Gap Analysis on EDI Implementation in Cargo Sector and Cargo Clearance Procedures at Indian Airports: Issues and Challenges

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ABSTRACT

*Technology is productively being used globally to expand and upgrade trade transactions. As a result of technology modernization, significant strides have been made in air transport trade in India which is competing with the elite group in growth of international and domestic traffic. Air transport normally grows at a rate which is about twice the GDP growth rate. India aims to become the third-largest aviation market by 2020 and the largest by 2030. It is already a fastest developing domestic aviation market in the fourth year in a row with a growth rate of 18.6%. Air cargo is a significant sector in India,that is on a high-growth trajectory. This article presents gap analysis in EDI implementation at some important airports in India handling cargo operations. It has been observed during the study that gapbetween "cargo clearance vs facilitation steps taken" has reduced and there is scope for further improvements for hassle free cargo movement. RMS bills are mostly released by Customs using EDI. However, for exports, currently concerns are being faced like non-payment of customs duty through the banks in EDI system. The connections of EDI with systems of trade companions is in place but 100% communication exchange as envisioned is yet to be completed. At certain joint venture major airports, EDI implementation amongst Customs and Custodian is in position for Export/Import operations through Cargo Management System established by airport operators. This system is suitable for integration with carriers, exporters/importers, cargo forwarders and customs traders. However, EDI message exchange between entire regulatory authorities in the air cargo supply chain is not happening showing the way to old physical process at some points, thus delaying cargo clearances. Interface is essential at the software and hardware level so as to effortlessly incorporate with the present processes. EDI of different allied agencies are not completely inter-linked. Banking Gateways for online transfer/payment are not available 24*7 hours at all cargo airports. The paper also proves that improvement in EDI system reduces congestion at cargo terminals. The study establishes that reducing dwell time has improved through puts in the entire air cargo value chain. This paper focuses on obstacles in successful execution of EDI in Indian cargo sector and recommends some vital policy mediations.*

Keywords: *Air cargo supply chain, Cargo clearance, Electronic Data Interchange, Message exchange, Dwell time, RMS*

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INTRODUCTION

The global air transport is progressing very speedily. The Indian civil aviation sector has made rapid transition incorporating innovative ideas and new inventions in information technology Changing global economy is compelling newer technologies to integrate various services and goods. **Electronic Data Interchange (EDI)** is an electronic communication and information exchange method that provides standards for exchanging data between applications across a supply chain via any electronic means. Emmelhainz [6] defines EDI as "inter organizational exchange of business documentation".Logistics sector is being enabled by EDI. Globally, airlines and freight forwarders are embracing devices which provide improved information management and container tracking. EDI has become crucial to such integrated methods. Electronics and information technology promote many aviation activities by streamlining jobs and lowering operational expenses.

EDI has been now happening for about 30 years. Buying orders, advance notices, useful acknowledgments, bill of lading, etc. can be electronically traded by following uniform standards. Handling of received messages is done by exploiting electronic processors. Individual involvement in handling of an acknowledged communication is ordinarily done only during error circumstances, for quality assessment and during special conditions. In logistics sector precisely, several enterprises or organizations, even in two different countries can electronically interchange forms and documents. B2B and B2C enterprises have made remarkable improvements, returns and savings by using Electronic Data Interchange (EDI) or other techniques of integrated system-to-system connections. Entire supply chain results into superior value, better performance and expenditure management. A market report by Dart Consulting estimated EDI to reach $1.68 billion by 2018, with predictions reaching as high as $2.1 billion by 2020 [13]. Thus, logistics segment is geared up for an impressive growth.

Global trade increased at a CAGR of 6.9 per cent in value terms during 1990-2015 [4]. In outgoing volumes, Asia Pacific stood out with growth over 10 percent year over year, followed by Central and South America at 8.7 percent and Africa at 8.5 percent [22]. ASSOCHAM report states that "Air cargo contributes about 20 percent of airlines revenue and involves a wide variety of service providers and employs nearly 70,000 persons in the country." [22] According to National Council of Applied Economic Research, Delhi Airport provides 17.89 percent to the Gross State Domestic Product. [16] The GMR group led Delhi International Airport Ltd (DIAL) attained 28th position globally. The cargo tonnage moved by Delhi airport is 29 per cent of India's overall air cargo. [16] It provides one million metric tons cargo in a year and as such has been projected as India's Air Cargo Gateway for its usage capacity, time saving processes and efficiency standards. These figures create a significant impact amongst its customers in promoting Delhi Airport as Cargo Hub Airport for Asia Pacific and the world. [16] As per cargo news, air cargo volume at Delhi Airport more than doubled to reach 980,000 metric tonnes per annum in 2018 [38]. Government of India aims to bring India in top five global air freight markets by 2025. [30]. It is endeavoring in making India the transit cargo hub to and from other parts of the globe. Delhi, Mumbai, Chennai and Bengaluru are some of the major Indian airports which can be developed as committed digital/e-freight corridors interlink for most important airport hubs globally. Total revenues of Delhi & Mumbai Airports are given in Table 1 below:

Table 1: Total Revenues of Delhi & Mumbai Airports (Rs. In Crore)

S.No.	Year	Delhi	Mumbai
1.	2002-03	369	423
2.	2003-04	408	436
3.	2004-05	489	489
4.	2005-06	670	665
5.	2006-07	720	719
6.	2007-08	876	857
7.	2008-09	958	955
8.	2009-10	1,172	997
9.	2010-11	1,255	1,180
10.	2011-12	1,531	1,314

(Developed from Annual Reports of different years)

EDI READINESS IN B2B AND B2C

Physical processing of B2B and B2C transactions encompasses numerous paper documents and various human interferences that leave the system susceptible to errors. For simplifying a more encouraging business environment for MSMEs, a large number of policy actions have been introduced by the government.

Electronic Data Interchange has streamlined the work processes. Human interventions and paper documents have been done away with in EDI systems. Transparency is ensured due to EDI processes. Moreover, EDI takes care that business vital data is timely transmitted from source to destination. Different types of tasks and service delivery channels are replicated as a never-ending value-adding chain while obtaining responses for inbound and outbound logistics. Efficient supply chain can speed up business cycles besides improving data quality, lowering transitional charges, facility in soliciting orders, distribution and accounting of data involving suppliers and customers. Errors due to illegible handwriting and missing faxes/mail are eliminated. These advantages indisputably contribute to making domestic and international air cargo businesses more competitive. The air cargo trade goes on with challenges of complex decision making, security, sustainability, cost-effectiveness and client satisfaction.

EDI IN AIR CARGO SECTOR

The noteworthy progress in Civil Aviation and air routing has realized a leading contribution in facilitating cargo movements throughout the world. The desire for air cargo movement has progressed significantly over the last few years as the excitement for rapid delivery of e-commerce products has progressed. Requirement for e-business and e-commerce models akin to worldwide just-in-time marketing and

business process out-sourcing have impacted fast growth of air cargo logistics business and digitization of supply chains. EDI has a great role in impressive growth of cargo sector.

Due to reforms effected in many sectors, India witnessed a 23-notch jump to a record 77th position in the World Bank's latest report in 2019, on the 'ease of doing business' that captured the performance of 190 countries. [24] AAI Cargo Logistics and Allied Services Company Limited (AAICLAS) was incorporated on 11th August 2016 alongside a vision to develop a prominent integrated logistics network in India. It will operate as a multi modal interchange contact point connecting air, surface and water transport.

During the financial year 2017-18, MSME sector alone contributed to 7.5 percent growth in exports of goods in India [15]. At the same time, the total imports raised 10.5 % YoY in Sep 2018. [23] Rapid transportation through air as compared to road or sea, together with EDI, is likely to modernize the global business environment for both imports and exports. Indian carriers are now flying out to more than 100 countries having bilateral agreements with India. As such, the transshipment sector has imperative market prospects. In such a shifting trade environment, speed in transactions is an economical compulsion. Supply of orders is facing a fierce competition. EDI facility has tremendously assisted dispersal of imports within the country and has reinforced exports access to and from the gateways of international airlines. Likewise the growth of cargo transferred as 'deck cargo' in inland airlines and 'freight interline cargo' from transnational line is also picking up in India after embracing EDI. As the competition is becoming severer, the organizations must look at every aspect or chance to remain viable. Enterprises with efficient supply chains are more cost effective than those of their competitors. In order to productively introduce EDI system, it is crucial that the current business processes are improved before the implementation phase is kicked off.

