberalized a range of service sectors over the last couple of decades, however, Transport and Professional services remain a bastion of protectionism in high-income countries and are also subject to high barriers in developing countries.

The GATS aims to establish a legally binding set of commitments to enhancing predictability and transparency under the tenet of progressive liberalization (GATS Preamble). Adlung (2011) examines the implication of the positive-list, or bottom-up, approach to scheduling trade commitments under the GATS and states that the great flexibility was given to Members in selecting the sectors concerned and specifying the levels of access provided under individual modes. Thus, not surprisingly, the schedules that emerged from the Uruguay Round, which still account for the majority of current commitments, contain a variety of unclear or superfluous entries that may cause interpretation problems.

A comprehensive discussion on the Market access issues in GATS is available in an article (Delmastis and Molinuevo, 2018) The GATS negotiating history (Uruguay Round, 1991) revealed that Members construed market access under GATS as extending beyond any notion of access for foreign service suppliers (tariff bindings in GATT) to encompass all policies, mostly of a quantitative nature, that restrict market access; and this even in a non-discriminatory manner. Art. XVI:2 lit. (f) relates to foreign equity participation and, thus, is a discriminatory quantitative limitation. The measures that require the creation of a joint venture are also discriminatory, as this type of establishment typically involves cooperation between a domestic and a foreign company.

Unclear entries in the schedules of commitments in the Uruguay round, including the non-specified and restrictive requirements of licenses, qualifications failing to ensure transparency, predictability and stability of trade and investment conditions, especially in the most economically relevant Mode 3- Commercial Presence, is termed as the 'FOG' in the schedules of commitment (Adlung, Morison, Roy and Zhang, 2011) These are serious limitations to the market access.

The relevant explanatory document of drafting conventions for the services offers to be submitted in the Doha Round, explicitly provides for the possibility – in addition, *inter alia*, to the inclusion of new subsectors (or segments thereof), inscriptions of new commitments, and improvements to existing commitments – to inscribe "other technical refinements that do not alter the scope or substance an existing commitment". However, in a comparison (Adlung *et al*, 2011) of the Commitments undertaken in Uruguay round and the services offers made in the Doha round indicates that the share of FOG¹⁹ in DDA offers has not shrunk significantly compared to the same Members' existing commitments: from 18 to 16 per cent of the subsectors committed or from 24 to 21 of the limitations made.

Adlung and Miroudot (2012) examined Commitments in regional trade agreements (RTAs) that fall short of the same countries' obligations under the General Agreement on Trade in Services (GATS). Given the broad definitional scope of the GATS, extending *inter alia* to commercial presence, such commitments may impinge upon the rights of third-country investors in the RTA economies. Based on are view of some 80,000 commitments in 66 agreements, this study seeks to develop a reasonably comprehensive picture of the frequency of 'minus commitments' and their dosage in

¹⁹ The existence of vague or flawed entries (FOG) in the access commitments scheduled under the General Agreement on Trade in Services (GATS). It refers to four catch-all categories of such measures: national treatment limitations erroneously scheduled under market access, a residual category of 'other' market access limitations that cannot be associated with any of the relevant GATS provisions (Article XVI:2(a) - (f)), a similar category of restrictions under national treatment that do not seem to fall within the relevant definitions (Article XVII), and market access limitations inscribed under national treatment. The existence of FOG in service schedules contravenes one of the basic purposes of undertaking commitments, i.e., to ensure transparency, predictability and stability of trade and investment conditions and, thus, promote international economic integration. (Adlung *et al*, 2011)

terms of sectors, measures and modes of supply. It also discusses potential remedies from a WTO perspective.

Another issue is the relationship between the trade restrictiveness policies and the Competition in services. This has been examined in a study by Nordas and Ragoussis (2015). Their evidence suggests that services trade barriers have similar effects to what has been documented for goods: they allow domestic firms to earn greater profits at the expense of more productive foreign competitors.

