

ABSTRACT

Air transport is a network industry with a natural monopoly of airport operators. For the next 20 years, the Airbus GMF (2017) forecasts a 4.4% global annual air traffic growth, despite some downward revision of future economic growth by a number of forecasters in several regions of the world. Amongst the Top 20 traffic flows, 50% will involve Asia-Pacific and 25% will involve the Middle East. Traffic between emerging countries is forecast to grow at 6.2% per annum, and will represent a growing share of air traffic, from 29% of world traffic in 2016 up to 40% by 2036. Globally though Indian aviation sector ranks as the 9th largest in the world, it has the potential of being the third largest one in 2020 and the largest by 2030. However, there is very little research done in this sector.

This study examined the emerging aviation Ground Handling Services (GHS), which is growing into a substantial market. Despite constraints of scope and time, this is the first academic research undertaken, providing the policy inputs and models for addressing the challenges of introducing competition in GHS market in India.

The Study of GHS market was undertaken in three parts:

- (a) First part deals with the assessment of perceptions of the stakeholders in respect of introducing competition for ensuring the service quality and efficiency in aviation ground handling services. Policy imperatives for opening the GHS market are examined for creating competition in Indian GHS market and a policy model is developed on the basis of findings, addressing especially the concerns, comments and suggestions of Stakeholders.
- (b) Second part deals with the study of delays affecting an aircraft turnaround¹ time, which in turn affects the total aircraft movement through an airport, impacting its operational efficiency and the revenue earned. The growing air traffic is facing constraints of airport capacity leading to congestion and

¹ Aircraft turnaround operation refers to the preparation work of an inbound aircraft for a following outbound flight that is scheduled for the same aircraft. Accordingly, activities of aircraft turnaround operation include both inbound and outbound exchange of passengers, crew, catering services, cargo and baggage handling. Technical activities in turning around an aircraft include fuelling, routine engineering check and cabin cleaning.

delays. Delays are the main obstacles for 'on-time' performance of an airline, and as such are indicator of the service quality for both the airport operator and the airline operators. Delays have a cascading effect and the ground operations being responsible for the readiness and release of aircraft for take-off, can be a driver of recovery and reduction of delays at the gate. A case study of IGI Airport, New Delhi, India was undertaken and the results are presented along with a diagnostic model to identify factors causing delays so that controllable ones can be managed to improve turnaround time. An operational performance efficiency index (PI) of an airport is developed based on the delay-data which can be a tool for internal benchmarking of performance efficiency of each day (Decision Making Unit-DMU).

- (c) Introducing competition in aviation ground handling services ensues international trade and market access. As such, the third part deals with status of GHS vis-a-vis the trade facilitation forum General Agreement on Trade in Services (GATS). Air transport is excluded from the purview of GATS except for three auxiliary services² which are specifically included. The GHS at present are not included under the Air Transport Annex of GATS, hence there are no commitments undertaken for these. Role of GATS and International Civil Aviation Organization (ICAO) in trade in air transport is discussed, especially in respect of timely addressing the issues and concerns voiced by the members about expanding the coverage of the Air Transport Annex to include the emerging sub-sectors like GHS. Considering that GATS second review of Air Transport Annex has not concluded yet after over a decade of discussions and debate, a plausible way to have an interface between the ICAO the regulatory body and GATS to remove the impasse is proposed.

A mixed methodology combining the exploratory qualitative and quantitative methods is adopted and findings are presented in three critical essays. Case studies of India's GHS market and the Indira Gandhi International airport, New Delhi have been

² The GATS is applicable only to the specifically mentioned three auxiliary services of air transport: (a) aircraft repair and maintenance services; (b) the selling and marketing of air transport services; (c) computer reservation system (CRS) services.

carried out. Research methodology adopted for each part of the study is given in succeeding paragraphs.

