

E-Freight: An Unique Initiative That Can Completely Trasform The Air Cargo Industry

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Abstract. This paper examines the effects and benefits of E-Freight, an unique initiative introduced by IATA on the air cargo supply chain network. This industry wide program originally initiated in 2007 aims to entirely replace the need for paper based documentation with electronic messages. This initiative facilitates the easy movement of cargo by air which can save the supply chain from billions of dollars and also offers a more ecofriendly alternative to the traditional air cargo shipments. Traditionally, the air cargo industry have extensively relied on the paper-based processes, and movement of the documents between the members of air cargo supply chain members right from the consignee to the consignor. These traditional paper-based processes are expensive and does not address the immediate need for security and speed which are the key characteristics of air cargo. E-freight assures to bring about significant benefits in terms of quality, cost savings, speed, quality, and regulatory advantage. However, despite these benefits, the high complexity involved in air cargo supply chains makes implementing this initiative extremely challenging and sophisticated for all the stakeholders involved in the supply chain. For this research, we have included a case study and also collected data from relevant journal articles in order to provide a deeper understanding into the challenges and benefits for countries to implement this initiative.

Keywords: e-freight, air cargo, supply chain network, logistics, IATA, paperless

Introduction

Even today, paper documents follows the goods from point of origin to the final destination which makes the supply chain surrounding the air cargo industry highly documented and subject to international laws. According to IATA (2018), air cargo is expected to generate revenue of over \$116 billion and transport over US\$6.4 trillion worth of goods, which is 35% of world trade value. Therefore it would be immature to underestimate the importance air cargo holds in facilitating trade which ultimately contributes to the global economic development and produces millions of jobs in the process. To help this industry to remain competitive and to improve quality, eliminate paper handling costs, reduce waiting times and better positioning in transportation sector, the International Air Transport Association (IATA) introduced the paperless initiative called “e-freight” in 2004. This initiative is aimed at digitalization of key transportation and commercial documents by introducing an integrated information technology platform and electronic data interchange messaging in order to completely replace the flow of physical documents connected with cargo. As per IATA Handbook (2013), the parties must have an in-house technology which should be linked to their partners or be supported by third party providers in order to enable this change. The shipper, freight forwarders, custom authorities, ground handlers supports the need for modernization.

A project team was established by IATA to identify those locations which had the right technical and regulatory environment to work in an electronic environment while expressing the willingness to migrate from a paper based process to an electronic process. There were 6 pilot

locations that were identified who met these criteria: Singapore, Sweden, United Kingdom, Hong Kong, Canada, and the Netherlands. The project team established by IATA had working groups in each of these locations which included airlines, freight forwarders, custom authorities, and ground handlers. These groups acknowledged the need to define a single e-freight operation process which allowed the clearance of imports and exports without using paper based documentation. In November 2007, 12 months after beginning the project, these chosen pilot locations implemented the new e-freight initiative. As of 2018, over 35 countries are already e-freight live. The level of industrial developments for different countries, involvement into international initiatives, some countries high attachment to paper based processes weakens the successful implementation of e-freight initiative. Thus it is important to evaluate the challenges that can affect the supply chain stakeholders plans for executing the project and identify the gaps between the current situation and desired plans.

The air cargo industry comprises of different set of parties that are involved in transporting of goods from the origin to the destination. The parties include shippers, custom officials, airlines, freight forwarders, ground handlers, and consignees which collectively form the air cargo supply chain. The communication among these parties in terms of flow of information and business is shown in Figure 1. The air cargo industry is constantly developing and has become a key component of international trade. This progress has made the industry a very powerful player in B2B sector which makes the business activities conducted through this industry highly secured and regulated. There are numerous difficulties in implementing the e-freight initiative given the fact that different stakeholders involved have their own way of doing business, different level of capabilities and mission. Therefore, the unwillingness or the weakness of some of the members of the supply chain can interrupt the implementation of e-freight.