2.10.2 GATS - Air Transport and Ground Handling Services

General Agreement on Trade in Services (GATS) has an annex for Air Transport covering three auxiliary services viz. Aircraft repair and Maintenance, Computerized Reservation System and selling and Marketing. As already mentioned the traffic rights granted under bilateral and multilateral agreements are excluded from GATS. The five yearly Mandatory reviews have not yet been successful in developing a mechanism and consensus to bring in other emerging and growing auxiliary services like ground handling and airport management services, under the purview of this Annex.

As regards the air transport, discussions in a special session in 2005 are available in the information Note (WTO CTS Note Job (05)/300) prepared by the Council for Trade in Services for the review of the Annex, WTO which lists out the proposals observations of the Member States in the Special Session- Nov. 2005. As per this Information Note, a proposal recognizes certain sensitivities concerning the improved commitments on the regulatory frameworks contained in existing bilateral and multi-lateral air services agreements. Another negotiating proposal emphasizes that any agreement needed to be in full conformity with international standards and regulatory measures as established by ICAO and the European Civil Aviation Conference (ECAC).

Discussing the nature of impediments to trade and investments in international air transport markets and examining the May 2001 US Plurilateral Agreement, Findlay (2003) argues that an important issue in any air transport reform, including within the GATS negotiations, is establishing mechanisms for managing competition policy

issues. The author recommends that a new and more efficient set of instruments should be established to substitute for the current arrangements

The debates in the second five-yearly mandatory review of the Annex of GATS revealed that while the developed economies are urging for liberalization, they are instrumental in avoiding any expansion of the coverage of the Annex for emerging services markets.

As regards the current Doha Round of negotiations on GATS, an United Nations Conference on Trade And Development (UNCTAD) Paper (UNCTAD/SDTE/TLB/2005/3, 2006) reviews relevant developments in WTO negotiations on transport and logistics services and examines issues that call for consideration by developing countries when they are devising their negotiating strategies and formulating their GATS market access requests and offers. It is argued that while the services directly related to air traffic rights have been explicitly excluded from the Agreement by way of the Annex on Air Transport Services, yet the proposed Logistics Services Checklist²⁰ includes Air Transport Services and hence the inclusion of sectors that are outside the scope of the GATS may diminish the impact of the Checklist as an effective negotiating tool.

Balasubramaniam (2007) examining the issue of market access and GATS Air Transport Annex, presents the challenges and issues for India. The factors affecting the market access are listed as: ‘onerous cabotage restrictions; debilitating ownership and control clauses; debilitating state aid programs; vexatious slot allocations; and environmental restrictions.’

²⁰For the purposes of structuring their commitments, WTO Members have generally used the WTO Secretariat Services Sectoral Classification List contained in document MTN.GNS/W/120 and commonly known as the W/120 classification. Transport Services, that include maritime, Air Land (Rail and Road Transport Services) and Other Modes (Internal Waterways, Space Transport, Pipeline Transport, Services Auxiliary to All Modes of Transport and Other Transport Services), are covered by this classification and hence fall within the scope of the GATS negotiations. In June 2004, Australia, Hong Kong (China), Liechtenstein, Mauritius, New Zealand, Nicaragua, Switzerland and the separate customs territory of Taiwan, Penghu, Kinmen and Matsu tabled a joint proposal to encourage Members to consider liberalizing logistics services and offered a checklist of services sectors, commitments in which would facilitate effective provision of logistics services (the Logistics Services Checklist) WTO, TN/S/W/20, 2004.

Decurtins (2007) has analysed the international air transport liberalization vis-à-vis the insight provided by the WTO/GATS into economic and political forces that exist in the industry and that have impact on trade negotiations. It is observed that despite the progress made at the bi-lateral level and the stated desire of the United States of America to drive liberalization forward, it and others blocked all attempts to expand the coverage of the GATS over the air transport sector, including the sub-sectors that can operate independently of the traffic rights.