- a) **Introducing competition in Aviation Ground Handling- A case study of Indian GHS market:** A qualitative research methodology has been adopted. Views and concerns of various stakeholders were obtained through surveys, interviews and focus group discussions. Primary data so collected was analyzed. As all stakeholders voiced their concern about importance of human factor in the safety of ground handling, analysis of incidents/accidents at Indian airports was carried out. A Policy model was developed for introducing the competition in the GH services market, based on the qualitative and empirical results of the study.
- b) **Implications of liberalization on Operations: Operational Performance Index (PI) and GHS - A Case study of IGI New Delhi:** A case study of Indira Gandhi International Airport, New Delhi was carried out for this part of the study. Rotation data (From touch down of every aircraft to its immediate next departure) from 01st Jan 2014 to 30th April 2014 is used for analysis. Data Envelopment Analysis (DEA) methodology was used to assess the relative efficiency of a number of entities (entity-A DMU= a day). OLS regression model was used to work out Operational Performance Index (PI) for an airport based on the stylized categories of delays using IATA delay codes. Keeping in view the limitations of scope and time for this study, only one indicator- total aircraft movement is considered for the PI.
- c) **Aviation Ground Handling Services and General Agreement on Trade in Services (GATS):** Exploratory research was undertaken to identify the issues and concerns of the members regarding the status of GHS and whether GATS can timely respond to the developments in the sector. To estimate the probability of a decision by a member to undertake a commitment under GATS, empirical analysis was carried out. For empirical analysis, secondary economic data for 147 Members of the GATS for the period 2000-2012 is used. Data is sourced from World Bank database³. A logistics regression

³ Each year on July 1, the World Bank revises analytical classification of the world's economies based on estimates of gross national income (GNI) per capita for the previous year. The updated GNI per capita estimates are also used as input to the World Bank's operational classification of economies that determines lending eligibility. As of 1 July 2014, low-income economies are defined as those with a GNI per capita, calculated using the *World Bank*

model is used, selecting the four main indicators of economic status of Member State which are relevant to the trade in services: Annual growth of GDP per capita (gdp_pc), Employment in services as a percentage of total employment (employment), Services trade as a percentage of GDP (trade services), Annual growth (in %) of exports of goods and services (export) and Annual growth (in %) of imports of goods and services (import). Categories of economies based on World Bank categorization to group the economies was used as the dummy variables.

The study revealed that :

- a) Stakeholders had mixed reaction to the proposed introduction of competition in GHS market depending on whether they have a monopolistic or oligopolistic powers. However, all stakeholders were concerned about the importance of human factor and ensuring safety in operations with new entrants operating in constraint of airport capacity. Introducing competition in a monopolistic or oligopolistic GHS market would require appropriate policy intervention and regulatory framework to ensure safety in operations. Empirical analysis of incidents validated the concerns.
- b) Delays are indicators of service quality. Whatever may be the cause of delay i.e. late arrivals, technical snags, loading errors, delay in connecting load, weather or runway capacity, specific Ground Delay Plan, they have a cascading effect on turnaround time and total aircraft movement at the airport. The diagnostic tool of PI can internally benchmark the performance efficiency in terms of aircraft movement and also help in identifying the factors that may be managed to reduce the delays. As ground handling operations at the gate or parking bay, ultimately ready and release the aircraft for takeoff, delays can be recovered and reduced during GH operations and PI can be improved.
- c) GATS though an ideal forum for trade facilitation, has deficiencies in services category classifications for all sub-sectors of air transport including that of GHS,

Atlas method, of \$1,045 or less in 2013; middle-income economies are those with a GNI per capita of more than \$1,045 but less than \$12,746; high-income economies are those with a GNI per capita of \$12,746 or more. Lower-middle-income and upper-middle-income economies are separated at a GNI per capita of \$4,125. Note that low- and middle-income economies are sometimes referred to as developing economies. The term is used for convenience; it is not intended to imply that all economies in the group are experiencing similar development or that other economies have reached a preferred or final stage of development.

raising doubts and debates about the status of GHS under the Annex. Apart from lack of definitions for ‘services directly related to exercise of the traffic rights’, there is an absence of clarity on procedures to amend the Annex, which is delaying any constructive decision in GATS about the treatment of GHS and hence inability to timely respond to the developments in the aviation sector in trade facilitation of emerging services markets like GHS market.

This study has taken a comprehensive look at the aviation ground handling services market at three levels: (a) at national level - creating competition and market access in ground handling services market- A case study of India, (b) at operational level: with growth in the sector, demand exceeding the airport capacity, improving operational performance efficiency of an airport in terms of total aircraft movement through the airport is presented, (c) International level - International trade in services, an analysis is presented with reference to the status of ground handling services under the Air Transport Annex of General Agreement on Trade in Services and role and relevance of GATS to timely addressing the requirements of facilitating trade in emerging sub-sector services of air transport.

Contribution

Research in Indian aviation market is very limited and this study gave an insight to the policy makers on challenges in opening of GHS market to competition and its implications for the safety in GH operations. The results and the policy model recommended here are very relevant and timely addition to the exercise of policy formulation for the GHS in India.