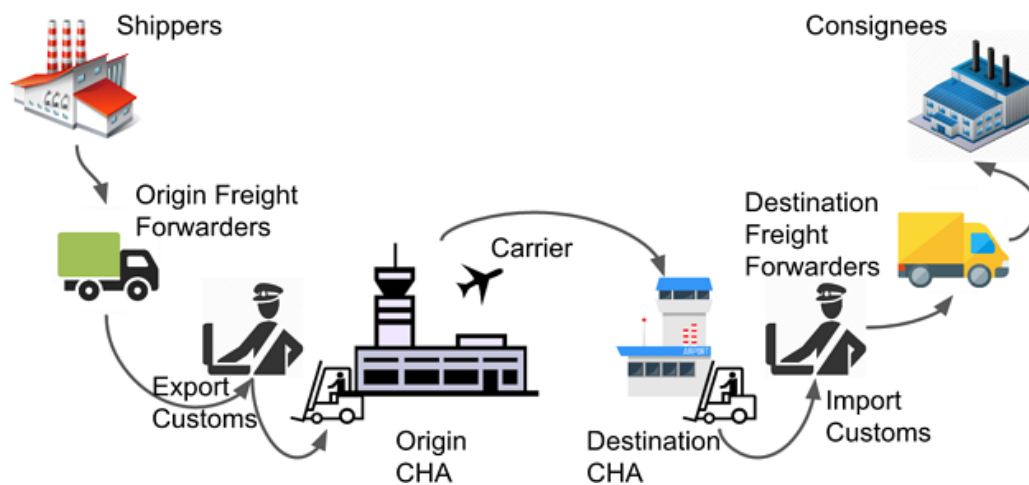


Figure 1. Air Cargo Supply Chain (SkyRadar, 2019)

Despite the timeline set by IATA for the e-freight, the implementation process is different in certain countries. IATA have given a step-by-step instruction on how to implement e-freight, however, it is important to understand the diversity of the members of supply chain involved in air cargo. Therefore the established plan for implementing e-freight can be used just as a toolkit for all the stakeholders involved. Through this research, we aim to answer the following research question:

What are the benefits and challenges to implementing e-freight, the IATA industry wide initiative in different countries?

Literature Review

In this chapter relevant literature with respect to Air cargo supply chain, Supply chain documents, IATA e-freight, and implementation challenges are presented as part of this research study.

Air cargo supply chain

ICAO (2013) has described air cargo supply chain as a combination of interlinked parties, data, locations and knowledge exchanges that enables movement of cargo from the origin to destination via air. Today the transportation industry has become one of the largest industry among with the manufacturing industries. According to Rushton and Walker (2007) Transportation is often referred to cargo transport which poses inbound and outbound movement of goods that also includes the collection of the products and their delivery to the end consumer. Sea, air, and road are the common modes for transportation of cargo from the origin to the destination.

During the development phase of the airline industry, the spare hold space of passenger flights were used to carry cargo as well as mail (Manners-Bell, 2014). In November 2010, the first ever cargo flight was from Dayton to Ohio while the first ever mail was carried from Albany to New York in the same year (Wensveen, 2012). As a result of rapid and constant improvements in technology, more goods were produced during those times which increased the freight volumes accordingly. Therefore, in order to cater to growing freight volumes, aircrafts became bigger, more efficient, and popular. As the years passed by, it caused supply chains to develop in a way to become individually positioned as air cargo supply chain. According to Manners-Bell (2014), air cargo have become integral part of global supply chains for most manufacturer's and retailer's which help firms from different sectors to operate in lean inventory environments.

The air cargo supply chain is often a complex process and are subject to wide range of regulatory requirements especially when there is international movements of goods and is transported by air. The cargo are handled along the supply chain by variety of entities with differing responsibilities which includes consignors, aircraft operators, ground handlers, regulated agents, express carriers, custom authorities, consignees, and hauliers. Further adding to the complication, these entities are most often known by different names according to the country or the region in which they are located (ICAO, 2013)

Air cargo supply chain documents

Without the variety of documents that move with the physical cargo or prepared and stored to allow such movements, the air transportation process cannot function. Figure 2 shows the 14 main documents that maybe used at various phases of the air transportation process (ICAO, 2013). Globally there is no unified scope for the documents that are required for transport of cargo from one country to another. The number of documents for air cargo transportation may differ from country to country due to different national custom norms, trade laws between countries or continents, security requirements and other factors. As a result of the current tendencies experienced in the air cargo industry, the number of documents in the supply chain flow are subject to constant change and decrease.