CENARIO ANALYSIS AND FORECASTS

According to International Air Transport Association, Indian economy will upsurge to the tune of Rs 240,356 crore by 2025-26. [25] The National Foreign Trade Policy proclaimed that international trade of the country during the next five years till 2020-21 would increase three times. Predictions are that 35% of such international trade would move by air. and as such, air cargo logistics sector has an excellent potential to meet the future high growth [7].

According to International Air Transport Association, India is evolving globally as the third largest domestic market for civil aviation in the world [10]. Later on, the Indira Gandhi International Airport (IGIA) in Delhi was placed the second best airport in the world. During 1990-2015, total cargo volumes handled globally by airports increased by 7.7% representing 118.6 million tonnes. Advanced economies held the largest proportion (62%) of global cargo traffic equating to the handling of 73 million metric tonnes.

According to Planning Commission, cargo traffic witnessed an unprecedented growth during the period 2001–02 to 2007–08. Growth in cargo traffic increased by 12.3 per cent during this period, which is 12.68 per cent for international cargo traffic and 11.57 per cent for domestic cargo. [42]

Planning Commission noted that "four airports at Delhi, Mumbai, Bengaluru and Hyderabad handle 67% of the total air cargo traffic in India." In 2006, Planning Commission estimated that over the next twenty years, the domestic and international air cargo throughput is likely to propagate by 7-10 times from the present level." [7] Recently, Planning Commission revealed an average annual rate of growth as 12 and 10 for domestic and international freight traffic as follows:

Table 2: Freight Traffic Growth

	Year 2011	Year 2017	Average Annual rate of growth
Domestic	0.9	1.7	12.0
International	1.5	2.7	10.0

Source: Planning commission

The JVC airports have shown impressive cargo growth in recent years as can be seen in the Table 3 below:

Table 3: Cargo Tonnage, Projected Growth & Annual Handling Capacity Of Jvc Airports

Year	Domestic Tonnage (in '000 MT)	International Tonnage (in '000 MT)	Total Tonnage Tonnage (in '000 MT)	CAGR
2010-11	53.9	37.9	91.8	-
2015-16	94.1	39.4	153.5	10.8%
2020-21	164.4	91.1	256.3	10.8%
2030-31	437.9	217	654.9	10.3%

Source: Planning commission

In FY18, domestic freight traffic stood at 1,213.06 million tonnes, while international freight traffic was at 2,143.97 million tonnes. [41] As presented by the *National Council of Applied Economic Research (NCAER)*, the general economic impact of Delhi Airport is projected to be approximately Rs 909.5 billion by 2020 that comes to 0.7 per cent of the National GDP. [15]

In 2010-11, on an average Delhi Airport handled 1,652 tonnes of cargo per day [16] Delhi's Indira Gandhi International airport handled over 'one million metric tonnes' of cargo in one year, between November 2017 and October 2018. [17].

As per data obtained from AAI and DIAL at the time of study, cargo volume for Delhi airport in 2014-15 was as below:

Table 4: Cargo Volume at Delhi for Year 2014-15.

Delhi Airport in MT		
International	Export	232,092
	Import	194,784
	Total	426,874
Domestic	Outbound	175,137
	Inbound	105,026
	Total	280,163
Total Air Cargo	Total Volume	707,039

Source: AAI, DIAL

Indira Gandhi International Airport, Delhi links to 67 domestic and 75 international destinations, served by nearly 64 Air Carriers and 16 Freighter airlines. DIAL is also accepted as the 'Authorized Economic Operator Certified Airport' by Central Board of Excise & Customs'. Cargo operations in Delhi are carried out at two separate terminals i.e. Greenfield cargo terminal and the Brownfield cargo terminal. Brownfield terminal operated by Celebi Delhi Cargo Terminal Management India Private Limited [approximately 70, 000 sq meters] is situated at a distance of about one km from the main terminal. The Greenfield terminal is operated by the Delhi Cargo Service Centre Private Limited. (approximately 48,500 sq meters} In 2007, the Delhi Airport was recognized for its exceptional and organized cargo handling arrangements. As per Centre Statistics Office, Govt. of India, across cities in India, Mumbai ranks 1st and Delhi ranks 2nd in the growth of Gross State Domestic Product (GSDP). In 2009-10, contribution of Delhi airport improved slightly to 20.8 per cent from 20.7 per cent in the previous year. Delhi airport contributed around Rs 351 billion out of the overall air-borne exports of Rs 1,690 billion [5]. It was predicted worldwide, commercial airlines are estimated to carry around 64 million metric tons of freight in 2018. “The existing volume of cargo being moved at AAI airports is 8.08 lakh metric tonnes. There is 34.53 per cent surge in tonnage and 19.55 per cent growth in revenue during financial year 2016-17 as compared to last year” [8]. This indicates that the domestic and international air cargo traffic in India is expected to develop hugely during next few years. As per the data base from Airports Council International (ACI), the global body that is responsible to monitor airport traffic, Delhi airport's compound annual growth rate (CAGR) between the years 2014 and 2017 is 14.3%.[24].

Airport Authority of India shares revenue of 45.99 % and 38.7% from DIAL and MIAL respectively.[19] According to airport operator, the Indira Gandhi International airport for the first time ever touched over 'one million metric tonnes' of cargo in a year (between November 2017 and October 2018). It also moved the highest ever monthly cargo tonnage of 1,00,091 MT in October.

In India, all airports taken together have moved 3.36 million MT cargo traffic in 2017-18, 2.98 million MT cargo traffic in 2016-17, 2.70 million MT cargo traffic in 2015-16 and 2.53 million MT cargo traffic in 2014-15. Compounded Annual Growth Rate (CAGR) during the last three years for cargo traffic is 9.9%. Projected growth in 2019-2020 is 1,081,991 MT in JVC Airport Authority of airports of India as illustrated in following Table 5.

Report of January, 2016 [34] relating to setting up of International Air Cargo hubs in India, an optimistic volume of air cargo (both domestic and international) has been highlighted in 2020-21 and 2030-31 as 4,289,032 MT and 10,063,780 MT respectively, as can be seen in Table 6.

The above stated RITES report also highlights that with regard to setting up of cargo hubs, Indian Airports are much behind international airports, in so far as international airlines and destinations are served. Free Trade zone status is also not yet available in Indian Airports, as can be seen from the Table 7 below:

Table 5: Annual Handling Capacity of AAI Airports (in MT)

Name of the Airport	Covered Area (in Sqm.)	Annual Holding Capacity	Projected Growth (2019-20)
Chennai	54620	1102373	480235
Kolkata	21906	303293	102507
Coimbatore	2585	62780	737
Amritsar	2256	60833	40059
Lucknow	200	4866	1305
Guwahati	150	3560	00
Port Biair	945	23116	4633
Trichy	4000	28993	4748
Mangalore	1400	17885	500
Total	88062	1607699	1081991

Source: CPMS, AAI Also, as per RITES Project

TABLE 6: FORECASTED VOLUME OF AIR CARGO

Location	International/ Domestic	Optimistic Tonnage (in MT)		Conservative Tonnage	
		2020-21	2030-31	2020-21	2030-31
India	International	2,502,044	5,553,662	2,301,186	4,442,876
	Domestic	1,786,988	4,510,118	1,618,119	3,461,186
	Total	**4,289,032**	**10,063,780**	**3,919,305**	**7,904,062**
Delhi	International	640,626	1,260,208	581,932	975,339
	Domestic	524,021	1,487,916	444,583	959,822
	Total	**1,164,647**	**2,748,124**	**1,026,515**	**1,935,162**
Chennai	International	406,269	1,102,646	354,146	764,574
	Domestic	166,253	525,651	132,237	285,491
	Total	**572,522**	**1,628,297**	**486,383**	**1,050,065**