New civil aviation policy was announced in May 2016. The GH policy notification was issued in December 2017. This notification is only a slight improvement on the earlier notifications of 2007 and 2010. It has opened the GHS market to a limited extent only and the safety regulator has not yet prescribed the service standards, safety management system for GHS. The recommended policy model in this study, however, emphasized *a priori* fine-tuning of the regulatory requirements to ensure prevention of fallouts of monopolistic/oligopolistic competition, safety safeguards through certifications of GH agencies, training institutions, and licensing of personnel and

recommendations of service standards, minimum technical specifications and maintenance requirements for ground support equipment etc.

Another first for the Indian aviation sector research is the second part of this study. It is the study of Indira Gandhi International Airport, New Delhi, in terms of its operational performance efficiency measure and benchmarking for the total aircraft movement per day as the performance efficiency index (PI) based on delay data. The model provides a simple diagnostic tool to identify the factors causing certain types of delays. This enables the manager to identify the factors causing such delays that can be controlled and reduced at the operational level and the total aircraft movement through the existing capacity of the airport can be improved. Further the predictorial regression model can be used to find out the PI, based on the data collected on the specific stylize categories of delays occurring at a given airport. In a competitive environment, the airport operator can control and reduce the identified factors causing the delays and differentiate its service through efficient movement of aircraft.

The results validate the results of the first part of the study- that the human factor is very important for safe ground operations. It also supports the proposed policy model with suggested implementation strategy to provide a strong regulatory framework to maintain the quality in all ancillary and supporting business units and processes like training, licencing of the personnel, certification of the GH agencies, training institutes.

As regards the use of GATS platform for market access in GH services is concerned, this study lists out the issues and concerns. Present impasse at GATS council deliberations and negotiations is due to Lack of definitions, whether GHS be covered under the Air Transport Annex of GATS, varied interpretation of the mandate for the review of the Annex and lack of legal procedures to amend the Annex. Keeping in view the role and functions of the two international forums like ICAO and GATS, the study recommended that ICAO being the technically experienced organization and an international regulator of all aspects of civil aviation to ensure safety and security in operations, could provide all needed definitions. These could then be discussed and adopted at GATS review meetings for the Annex and expedite the process of long

awaited decisions on expansion of coverage of the Annex. The Study also recommended that the Council for trade at GATS need to provide clarifications on procedural and interpretative issues.

The study has been able to explore the relationship between the status of the economy of a State and the likelihood of its decision to undertake commitments under the Air Transport Annex of GATS. These results are indicative of the probable behaviour of the States, if in future the Air Transport Annex is expanded to cover the GHS.

Future areas of research

Aviation ground handling services markets are peculiar in structure and are monopolistic or oligopolistic. Even though there is a considerable research available on air transport, airline industry, aviation safety and airport operations, as GHS are attracting attention having grown into a billions dollar market, for ways to make it competitive for improving efficiency, revenue maximizing (for airports), better service quality (on-time performance of airlines). There are many aspects that can be looked into in detail. A performance measurement system could be developed for each of the ground operations, so that these can be benchmarked and made more efficient. A real-time collaborative decision making for deployment of manpower, ground support equipment and vehicles is another area for exploration.

In contrast to monopolies, oligopolies can deliver effective competition under certain circumstances (BEREC Report Dec2015). Effective competition in an oligopolistic market like GHS can be studied in a ‘colluding’ and ‘non-colluding’ environment. Further, a relationship could be examined between the regulatory interventions and responses of firms in terms of innovation and investment incentives.

Considering the growing demand, there is still a scope for research to add to the body of knowledge by providing various models and solutions to the problems of airport capacity constraints, congestions and delays. Each activity of the ground operations can be studied to develop different specific model with logistics, vehicle scheduling or in the engineering and design of an aircraft.

Studying India's position on undertaking commitments for certain services like air transport and GHS, negotiation strategies, strategy for taking on a leadership role for regional developing and least developed economies for trade in services, are topics which could be considered for further detailed research.

Harmonizing the regulatory standards and rules and legal principles etc. of the States across jurisdictions, in order to reduce business uncertainty and transaction costs, and thus prices to consumers, is a valid aim, which seems to be very difficult to achieve. The GATS does not provide a definition of Domestic Regulation for the VI: 4 disciplines, and perhaps there is no universally agreed definition of 'regulation' to call on. Some original work on the concern of the GATS Members to adopt a universally applicable regulatory framework of principles and international standards will be a useful contribution, considering national, and diverse sectoral particularities of developing country Members than that of developed countries.

There is very little research available on Indian aviation sector. Various aspects of trade in air transport services, effectiveness of India's decisions of outsourcing the airport operation, management and development to a private party, Measurement and Comparison of performance of airport operators (Private and public), airlines and LCCs are some of the relevant areas for future research