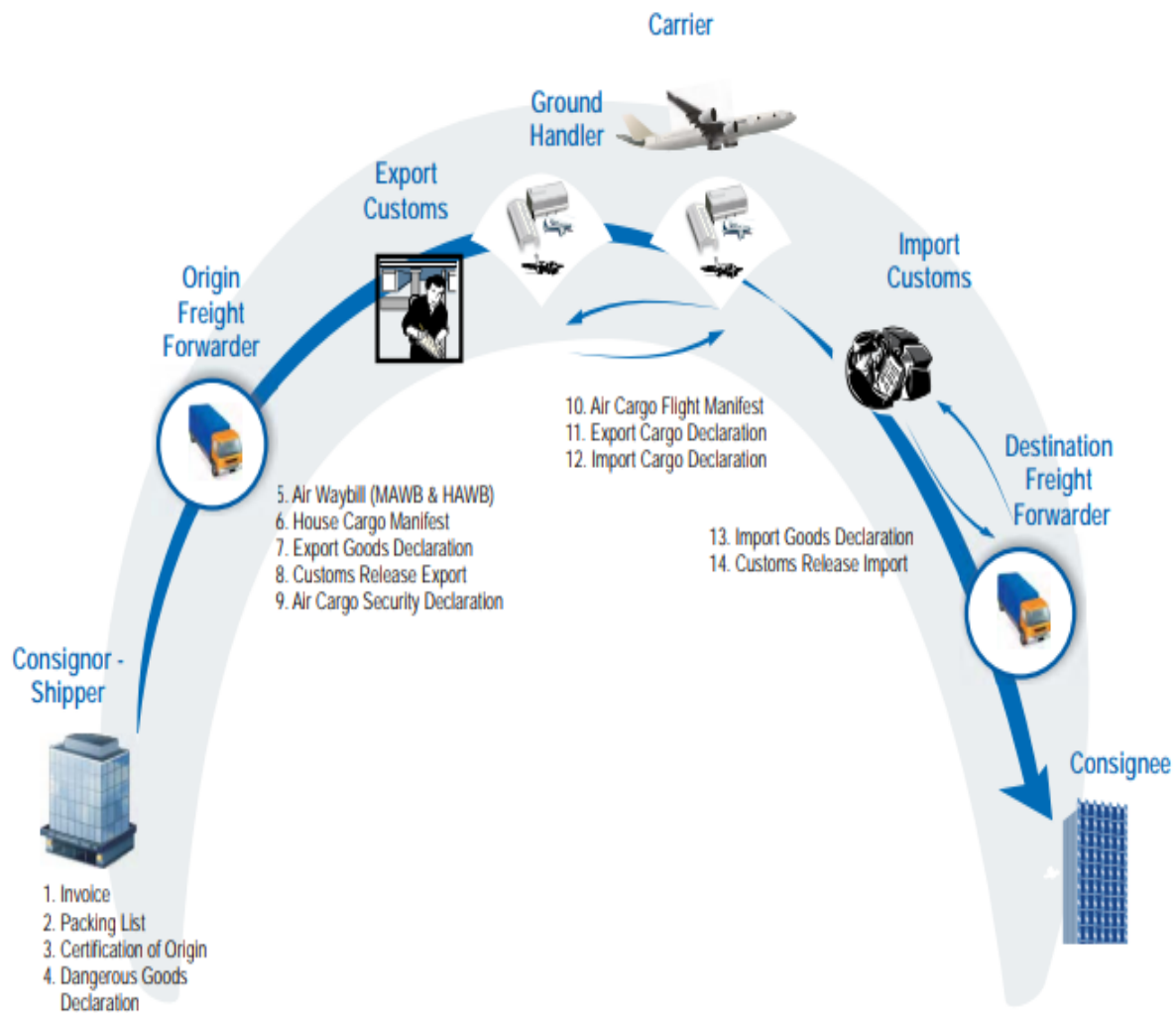


Figure 2. Air cargo most common document flow (ICAO, 2013)

As mentioned in the previous paragraph, number of documents while transporting cargo from origin to the destination may differ significantly. The 14 documents listed above (Figure 2) are in paper forms that are issued, copied and stored in different amounts for different period of time. Considering the average amount of issued copies for a single shipment, it could be concluded that a minimum of 30 page papers are in rotation for one flow.