Studying the Economic Effects of Air Transport Market Liberalization in Africa, Abate (2014) empirically measured the economic effects of air transport liberalization, mainly on two supply side variables: fare and service quality, measured as departure frequency. The empirical models evaluate how air fares and departure frequency respond to measures of openness in air services agreements, while controlling for other determinants. The results show up to 40% increase in departure frequency in routes that experienced some type of liberalization compared to those governed by restrictive bilateral air service agreements.

One symptom-and, to some extent, cause-of the stalemate in multilateral WTO negotiations as pointed out by Block (2014) is the proliferation of alternative preferential trade agreements (PTAs)-regional PTAs, such as the United States-driven Trans Pacific Partnership (WPP) and Transatlantic Trade and Investment Partnership (TTIP), and bilateral PTAs, such as the U.S.-Colombia trade agreement. Frustration with the limited extent of trade liberalization under the GATS has also channelled the negotiating energy of a number of countries toward an alternative international Trade in Services Agreement (TISA).

2.11 Outcome of the Literature Review

Literature review has revealed the direction of the research so far, significance of liberalization and deregulation to the economic growth and in case of air transport and ground handling services, various aspects need to be researched further.

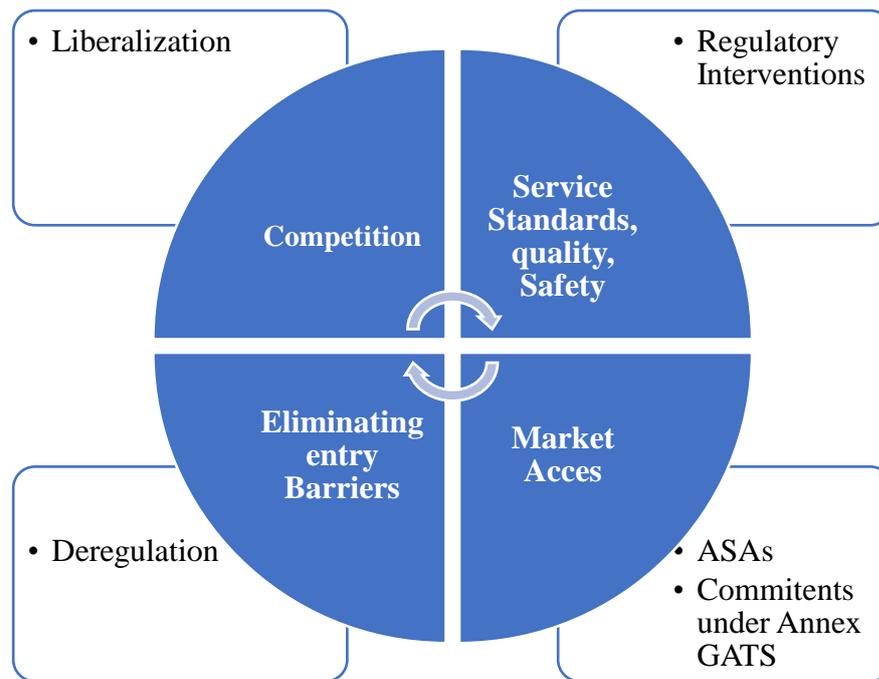
The review has also highlighted the hierarchical layers of policies and domestic regulations restraining the extent of liberalization and deregulation, restricting a free play of market forces, especially in case of ground handling services markets. With government subsidies and safety and security regulations further skewing the

competition, it is difficult to retrieve full benefits of the liberalized and deregulated market.

It is found that the Ground Handling Services form a very important part of the aircraft trajectory and the on-time performance of the airline. GHS market in India and world over is emerging as an important and essential services market under air transport. Opening the GHS market has a two-fold effect- national and international trade in services and competition. European experience of opening the GHS market has shown that while the customer airlines enjoy a choice, and the service quality has improved due to competition, there has been no concrete evidence of benefit due to any lowering of prices.

The review of existing literature within the defined parameters of air transport and ground handling services, has helped in developing a structured relationship matrix for the policy interventions- liberalization and deregulation, Outcome and constraints of such exercise and the overarching role of the Domestic regulations—economic, safety and security. The matrix of liberalization, market access and effect of domestic regulations/de-regulations is given in figure 2.1.