Source: RITES

TABLE 7: COMPARISON BETWEEN MAJOR HUB AIRPORTS WITH REGARD TO CUSTOM STATUS

Country	Airport	Total Million Pax Handled	International Airlines being served	International Destination served	Nature of Custom Status
Singapore	Changi, Singapore	54.1	106	240	Free Trade Zone
France	CDG, Paris	63.8	120	270	
Germany	Frankfurt	59.6	110	264	
The Netherlands	Schiphol, Amsterdam	54.38	101	301*	
UAE	Dubai	70.5	140	270	Free Trade Zone
Hong Kong	Hong Kong	63.3	100	180	Free Trade Zone
USA	Ted Kennedy Anchorage	53.2	75	130	Free Trade Zone
China	Shanghai	51.6	87	194	Free Trade Zone
South Korea	Incheon, Seoul	40.78	60	123	Free Trade Zone
India	Delhi	39.75	58	62	
India	Chennai	14.29	37	45	

Source: CPMS, AAI

** (Including 27 direct cargo destinations)*

Airports Authority of India data suggests that total air cargo at all Indian Airports during 2016-17 (Apr'16-Feb'17) perceived a growth rate of 9.3% and the air cargo has developed more than 20 times from 0.08 million metric tonnes in 1972-73 to 2.5 million metric tonnes in 2014-15. Data also indicate that overall air cargo at all Indian airports during 2016-17 and 2017-18 foresaw a progress of 10.1 per cent and 12.7 per cent respectively. For the period 2018-19 to 2022-23, 8.5 % growth has been projected by AAI.[17] The data maintained by the World Bank also shows that air freight moved by India went up from 96.3 million tonne-kilometers in 1970 to 1,833.8 million tonne-kilometers in 2015 (19).

As per data taken from Directorate General of Commercial Intelligence & Statistics, the significance of exports of MSME related products has been increasing consistently during last four years. During the financial years 2015-16, 2016-17, 2017-18 and 2018-19 (till September, 2018), the value of exports are USD 130768.70 Million, USD 137068.80 Million, USD 147390.08 Million and USD 78519.91 Million respectively. Tremendous increase in export growth is leading to international cargo growth [21]. Similarly, by 2030, domestic cargo growth rate expected by various agencies like AAI and MOCA traverse from growth of 8 to 10 times and in respect of international cargo it is estimated to be 4 to 7.5 times [20].

Forecasted growth of this level would necessitate development of infrastructure abilities, conception of logistic parks, universalization of procedures and acceptance of information technology/computerization in addition to excellence of human resources in the aviation skills.

International Air Transport Association (IATA) forecasted international air travel worldwide to develop by an average of 6.6% a year and over 5% a year from 2010 to 2020. Express Industry Council of India published a Deloitte- led independent report titled *'Indian Express Industry-2018: A multi-modal play in building the ecosystem'*. This study predicts the growth of the express logistics industry at 17 per cent CAGR, estimated to reach Rs 48,000 crore by 2023. [39]

Nevertheless, in order to boost air cargo sector, 2017-18 Budget by Union Finance Minister laid emphasis to push infrastructure development for the logistics industry which includes, interalia, development of multi-modal logistic parks with multi-modal facilities. It has also been proposed that logistics sector should be treated as an industry. In the budget of 2019-20, a modified scheme of bringing in duty-free capital imports and inputs for production and export has been presented, alongside introduction of single point of authorization under the Customs Act. It was also highlighted in the budget that Customs Authority of India is commencing complete and wide-ranging digitalization of /import/export transactions and positioning RFID expertise to expand export logistics [19]

EY POLICY INTERVENTIONS

National Civil Aviation Policy

One of the key objective contained in National Civil Aviation Policy (NCAP) announced by M/O Civil Aviation (MOCA) on 15th June, 2016, is to promote government initiatives like *'Make in India', 'Digital India', 'Skill India' and 'E-Commerce'*, which ultimately give boost to all the sectors of air cargo i.e. domestic, international and express services.

Diminution of Dwell time:

One of the critical operation indicators of processes at cargo terminal of any airport is the Dwell time. More dwell time interrupts service quality and system operations. Dwell time has three

main components, i.e. valuation for payment of duty, examination of goods and registration of goods.

An important measure of supply chain productivity is dwell time. Dwell time is the ratio of time that an asset sits idle to the time necessary to fulfill its particular supply chain mission. As per 'CBIC' website, "Dwell time is the measure of the time elapsed from the time the cargo arrives in the Customs Station till the clearance is provided by Customs." [9]

The time release considered by Indian authorities is the time taken from arrival of the goods (represented by entry inwards) to release of cargo by customs (represented by grant of out of charge). Virtually, no time is taken at major Indian airports for assessment and examination of goods under the Risk Management System (RMS) for accredited clients. However, for the remaining goods, Dwell time was considered excessive and a need was felt to reduce the Dwell time.

An important footstep taken by Government for progress of air cargo was that Ministry of Civil Aviation prepared a Dwell-Time study for six major airports. The intention was to ascertain the causes for higher dwell time in Indian Airports and suggest remedial action required. Based on the suggestions contained in the study report, the National Civil Aviation Policy released by Ministry of Civil Aviation mentioned that Dwell time would be reduced and finally, Government of India announced decrease in free period valid for air cargo at all airports. w.e.f. April 2017 as follows:

a) Free period for import cargo was reduced from 72 hours to 48 hours. (I.e. two working days). The period of calculation of free period would begin from segregation time revealed in ICEGATE.

b) Free period for export cargo in respect of airlines was reduced from 48 hours to 36 hours and free period for exporters was reduced from 24 hours to 12 hours. Thus, the total free period available for export cargo was 48 hours (i.e. two working days)."

In 2016, average dwell time was 100 hours in import and 38 hours in export. Subsequent to policy announcement on dwell time, secondary data sourced from IATA has revealed that airports have gradually driven to cut air cargo dwell time for imports to about 52 hours by December 2017. Assessments for the eleven major airports by IATA has further discovered that on the basis of average time taken for delivery of cargo and documents from the air carrier to the customer , the dwell time has further reduced to about 39 hours for imports by December 2018. A lot is yet to be done to bring down the dwell time equivalent to international norms.

Other Initiatives

(i) The idea of 24x7 customs clearance of Import/Export Cargo has commenced at all major airports.

(ii) ''Single Window'' concept has been adopted by customs w.e.f. 1.4.2016 in a scheduled manner for granting on-line approval to several regulatory organizations at one place.

(iii) With 'Ease of Doing Business in India' together with 'Digital India' concepts, many airports have introduced latest technologies like robotics, artificial intelligence, biometrics, Automatic Storage & Retrieval System (AS&RS), Internet of Things, Elevated Transfer Vehicle (ETV) for managing import and export cargo.

(iv) All the International Air Cargo Terminals accomplished by AAI are well equipped with latest cargo processing facilities besides having adequate storage area, mobile solutions, cargo handling equipments, cold rooms for perishable cargo and other fundamental amenities.

(v) The Common User Domestic Cargo Terminal (CUDCT) concept has been presented for determined presentation of accessibilities.

(vi) AAI has designed a road map to construct updated cargo infrastructure and conveniences at 24 AAI Airports to begin with. This scheme propounds push to financial growth and development and secures sure growth of all regions in India.

(vii) Lately, private players have also developed the platforms which get together all main stakeholders in the supply chain, to communicate liberally and gain the best service support from each other. Clients can consider where and how to trade their service necessities to various service providers instantly and get best choices. With the presence of two-way communication platforms, the new innovative systems promote to and fro processing. Cargo E-Go platform has been initiated in April 2018 by one private company bringing together all key stakeholders in the supply chain.