IATA e-freight

The initiative of paperless air cargo was introduced by IATA which already works for single stations around the globe. E-business, E-commerce, E-Systems, and E-solution are the examples of trends that have deeply integrated into most leading industries as the computer technologies progressed. According to Air logistics Journal (2013), In 2004 Board of International Air Transport Association commissioned the association to lead an industry-wide initiative to transfer from paper based processes to paper-free processes called e-freight. Since then, the tools required for this project have been constantly being developed and calculated. This initiative is designed to modernize the process and replace paper with digitized standard documents that have been revised

for e-commerce which can help achieve to goal of cutting 48 hours from end-to -end shipment times (IATA Annual report, 2014).

It took many years, like any other industry-wide projects to define the project specifics and take all the circumstances into account for all the involved parties. IATA has defined the vision for e-freight as following:

Building an efficient air cargo industry relying on full paperless processes & smart data sharing, enabling innovative & value-added services to its customers.

Air transportation is probably the most comprehensive example for applying the e-freight solutions (Pilli-Sihvola et al., 2011). However, the launch of the program and its constant evolution enabled the industry to obtain a “product” that could respond to the needs of industry towards the paperless change. Figure 3 shows the development life cycle of the e-freight initiative which depicts the main activities involved during the project formation.

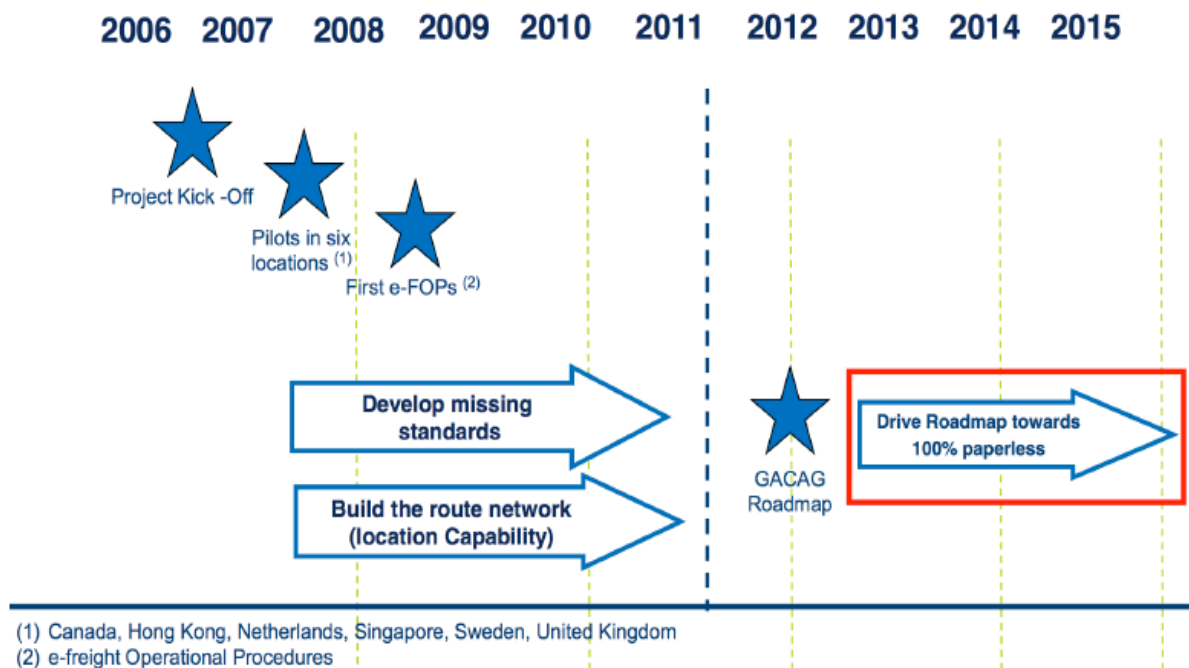


Figure 3. IATA E-freight development life cycle (IATA, 2013)

The roadmap for e-freight (Figure 4) outlines a shared end-to-end approach for the industry with clear leadership roles around three core “pillars” or components.



Figure 3. IATA E-freight pillars (IATA, 2018)

Implementation challenges

Project are rarely fully realized according to the plan and even well-planned projects can face difficulties when achieving their goals (Artto et al., 2011). It is impossible to predict all the opportunities and ways in which projects can be affected by the challenges, especially in industry-wide projects. Therefore, in the project planning phase and its lifecycle, many factors can missed out.