Figure 2.1: Matrix of Liberalization, market access and domestic regulation



Source: Developed by the author, 2016

Outcome of the literature review revealed that thus far research have mainly focused on the following aspects only -

- a) Implications and benefits of trade in services, liberalization and deregulation of air transport.
- b) Ways and means of opening the trade in services, market access and competition in air transport
- c) Development of mathematical models and carried operation research to bring in efficiency in the ground handling operations
- d) Examine effects of and recommend process re-engineering, adoption of modern technology and design improvements for improving airport operation performance, airlines operations and ground handling operations
- e) Development of models and methods for dealing with the airport capacity, Delays and Congestion due to growth in air traffic – incidental fall out of the liberalization, deregulation of air transport sector
- f) Assessment of the implication of market access and competition on service quality, price benefits, safety and security in service delivery

g) Assessment of the negotiations going on in GATS as an international trade facilitation platform in case of air transport.

While the vast research has been done on the aforementioned aspects of aviation sector including and assessing its social impacts and legal status, it is found that qualitative research methods have been used in a few research projects like assessing consumers' perceptions about the service quality, standards and customers' expectations of these, to assess the organizational safety culture and employee attitude towards safety in airline's and ground operations. Secondly, it is seen that very little research is carried out in case of Indian aviation sector, despite having a sustained growth in the sector over decades. There are very few research articles and a few college dissertations on the Indian air transport, especially the ground handling subject. Examining the effect of liberalization and feasibility of creating competition in the Indian GH services market, would be a timely and valuable addition to the literature. India has adopted a fresh civil aviation policy in mid 2016. However, a comprehensive regulatory framework for service delivery and standards of GHS as also the dedicated aviation GHS policy is yet to be issued.

There is no research work available on India's systematic consultations with the stakeholders prior to policy decisions in aviation sector. Although the government more often set up Committees with representatives from the ministries concerned and the Committees may be holding consultations with the stakeholders, the scientific rigor of qualitative research is absent. Draft regulations are put up in public space for seeking public/stakeholders' comments but there is no transparency of process when the regulation is finally notified. In Indian aviation sector (which is taken up for a case study for ground handling services market) government may be taking a note of stakeholders' suggestions and concerns brought to the notice from time to time, however, a methodical consultation with the stakeholders is missing while framing and issuing policy and policy directives. This study addresses such gap and provides a systematic and methodical approach to policy formulation and regulatory framework of opening the GHS market, market access and competition through a qualitative assessment of the stakeholders' concerns and suggestions, including those of the government regulators.

Another issue revealed in the literature review was the problems of airport capacity constraint, congestion and delays as a result of the cascading effect of liberalization, growth in air traffic and consequent increase in demand for larger infrastructure requirements. Similar fate of congestion and chaos is expected for GHS market liberalization as India is seen to have a sustained growing aviation sector and shrinking infrastructure capacity. Proposed Study of the effect of such growth and competition at an operational level in terms of status of airport capacity constraints if undertaken at this stage, will be a timely addition to the knowledge. Main focus of the study being the opening of GHS market, a case study has been undertaken of the Indira Gandhi International (IGI) airport to examine the role of ground operations in the delays and whether any solution is possible to enhance the operational efficiency of the airport within the existing capacity itself.

Thirdly, Trade in GHS, market access and competition literature abounds in debate of review of the Air Transport Annex of General Agreement on Trade in Services of WTO. While there is ample research on GATS and trade in services, mostly from the WTO Trade Council economic research division itself, very little work is seen about the effectiveness and relevance of GATS to the development and changes taking place in air transport. This study examines the process and ongoing negotiations, to assess the effectiveness of the processes of GATS as a means to ensure trade and market access in GHS market. Without undermining the significance of the universal trade facilitation platform of GATS, a need is felt to address the research gap about the effectiveness and relevance of long drawn negotiations to expand the coverage of the air transport Annex to include the new emerging sub-sector services like ground handling.