(viii) The Ministry of Commerce has started developing a national logistics portal, as part of its measures to ensure ease of trading and cut high logistics costs from 14 per cent of the GDP to 10 per cent by 2022. The National Logistics portal will be implemented in phases and will realize the promise of the Government of India to improve trade attractiveness, put up with 'Digital India' and overlay an approach towards making India a global logistics hub.

(ix) Modernization of Delhi and Mumbai Airports had been considered as early as 1996 by Airports Authority of India. Technology upgradation of these airports is now in the lead as compared to other airports in India.

Integrated declaration

"Integrated declaration" has been emphasized recently in which improved customs Bill of Entry includes all kinds of data relating to permissions which were hitherto reflected in separate documents. Thirty-nine different documents have been swapped by a single window declaration.

Air Cargo Community System

Air Cargo Community System (ACCS) is an umbrella structure to bring all air cargo logistics trade stakeholders within its scope and offer end to end comprehensive solution under a digitized platform, where efficiencies are created to provide supply chain visibility. Cargo Community Systems are successful across the globe. With the endorsement for developing ACCS, the Ministry of Civil Aviation in its report, has added a new determination in the air freight industry. It is an immense initiative taken by Government to digitise the stakeholder interactions and facilitate the 'ease of doing business' through a national air cargo single window. This step of the government is in line with its proclamation listed out in NCAP, 2016. The gauge and magnitude of what is envisioned is unparalleled. This platform would challenge a lot of issues, in terms of avoiding delay in the seamless processing of EXIM trade, removing duplication of data, heavy loads of documentation and bringing uniformity in transactions. The government report takes the cognizance of the fact that airports and cargo agents have their own community systems and their investments in developing and managing those must be deliberated while rolling out any fresh system. The current community systems may remain with interface to the national single window so that already created infrastructure can be reused and leveraged.

CTIVITIES INVOLVED IN AIR CARGO SUPPLY CHAIN

Air freight is normally handled for high value and low volume consignments. The old method of air dispatch is to transport a consignment encompassed by a distinct air waybill to an air carrier either directly or through a freight forwarder. Transshipment is a cumbersome process. There are too many activities from arrival of flight till the departure to the last consignee. A number of agencies are accountable for smooth operations in the cargo handling and movement which includes Customs, Carriers, Custodians, Air Freight Operators, Cargo Handling Agencies (CHAs), Bureau of Civil Aviation Security (BCAS) and many cross border inspection agencies. According to A.T. Kearney's research, "inefficiencies in the supply chain can waste up to 25 percent of a company's operating costs. With profit margins of only 3 to 4 percent, the consultants point out, even a 5-percent reduction in supply-chain waste can double a company's profitability."[37]

The air cargo business encompass a complex supply chain, which embraces airlines, government regulators, suppliers, customs, ground amenities, air cargo forwarders, brokers, inland transportation, air cargo terminals, supply centers, integrated global express services and various kinds of service providers. Air cargo terminal is most essential in the air cargo supply chain. A normal air cargo terminal has three broad groups i.e. airline carriers, air cargo terminal operators and cargo-agents/forwarders. Collaborative efforts of cargo agents provide key sources for the revenue of air cargo terminals. It is obvious that such a large supply chain can function effectively in an integrated approach in a common platform where all the stakeholders and all their stated activities are interlinked. Efficient technological enablement of cargo management supply chain can improve handling and processing of cargo. Cargo activity supply chain management involves a series of steps from one end to another end as can be seen in the process chart at Figure 1 below:

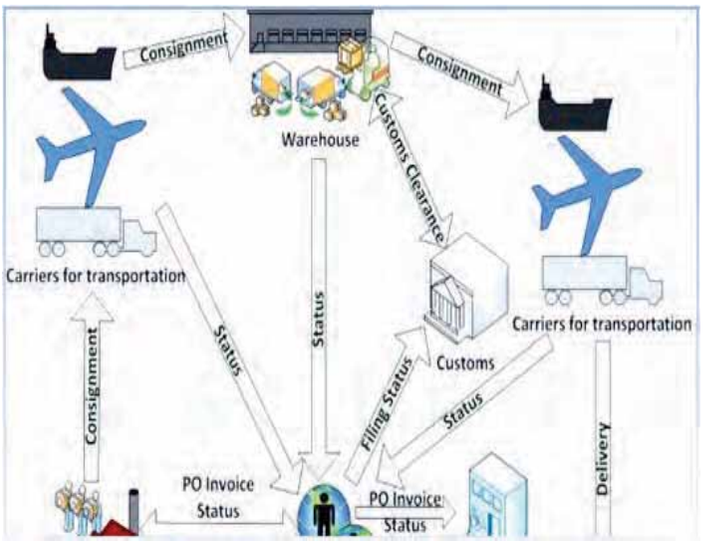


FIGURE : ACTIVITIES INVOLVED IN AIR CARGO MOVEMENT

Source: www.bing.com

SUPPLY CHAIN IN AIR CARGO

According to Beamon (1998), supply chain efficiency is the measure of how well the resources expended are utilized.[3] Lambert et al (1998) says "Logistics is that part of the supply chain process that plans, implements, and controls the efficient, effective flow and storage of goods, services, and related information from the point of origin to the point of consumption in order to meet customer's requirements.[27] Air cargo supply chain travels from source to regional warehouse, central warehouse, freight forwarders and then transmitted through aircrafts and vice versa, as explained in Figure 2. EDI plays an important role in streamlining the supply chain while quickly responding to market demands. Shipment visibility requires real time alerts with carriers, shippers and custodians in an IT enabled environment.

NEED AND SIGNIFICANCE OF STUDY

The present study was undertaken to assess functioning of EDI system in Aviation Cargo sector as the results are significant to increase revenues of respective governments as well as organizations in the supply chain, besides facilitating e-commerce and e-business services to meet citizens expectations.

METHODOLOGY USED IN THE STUDY

Methodology included carrying out an empirical study. The theoretical framework and the empirical study together constitute the base for the presented index. The approach for the study consisted of primary data analysis, secondary data analysis, analysis of information collected from stakeholders through following data collection techniques: Observations are based upon the visits of Mumbai, Delhi, Hyderabad, Goa, Lucknow, Leh and Bengaluru Airports.

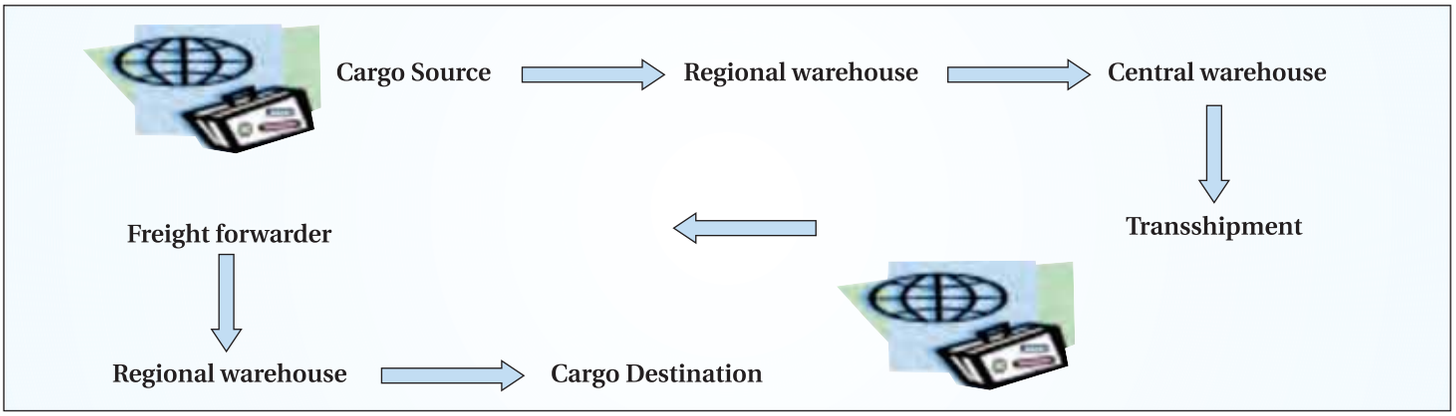
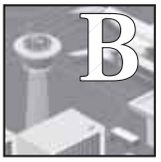


FIGURE 2: AIR CARGO SUPPLY CHAIN



BENEFITS OF EDI IN CARGO SUPPLY CHAIN

The supply chain activities require integration throughout the organization and beyond with suppliers and customers. In digital environment everything is carried out "just in time". "Just in time" communication, and "just in time" delivery are attractive everyday ideas. Electronic Data processing being an alternative to paper-based requirements, many benefits are noticed in electronic processes as compared to physical processing of documents. EDI helps in more effective resource management as electronic records are used instead of original documents. Besides reducing paperwork, EDI results in ease of record maintenance and retrieval and improves transparency. Following documents are exchanged electronically through EDI, enabling trade at all levels of supply chain.