The challenges often includes the legal and institutional challenges, financial challenges, political and cultural challenges, practical and technological challenges. Such challenges can ultimately lead to overlooking of certain policy instruments and the resulting strategies to being much less effective. Even though the e-freight initiative can transform the air cargo industry as it can help to reduce costs and improves operational efficiency, some countries may not be willing to adopt this initiative due to their unwillingness and unreadiness to implement such large scale projects. Some countries as a result would reject the e-freight initiative just because they are going to unpopular in their respective countries. Therefore the emphasis should be more on how to overcome these challenges and not just avoiding them.

Methods

There are several methods of data collection and extensive literature discussion to highlight the importance and relevance of data collecting methods. The most important point is to choose the right method for collecting data that fits the research purpose and answers the research questions. Factors such as quantity, quality, suitability, and adequacy of data collected determine the quality of the research. As part of the study we have collected information from secondary data sources as well as primary data and the findings of our study will be discussed in the next chapter.

According to Saunders et al (2009), Secondary data is defined as data that has been previously collected for some other purpose and can be made up of both raw data and published summaries. As we are primarily interested in examining the benefits and challenges to implementing the e-freight initiative. Following are our methods of collecting secondary data as part of our study:

- Published Books,
- IATA & ICAO documents,
- Journal articles,
- Newspaper reports

According to Hox & Boeijie (n.d.), Primary data is defined as data that has been collected by a researcher specifically for a research assignment. Following are our methods of collecting primary data as part of our study:

- Observational study,
- Statistical Analysis

In addition, we have also included a case study based on Lufthansa cargo who have been deliberately pushing forward for the e-freight initiative for several years and the benefits they have received as a result of implementing this industry-wide initiative. The above chosen data collection methods will help us to provide a deeper understanding into the challenges and benefits for countries to implement the e-freight initiative.

Discussion and Results

Presently, in order to support the movement of the movement of goods, the air cargo supply chain relies heavily on paper based documents. As a matter of fact, the average air cargo shipment produces over 30 documents starting from Certificate of Origin to Declaration of Import Goods. This heavy reliance on paper based documents is based on traditional system of transporting goods which increases transportation time, higher shipment cost, and provides the customer with little real-time visibility. Due to the large number of stakeholders exchanging information in the supply chain, the manual transfer of data is highly prone to errors. As a result of the custom documents arriving simultaneously or even after the arrival of the shipment, eliminates the ability to pre-clear goods which causes delays and also obstructs the custom officials ability to conduct targeted screening. The managing of so many documents raises the need for more resources across the air cargo supply chain which ultimately increases the overhead costs.

Furthermore, inefficient, unclear, and unpredictable customs procedures and practices contributed to unnecessary import and export costs as well as delays. With the development of trade, countries have adopted complex requirements for the provision of information. Most governments require data to be submitted on paper and also be submitted to more than one authority, which increases the cost of doing business without adding value to air cargo supply chain or for the end customer.

IATA e-freight: A paper-less initiative

The entire air cargo supply chain comes under IATA e-freight and electronic messaging standards have already been published by IATA which will replace the existing 14 documents. By contrast, IATA e-freight eliminates larger number of documents for cargo, which unlike a passenger cannot walk and talk. This calls for the immediate need for a strong process critical otherwise the cargo risks sitting immobile. Replacing paper with electronic messages enables faster movement of goods, provides better information for stakeholders in the supply chain and also helps in lowering industry costs. IATA, in fact, based on Singapore's experience has estimated that the ability to send information ahead of arrival of the shipment can help reduce shipment time by a global average of 24 hours.

Adopting the e-freight initiative can help countries to reduce their footprint on the environment. IATA has estimated that the e-freight initiative will remove almost 8,000 tons of paper per year, based on the number of paper based shipment documents presently, it is enough to fill up 80 Boeing 747 freighters. E-documents help improve the security of the shipments information as it restricts the availability of the information to those only who require them. This initiative eliminates shipment delays that occur from inconsistent manual data entry and is also less likely to be misplaced unlike the traditional paper based documents.

Benefits for implementing countries

Countries entire air freight supply chain and their economy can benefit from the move towards the e-freight initiative. Shippers will hugely benefit as a result of quicker processing times and better convenience. This reduction in processing time is driven by accurate data from the electronic information exchange as each member involved in the supply chain inputs the data into their own systems which is then electronically transmitted across the entire supply chain. Custom authorities will benefit because from more targeted screening as customs information are submitted prior to arrival of the goods. The global trade has been rapidly increasing which is increasing the pressure on the customs to ensure the faster flow of cargo but at the same time provide enhanced security. Therefore, the e-freight initiative launched by IATA helps the custom authorities to conduct a more risk management to help identify those shipments which poses high risks. As the data is electronically exchanged between the exporting and importing countries, there is a lesser chance for mis-declaration of goods. Therefore, there is a reduction in leakage of custom duties revenue which thus gives the government a direct financial benefit. To determine the value of key savings, The IATA handbook (2013) has presented the key financial table which illustrates the net benefits (US \$ billion) for a 8-year period starting from 2010. The below results (Table. 1) showed 5 key savings in terms of delivery time shortening, inventory savings, document processing, increased market shares over the modes of freight, and reduction in customs penalties.

Table 1. E-freight financial analysis (IATA Handbook V4.0, 2013)

	YEAR		YEAR		YEAR		YEAR		Total
	1	2	7	8	7	8	7	8	
COST SAVINGS									
Document Processing	\$ 1.18	\$ 1.27	\$ 1.66	\$ 1.73	\$ 1.66	\$ 1.73	\$ 1.66	\$ 1.73	\$ 11.74
Delivery Time	\$ 0.63	\$ 0.66	\$ 0.83	\$ 0.87	\$ 0.83	\$ 0.87	\$ 0.83	\$ 0.87	\$ 5.97
Inventory Savings	\$ 1.26	\$ 1.32	\$ 1.66	\$ 1.74	\$ 1.66	\$ 1.74	\$ 1.66	\$ 1.74	\$ 11.91
Reduced Customs Penalties	\$ 0.02	\$ 0.02	\$ 0.02	\$ 0.02	\$ 0.02	\$ 0.02	\$ 0.02	\$ 0.02	\$ 0.16
Market share increase over other modes of freight 1.00%	\$ 1.16	\$ 1.23	\$ 1.67	\$ 1.78	\$ 1.67	\$ 1.78	\$ 1.67	\$ 1.78	\$ 11.59
Potential Savings Subtotal	\$ 4.24	\$ 4.50	\$ 5.85	\$ 6.16	\$ 5.85	\$ 6.16	\$ 5.85	\$ 6.16	\$ 41.38
% international air freight volume e-freight enabled	38%	69%	98%	98%	98%	98%	98%	98%	
Average % penetration in enabled airports (2 year lag on enablement)	1%	15%	98%	98%	98%	98%	98%	98%	
Potential Savings Subtotal	0.02	0.47	5.62	5.91	5.62	5.91	5.62	5.91	24.00
EXPENSES									
New technology expenses	\$ (0.5)	\$ (0.6)	\$ (1.3)	\$ (1.0)	\$ (1.3)	\$ (1.0)	\$ (1.3)	\$ (1.0)	\$ (9.6)
NET BENEFIT (COST)									
Net Benefit	\$ (0.5)	\$ (0.2)	\$ 4.3	\$ 4.9	\$ 4.3	\$ 4.9	\$ 4.3	\$ 4.9	14.4
Cumulative Net Benefit	\$ (0.5)	\$ (0.6)	\$ 9.5	\$ 14.4	\$ 9.5	\$ 14.4	\$ 9.5	\$ 14.4	
Savings / transaction	\$ (4.41)	\$ (1.58)	\$ 31.94	\$ 35.16	\$ 31.94	\$ 35.16	\$ 31.94	\$ 35.16	

Not only does implementing the e-freight initiative bring tangible benefits to the shippers and other key stakeholders in the supply chain in terms of time savings and efficiency, it also provides benefits to the broader economy of the implementing countries. According to ITP Business Portal (2011), savings on paper amounts to a staggering \$ 5 billion which can potentially save the airline industry and end-to-end cycle for the shipment will also be reduced to 24 hours as a result of implementing e-freight initiative. E-freight cost savings would represent nearly 2% reduction in the overall cost of moving goods from the consignor to the consignee via the air cargo supply chain. The reduction in transportation costs can significantly stimulate the trade between the countries and

thus help in the economic growth for those countries and also increase the prospects for their respective geographic regions. According to Organisation for Economic Co-operation and Development (2013), a 1 % reduction in trade transaction cost, which is measures as a proportion to the value of world trade can lead to increase in world income by around US \$40 billion. The direct benefits of a faster, more reliable and efficient supply chain for both the shipper and the consumers combined with a broader economic benefits adds further strength to argument in support for widespread e-freight implementation.