- Advance notices
- Functional acknowledgements
- All types of messages
- Goods and cargo statements and declarations
- Discharge and control notifications
- Support documents like invoice and packing list, master air waybill and house air waybill (for post-flight audits)

- **Questionnaires and Opinion Surveys:** Forms were distributed to 100 cargo stakeholders at Delhi, Mumbai, Hyderabad and Bengaluru airports of India to elicit their views about processes and factors responsible for successful implementation of EDI, which were completed and returned by respondents. Diverse expert resources from government and industry were quizzed. Representatives selected for opinion survey and questionnaires were selected on the criteria that they should be associated with air cargo supply chain and dwell time issues. For testing hypothesis, responses were obtained on following ordinal parameters:
  - Extreme
  - Very Strong
  - Strong
  - Moderate
  - Low
  - n/a

Comprehensive case method

Due to higher growth in Delhi and Mumbai as indicated in various paras of this document, cargo terminals of these two airports were selected for comprehensive case study. These are India's two leading cargo terminals by volume and revenue. This involved secondary information and a primary recounting by those involved in various activities.

Interviews: Interviews with resource persons and experts were carried out. Policy makers, top management as well as freighters were interviewed to study bottlenecks in the present system. The interviews were performed either as telephone conversations or as personal meetings. Questions asked were basically open ended, capturing respondents' perceptions about the present process in cargo supply chain, challenges being faced and suggestions to enhance performance. Table 8 shows the breakdown of the composition of the survey respondents who were interviewed and whose views have been reflected:

TABLE 8: DISTRIBUTION OF RESPONDENTS

Respondents	Percentage
Clearing agents	30%
Transporters	25%
Consignees	5%
Policy makers	15%
Representatives of Airport Authority of India and Airport operators	15%
Shipping agents	10%

The overall target was 300 respondents. Majority of the respondents interviewed were in business operations/ policy making for more than 5 years.

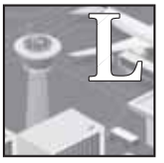
Direct observations: Direct observations method was used to observe the complete supply chain process in Delhi and Mumbai. Every detail as it occurred was recorded in a flow chart. It was made sure to record the movement time at a fixed starting and stopping place for 50 cargo items selected at random. Several short charts rather than a long single chart were prepared to record necessary steps in operation. Wherever one or more improved methods were applied, a critical review was done with a view to evaluate the effectiveness of the new proposals regarding reduction of dwell time. Each step of activity with the corresponding elapsed time was recorded in the flow process charts prepared for further analysis. A total of 580 observations were made of 'cargo active' and 'idle times'. The number of observations was determined taking into confidence level of 95% and the limit of error of 5%. , which included periods before and after announcement of 'dwell time reduction' by Government of India. Period of study was spread over two years at different times. The observation period was not continuous but random. Analysis was made to arrive at significant trends, using the recorded flow process charts and observation sheets, to identify which step consumed a lot of time, and for duplication of effort, backtracking, excessive handling, costly delays, etc.

Literature Survey: Extensive Literature Survey was carried out for this research, which included relevant reports from DGCA, Ministry of Civil Aviation and Airport Authority of India. Annual Reports of Directorate General of Civil Aviation, Airports Authority of India and MOCA including Civil Aviation Policy document of Ministry of Civil Aviation, Parliament budget speeches, etc. were studied. Customs Rules and Regulations relating to EDI were evaluated. In addition, reports prepared by other relevant organizations were consulted, e.g. relevant ASSOCHAM reports, Project Report of RITES on "Setting up of International Air Cargo Hubs at Chennai and Delhi Airports" (2016), Asia Aviation Associates Report on "Creation of Centralized Domestic Air Cargo Handling Facilities at Airports in India", ARES Advisory *"Feasibility Report on Air Freight Stations (2015)",* etc. Various issues of "Cargo Talk" were analyzed. Primary data was also collected from Directorate General of Civil Aviation and MOCA websites relating to cargo growth at various airports. EDI-related literature was reviewed from the Government of India Report of the Task Force (2006) [7]. Export and import trade data was studied from the web site of Directorate General of Commercial Intelligence and Statistics [26].

Secondary sources including articles and books on the subject were scanned as also web based information to study latest research in the field. Gupta (2004) study revealed that E-Governance is said to be 20% technology and 80% management. [29] Prabhat Kumar et al (2004) case study of Indian custom EDI system revealed "If the technology used was of higher order, connectedness could have been enhanced. Partner agencies also need to catch up faster with customs computerization plan." [31]

Amir Parsa Thesis had concluded in 2003 that EDI is an electronic movement of repetitive business information /documents such as purchase orders, invoices, payments, bills, shipping-manifests, and delivery schedules, between the computer systems of trading partners that are based on standardized and structured messages. [2]

Puong (2000) argued, in any mode of public transportation, dwell time is a key parameter of system performance, service reliability and quality. Indeed, dwell time might represent a significant fraction of total trip time along a service transit line, thus affecting travel time and system capacity. Where dwell time variability lowers service reliability in terms of on-time performance and decrease service quality through longer waiting times and thus leads to overcrowding in the transport system (33).



IMITATIONS OF STUDY

Data collection from Govt. agencies is not easy due to fear of compromising requirements of business confidentiality. Despite these constraints and limitations, study has succeeded in getting the desired results.

YPOTHESIS FORMATION

Based on observations, discussions and literature survey, following hypothesis were formulated:

A) Dwell time reduction is crucial to improving supply chain efficiency;

B) Improvement in EDI system reduces congestion at cargo terminals;

C) There is a gap between cargo clearance facilitation steps taken and the continuing bottle necks.

NALYSIS, RESULTS AND DISCUSSIONS

Following forecast regarding domestic and international cargo growth has been revealed in the study:

Three days data taken randomly, yielded following data in respect of Mumbai Joint Venture Airport:

Average daily Tonnage delivered	530
Average daily gate pass generated	140
Bill of Entry Submission	**(%)**
Advance Bill of Entry	33%
Within free period	43%
	23% Day1
	13% Day 3 Day 27%
Beyond free period	23%
RMS Clearance	**49%**
Within free period	68%
Beyond free period	32%
Additional Shift (11:00 PMto 7:00 AM)	.02%

Average Clearance (%) of overall transaction

Within free period	54%
Beyond free Period	46%

The essence of the findings obtained through opinion survey, questionnaires, interviews and direct observations during the study is outlinedbelow:

- Airports have reduced the time for cargo clearance by implementing efficient electronic data interchange system.
- Trading across borders has become easier by introducing ICEGATE—an electronic data interchange system making it possible to lodge customs declarations through the internet and facilitating the operation of a risk management system, an electronic payment system and an electronic manifest system that allows stakeholders to submit their cargo manifest in advance. “ICEGATE is an infrastructure project that fulfils the department's EC/EDI and data communication requirements.” [11] About 90 per cent of traders pay duty through e-payments and these transactions can be viewed on the ICEGATE (E-payment gateway).
- “Lengthy Processes", “Obstacles in E-payments”, “Acceptance of linkages by all allied agencies”, “Need for enhancements in EDI system, "Absence of Accountability", "Misplaced Packages", " Debilitated Cargo", "Delayed Carriage", “Repeat activities”, etc. were the common responses.
- A mere 2 percent of the surveyed executives stated that dwell time is not crucial for supply chain efficiency.
- During the study, it was observed that physical compliance of documents realized significant time.