To provide a practical example, Case study of Lufthansa Air Cargo, German based cargo airline which operates air freight and logistics services worldwide, summarized the e-freight benefits across their 137 stations as follows:

- E-freight implementation can help in long-term reduction of CO2 emissions.
- Implementing e-AirwayBill (eAWB) helps to reduce administrative, recycling and storage costs
- Today, 137 stations can handle consignments without printed air waybills, accounting for approximately 85% of Lufthansa Cargo shipments.
- Lufthansa cargo is slowly increasing their share of paperless shipments and are constantly developing their logistics network.

Through this subsection, we aim to provide a deep insight into the benefits that the air freight industry can receive by implementing the e-freight initiative. Moving towards the paperless air cargo industry, different stakeholders may be able to develop unique business models that will bring the intended benefits to the companies.

Challenges to implementing e-freight

For the e-freight initiative to succeed, it would require an industry wide acceptance of common procedure for digitizing the air cargo industry. If exchange of electronic messages cannot be supported by a particular country, the replacing of paper based process would not be possible and therefore, e-freight cannot be implemented in the location. Although there may be a framework in place, there should be a willingness of government authorities to implement the e-freight project. And therefore, six pilot locations were chosen: Singapore, Canada, Sweden, United Kingdom, Netherlands, and Hong Kong. In these countries, custom authorities were willing to consider an IATA e-freight project that supports their operational and regulatory processes. The countries that have already taken the step represent only one third of the volume of global air cargo. To date, the efforts of IATA and their partners to persuade other governments to adopt the e-freight initiative have only met with differing success. Notable among the countries that still do not allow e-customs clearance are the fastest-growing emerging economies which are China, India, Russia and Brazil all of who stand to benefit to a great extent by reducing long custom delays. In Russia, a private-public partnership was formed to develop an administrative framework to streamline regulations, efforts are underway to bring them on board while in China, a pilot program has already began. To date, e-freight has made little progress in Brazil and India.

Electronic customs procedures are a necessary but far from adequate precondition for global air shipping participants to take full advantage of e-freight. One condition for the true success of the e-freight initiative is the support and adoption of the paperless process by all the parties, but the air cargo industry is still far from that goal. According to World Economic Forum (2013), Even in countries where the customs procedures have been completely digitized, only 10% to 15% of all the stakeholders in the air cargo supply chain have fully implemented an e-system starting from shipper to carrier to freight forwarder, leading to a global penetration of only over 4% of air shipment globally.

Conclusion & Future Study

Facilitating international trade and global economic growth requires efficient, effective, and reliable transport. Given the increasing importance of the air cargo industry in facilitating trade between countries, lawmakers should be able to provide an environment that allows the efficient flow of cargo without the need for paper documents by replacing them through the electronic exchange of messages. That kind of environment lies in framework proposed by IATA e-freight initiative. IATA has defined a set of operational procedures and standards are aligned with the World Customs Organization and United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT). IATA e-freight provides countries with a common set of standards and processes to facilitate easier exchange electronic messages. Reliability, improved transit times and reduced costs are important in order to ensure that air cargo supply chain continues to efficiently meets the needs of the consumers. The countries must implement a framework based on common standards and processes instead of protective ones which would only further add to the complexity and cost for the air cargo supply chain.

The e-freight initiative has a very vast scope in the future. With the proposed initiative of IATA ready and fully functional, the countries can now be able to manage and hence run the entire air cargo supply chain in a much better, accurate and error free manner. The following are the future scope for the project:

- Blockchain-based air cargo billing, costing and reconciliation system. Through which airlines and freight forwarders can also update their shipments and compute charges in real-time
- A single immutable source of shipment rates for air cargo (computed and updated directly to blockchain), shipment details and billing processes via blockchain, with real-time updates given by stakeholders.
- Real-time revenue recognition to enhance efficiency for airlines, cargo agents and freight forwarders involved in the entire supply chain.

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