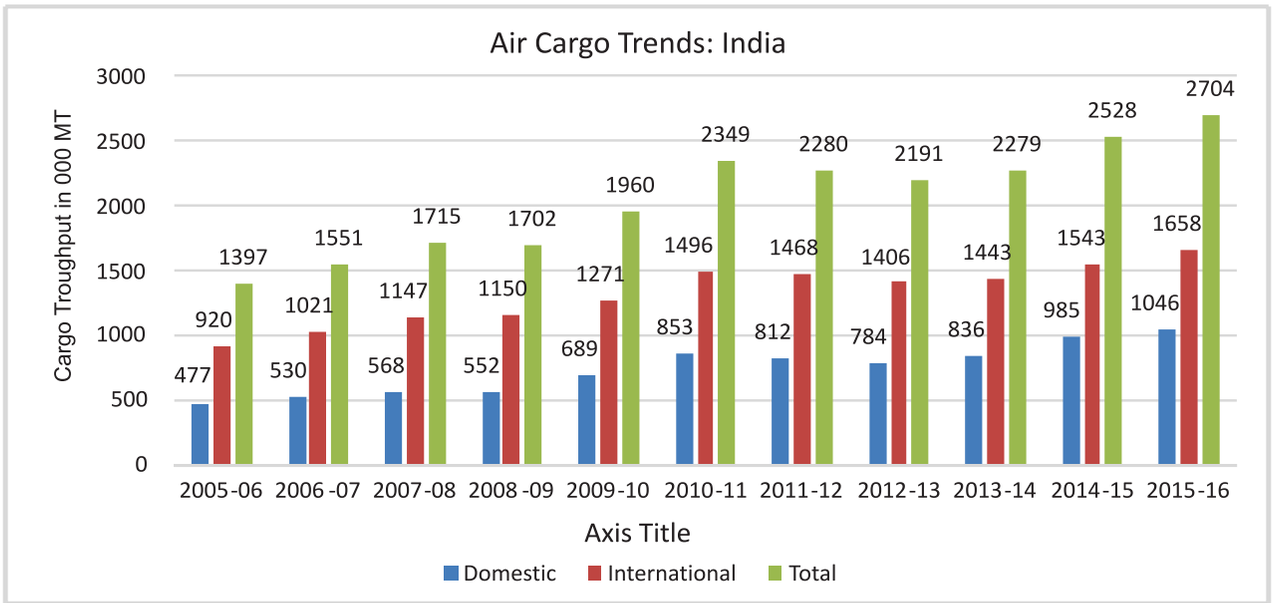


Figure 3: Air Cargo Trends: (domestic And International)
(Figure adapted from data obtained from Airports Authority of India and Directorate General of Civil Aviation)

During observation period, the operation habitually started in the afternoon. Assessment and approvals appropriated up to 2 hours. However, the process took considerable time for physical examination. As a result, the cargo generally could not be cleared till next day due to crowding, even after adding the free dwell time. As cargo was not transported into the terminal and hauled in, this was more than the actual free dwell time allowed.

- It was observed that metro airports were doing well in implementation of government initiative of 24x7 export cargo operations. It is significant to realize that in pursuance of the customs circular mandating 24x7 export operations for all shipping bills, international airports at Mumbai, Delhi, Hyderabad and Bengaluru are providing round the clock resources. Overall outcome of exchange of electronic messaging is quite successful under their customized EDI systems. The e-filing of customs documents and exchange of Electronic Data Message (EDI) has fast-tracked the impeccable processing and clearance of cargo. Transparency and accountability has improved, thus cutting down on dwell time. Customs has also improved upon their EDI system of air cargo. The customs officials are also available on 24x7 basis in shift patterns. This has reduced the morning hour usage resulting in peak admittance from afternoon till evening. However, this facility is not completely optimized by all members of the export trade, though export cargo operations are being handled effectively without any delays and irregularities. At metro airports, additional facilities are being created to clear pharmaceutical and agro exports. "E-freight initiatives" are being implemented successfully at air cargo complexes, eliminating paper at many levels of cargo operations. The facility of payment of customs duty through e-banking has been introduced to facilitate imports and exports and quick clearance of goods. However, banks are not open 24 hrs. It was noticed that percentage of shipments admitted and cleared during night shift, second Saturday, Sunday and public holidays are negligible except for blood samples and bonded cargo. Hundred percent EDI is available in imports for Facilitated Bills of Entries in Risk Management

- GMR Hyderabad Airport International, which runs the airport claims that Hyderabad's cargo terminal is India's first modular integrated cargo facility. During 2011-12, Hyderabad airport handled 82,000 tonnes of cargo, a growth of 15 per cent against the national average of 11.2 per cent, which increased to 1,31,670 tonnes in 2017. This terminal also has India's only dedicated pharmaceutical handling zone. As per Cargo Talk (2016) [39], with its central location, world class infrastructure, free trade and special economic zone, there is huge presence of pharma sector. Hyderabad is one of the fast growing cargo airports. The study revealed that EDI implementation was one factor contributing to this progress.

MIAL, Mumbai has started commercial operations as a custodian for the air cargo terminal, in the year 2006. During the financial year 2013-14, CSIA and GVK-Mumbai International Airport Private Limited (MIAL) had registered Year-on-Year growth of 5%. M/S Cargo Service Center, authorized concessioner of MIAL for handling export perishable cargo had registered Year-on-Year growth of 18 % during the financial year 2013-14. This signifies that the airport has achieved growth due to improved EDI system, cargo community system and e-message facilities. There was adequate deployment of manpower, equipment and resources. Cargo Management System at MIAL was introduced with "Air Cargo Community Platform". The online web based programme was propelled in the year 2013 to transform and transport the web services and is recognized as "GVK MIAL AIR EXCHANGE (GMAX)".GMAX is an integrated electronic platform assisting online cargo tracking by joining one Cargo Terminal Operator with another air cargo patron. All regulators utilize this e-freight service while networking through this portal.

- **Cargo Mobile Application:** MIAL and DIAL are the pioneer airports in India to extend "Cargo Mobile Application". This facility covers all the air cargo stakeholders and provides widespread discernibility about the cargo status at Mumbai Air Cargo Terminal.

- **E-Freight Initiatives:** MIAL was rated e-freight compliant cargo station in the month of January, 2015 by International Air Transport Association (lATA) for adopting paperless initiatives for air cargo operations. Some of the E-freight initiatives taken by MIAL are, E-reception (exports), online carting order (exports), elimination of hard copy of Airway Bill at cargo acceptance (exports), advance shipment information (exports), online examination receipt (imports), etc. APM Terminals Mumbai has announced a new value added service in March 2018, which is designed to accelerate and improve turnaround time of freight arriving at the terminal. Titled as Vehicle Booking System (VBS), the service entails the terminal allocating fixed time slots to each Container Freight Station (CFS) every day, whereby the CFS is encouraged to collect its consignment during the time allocated. Once the CFS' trailers reach the Y-junction at the port complex during the allotted slot, they can approach the terminal through the empty TT lane. The trailers thus skip traffic and enter the yard in a short time. Additionally, the terminal also allocates dedicated equipment at the yard block for serving these trucks once inside the yard. With CFSs directing their trailers only during assigned slots, the terminal is able to competently handle import clearings, eluding traffic congestion outside its gates.]

- The correlation between the level of EDI implementation and 'clear guidelines for EDI interchange agreements 'and "training" was established. These results imply that changes in the levels of EDI implementation have good effect on execution of the systems. Implementation of EDI requires significant investment in infrastructure, training, and business process re-engineering. Latest educational training sessions for all EDI participants was aggressively mooted by practitioners.

- Importantly, the strongest correlation established in this study is between reduced dwell time and supply chain efficiency (0.90). Correlation between EDI improvements and reduced congestion was also positive. (.64) Findings

suggest the increasing importance of EDI in the cargo sector partake inclusive economic growth.

Second Assessment and Current Situation

The second assessment (following the reduction in free period for Dwell Time) was conducted in January 2018.

Following the implementation of dwell time reduction policy, improvement in cargo clearance at the airports has been noted. Relevant stakeholders including many clearing agents and some representatives of Ministry of civil Aviation, representatives of Airport Authority and Airport Operators are of the view that computerization of procedures and digitization of documentation has improved cargo clearance at airports.

Although some changes (to ensure supply chain security) have had an adverse effect on the dwell time, the overall effect has been beneficial in improving the efficiency of the transit trade supply chain. Greater efficiency is anticipated as the systems and processes become completely automated and infrastructure is improved.

Goods that arrive at the Customs prior to 1400 hours are usually cleared the same day. Coordination among various stakeholders and integration of IT Platform as a single window for all logistics related matters has tremendously improved. There is, however, a need to have more linkages with the IT systems of Railways, Road transport & Highways, Shipping, Civil Aviation, CBEC, State Transport departments etc. and the integrated system should act as a logistics marketplace. Policy changes have ushered in ease of documentation, faster clearance and digitization. Following e-services/ information is being offered by customs which has eased the cargo clearance process to a large extent:

- Challan Enquiry
- Job Status Tracking
- Document Tracking Status
- Drawback Enquiry
- DGFT Shipping Bill Integration Status
- Status in RBI EDPMS
- Check IE Code/BIN Status
- IEC Wise Summary Report
- CB Wise Summary Report
- License received from DGFT
- Warehouse Code Enquiry II.
- Electronic document filing in the International trade
- Bills of Entry
- Shipping Bills
- Import Goods Manifest
- Export Goods Manifest
- Console Goods Manifest
- Intimation and Notification
- ICEGATE Registration
- Month-wise DBK Scroll
- Custom Registration Status
- Provisional Assessment
- Electronic Return Filing
- E-payment
- Learning management system
- Claim & Intimations
- Grievance Redressal
- Refund follow up

As a result of various improvement measures, clearance time at Delhi and Mumbai has shown improvement. Following graph has been prepared on the basis of May 2019 data of CBIC:

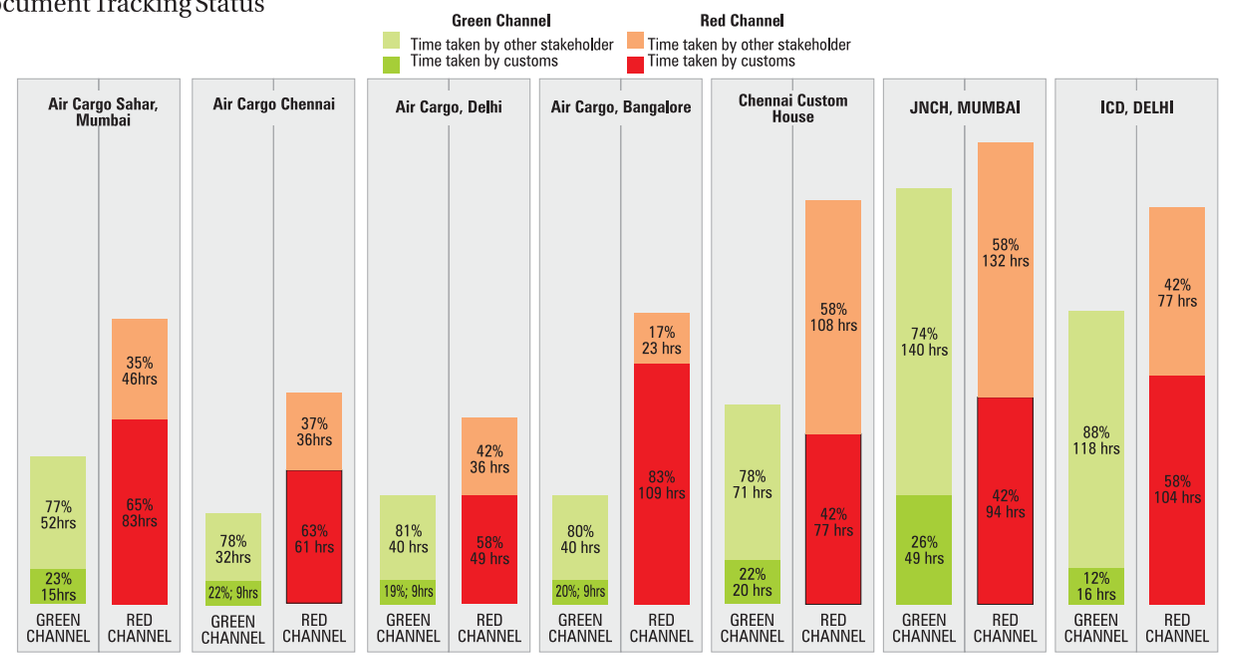


Figure: 4

LEARANCE TIME AT VARIOUS AIRPORTS

It can be seen from Figure 4 above that time taken by other stakeholders is more than the time taken by customs at red channel of Chennai Custom House and JNCH Mumbai, thereby indicating need for improvement.

Observations, discussions and analysis of data obtained during second assessment also revealed the following:

- EDI based customs control has integrated Customs EDI with other agencies. With the introduction of uniform and simple procedures, now there is a need for amendment to Import General Manifest, bank guarantee waiver, etc.
- Discussion with stakeholders during second assessment study revealed that the average time taken from filing of bills of entry to giving out of charge has reduced progressively for different categories of cargo subsequent to reduction of free period for import and export dwell time.
- Documents were studied which revealed that prompt filing of normal bills of entry, the percentage of normal bills of entry filed more than 48 hours after import manifest has declined from 50% in January to 40% in July, 2017 subsequent to EDI system improvements.
- The analysis reveals that still there is need to remove information gaps, service gaps and performance gaps. Performance gaps occur when delivery operators and customers do not satisfy their requirements (e.g. late delivery, delivery outside fixed times lot).
- The bills of entry filed within specified 24 hours declined from 29% in January to 23% in July, 2017, even as those filed between 24 hours to 48 hours increased from 19% to 34% during the same period.
- The interest free period for payment of duty after assessment has been reduced from 48 hours to 24 hours. In January, 2017, in respect of 40% of bills of entry, duty was paid within 48 hours.
- In July, 2017, only in respect of 32% of bills of entry, customs duty payment was made within 24 hours of the assessment, which is an increase from 22% in January, 2017.
- Data collected through questionnaires and interviews suggest that trade prefers to take physical custody of the cargo based on their inventory management priorities.
- There is reduction in time in filing documents, examination and assessment procedure after the policy interventions.
- A comparison of the time taken at different stages of time release for normal and advance bills of entry for the two periods brings out the basic difference between these two categories, highlighting the obvious advantage of advance bills of entry.
- The analysis reveals that still there is a need to remove information gaps, service gaps and performance gaps. Performance gaps occur when delivery operators and customers do not satisfy their requirements (e.g. late delivery, delivery outside fixed time slot).
- The research also reveals that there is deficient interoperability at many places. There is a need for continued development of initiatives to increase interoperability.
- During January, 2017, 30% of the total bills of entry were subjected to assessment and examination.

Comparison of data between first assessment and second assessment and subsequent discussion with stakeholders proved that the entire assumptions made before the study initiated, have been verified. Responses of users to the hypothesis statement have been analyzed and correlations established between “dwell time and supply chain efficiency” on the one hand and “improved EDI system and reduced congestion” on the other hand. All the three hypothesis statements have been proved in the study as summarized below:

Hypothesis	Before policy interventions	After policy Interventions	Scope for further improvements
A	Free Dwell time was responsible for congestion at Airports leading to supply chain inefficiency.	Hypothesis proved	There is scope to reduce Dwell time even further
B	EDI system had been established but delays were still taking place	Hypothesis proved	There is scope for reducing delays with further integration of EDI systems at various levels.
C	It was known that Gap was already existing but study was made to find out whether the gap has reduced or not.	Hypothesis proved	Gap has reduced and there is scope for further improvements.

THE ISSUES AND CHALLANGES

The key issues which need further policy interventions were brought to notice during study:

- There are allied agencies like customs brokers, warehouse operators, and trucking firms that aim to work in tandem with safety regulators like drug controllers, health representatives, food safety and standards authority of India, animal and plant quarantine authorities, etc. for providing security, safety, and environmental regulations These agencies are encompassed by the allied acts and have an assigned task in clearance of cargo through their certification. However, not all of them have their offices at the air cargo complex. Some have their offices positioned far away from the airports. Various agencies concerned in the customs clearance are not always present at the air cargo complex. As such, extra process time is necessary in the clearances of such import and export. EDI of different allied agencies are not completely inter-linked, due to which cargo clearance is congested at certain places.
- Identical trade, customs and transportation data is written multiple times during the logistics flow, ensuing in high administration costs and possibility for physical errors.
- Absence of shipment visibility necessitates continuous follow-up with regulators, carriers, shippers and custodians. This impacts additional message costs, fines and delays, and end up with client dissatisfaction.
- Banking Gateways for online transfer /payment are available only up to 2000 hrs.
- Key investment is often focused on major Tier-I cities, while smaller Tier-II cities are neglected to the detriment of the industry as a whole by restricting the movement of cargo within India.

RECOMMENDATIONS

Based on an analysis of the underlying reasons for the detected delivery gaps, a number of recommendations have been provided on how to reduce the gaps and increase user satisfaction, e.g. some processes vary at different airports, especially at non-metro airports. There should be standardization. Each custodian is embarking on its exclusive custodian structures. Subsequently, the trade is wriggling with multiple systems and there is deficiency of principles of data exchange across various airports for the similar operations. Data cannot be effortlessly integrated due to certain manual procedures and paper records. Even in cases where shippers have their specific computerized processes / ERP systems, they still deal with paper documentation with the related authorities/ mediators. There is an obligation for all-encompassing shared platform through which all operators and regulators can be associated. Cargo community system should be espoused at the earliest. All stakeholders should be brought to the common platform and nobody should repel. Facilitation of further industry collaboration is the need of the hour. All relevant governmental agencies should be hundred percent interconnected.

- ✓ Technology is crucial for supply chainas a means for collaboration. Automation and mechanization should be widely used at all cargo complexes in the Indian airports so that commercial supply chain for value to weight products is not affected. Devices like Warehouse Management System (WMS), new caster and wheel systems, Radio Frequency Identification Devices (RFID), Automatic Storage and Retrieval Systems (ASRS) should be leveraged to upsurge automation to enable speedier and well-organized operations managing congestion at the airports. The database should deliver valuable feedbacks about the position of goods in the warehouse. The purpose of a warehouse management system is to offer a set of computerized actions to manage the acceptance of stock and incomes into warehouse proficiency. WMS helps to standardize the rational depiction of the physical storage facilities (e.g. racking etc.), manage the stock within the know-how and allow a unified link to mandate processing and logistics management. The system benefits collection, packing and transportation of goods out of the WMS system. Along with such technologies, the trade should link with improved information movement between various activities in the logistics chain through electronic messaging and relationships with other EDI processes. Radio Frequency Identification Tags are immensely useful for real-time tracking of cargo containers within the warehouse.
- ✓ Material documentation is still being consumed even after implementation of EDI in the processing of both import and export cargo. Hard copies should not be insisted by customs, wherever data is transmitted electronically. Physical copies should be required only in those cases where no electronic data is delivered. This supports fall in the dwell time of import/export cargo by at least 10-20%.
- ✓ Customs should go for comprehensive EDI implementation for import/export registration, clearance and e-payment of duty, etc. This will help in discharging some manpower and man-hours in the existing group, which can be positioned somewhere else. Certain functionalities are needed to be realized fully through EDI.
- ✓ There is a need to completely dispense with the physical printing of various types of bills like customs, shipping bills and bills of entry with a view to accelerate processing time at examination points.
- ✓ Amendment message without human provisions should be made a part of regular EDI process for regularization of short/excess/over-carried cargo intervention. EDI should be enabled to identity repair return shipments.
- ✓ For effective implementation, it is recommended that EDI standards are quickly implemented uniformly throughout the country. All testing agencies are not completely linked to customs. It should be mandatory to adopt standardized actions, digital signatures, inter-

linking of regulatory agencies and acceptance of multi-model EDI processes. As such, valuable time is lost when documents physically travel from several positions to customs.

- ✓ Smooth movement of data between airports, airlines, operators and other stakeholders in the supply chain should be safeguarded. With a view to achieve better association of the processes, there should be inter-linkages and all side flow of information with airline carriers, airport operations, custom house agents and air freight stations, Customs, Banks, and other allied agencies like Plant Quarantine Officers, Assistant Drug Airport Health Officer etc. The trade should care for improvement in information flow between various parties in the logistics chain, through electronic messaging and other EDI practices.
- ✓ Processes should be improved to categorize parcels meant for examination based on item of export, standard applied and other precincts. System connection should also be effectually established with custodians to supply the packages so identified, to exclude human intervention and permit custodians to arrange rest of the cargo to warehouse.
- ✓ NIC and Directorate of Systems should provide regular training in respect of ICES/ ICEGATE to the airlines and other agencies for enhancing compliance with law and procedures.
- ✓ Legal and institutional provisions should be made that are conducive to promotion of EDI.
- ✓ Electronic declaration for continuous and efficient transshipment will help accomplishment of the vision to produce air cargo hubs in India.
- ✓ Government should remove duplication of activities between their agencies and custodians.
- ✓ Allocation of EGM and inward entry of import flight should be digitalized in totality to speed up things.
- ✓ At the time of survey, Mumbai International Airport Ltd. was in the process of creating a Temperature Controlled-Warehouse for Import Cargo. Extending similar facility to Export Cargo too will improve "B to B" as well "B to C" transactions.
- ✓ Field formations should be instructed by CBEC to respond online to the specific queries of stakeholders in a time bound manner.
- ✓ More research is required to be carried out on the EDI and System related issues in the interest of trade facilitation and more customer-oriented delivery results.

ONCLUSION

The substantial growth in Civil Aviation and air connectivity over the years has portrayed a noticeable role in enabling cargo activities throughout the world. Generally, there has been an isolated outlook to planning of IT whether public sector, commerce or business. EDI being an IT enabled process, its implementation is always slow as EDI traffic and the IT infrastructure are to be linked with data systems of business partners. Setting up of an integrated approach with a total industry view through a common platform is a timeconsuming process. Techniques for transshipments and export / import procedures differ at various airports. As such, facilitation procedures with regard to transshipment cargo still need further precision and simplification by custom authorities. There is a pressing need for standardization of policy / procedures for computer networking systems. Many tasks could be simplified if unified technologies are espoused for improving efficiency. Free period for dwell time should be further decreased as new Indian carriers hover to and from International destinations. The transshipment sector is heading for considerable market potential as flow of goods and information are unified. Linkages should be seamless as there are too many steps in the whole transshipment process. Commercial, customs and transportation data should not be entered multiple times during the logistics flow, with a view to reduce high administration costs and scope for manual error. There is a need to further reduce the gap through unified exchange of all the organizations in the supply chain with EDI. Paperless initiatives will maximize usage capacity and facilitate proficient procedures and service standards This will enable our country to join international linkages and interact with any global community system. Manual documents should not be insisted upon wherever trade partners are submitting data electronically. This will avoid duplication of work and unnecessary paper work. Complementary policy solutions as stated above could further promote better cargo delivery performance.

To sum up, this study has offered an assessment of the significant linkages between reduced dwell time, improved EDI linkages and rapid cargo interchange. The outcomes of this study should be of significance for policy makers, practitioners and academicians. For practitioners these results can be used as a guideline in securing the returns of EDI mechanism. For academics, it offers a clue to initiate more research in this sector. These initiatives aim at addressing inefficiencies in air freight transport information interchange and EDI implementation in air cargo sector.

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