Chapter 5

Empirical Findings

In line with the central questions towards the empirical research, the findings from the interviews held are structured as follows: Beginning with the players within the air cargo business system – freight forwarders, handling agent and air carriers - a short overview on the activities of the interview partners' organisations is given ("Interviewed Organisation(s)"). Next it is reflected how the interview partners perceive their organisations' role and situation within the air cargo industry and especially which challenges they find themselves confronted with at the moment ("Perception Of The Air Cargo System"). This information gives a first impression on how far systemic thinking dominates the air cargo industry. Whether the spread of systemic thinking is changing under the influence of current developments is reflected in the third block of information. This third block will summarise how the interviewed organisations experience the developments currently impacting the air cargo industry, namely the introduction of electronic documentation ("Implications Of The Introduction Of Electronic Documentation"). A summary of the interview partners' vision of the future of air cargo concludes the description of the findings ("Vision Of Air Cargo's Future").

A similar structure is applied to the second half of this chapter, which reflects the findings of interviews with organisations from the air cargo system's environment: IT providers, governments and customs, competitors, customers and NGOs. Due to the different perspective of these players, slight variations to the structure can be found here. The chapter is closing with a summary of the interviews.

5.1 Players Within The Air Cargo Business System

5.1.1 Freight Forwarders

Interviewed Organisations

The three companies interviewed in their role as freight forwarder within the air cargo system are Kühne + Nagel, based at Frankfurt Airport, Panalpina, Basel, and Rhenus Alr, at Schiphol Airport in Amsterdam. All three freight forwarders are leading providers of logistics and transportation on an international level.

With an overall turnover of CHF 17 406 Mio. in 2009, Kühne + Nagel is the biggest of these three, operating in the areas of seafreight, airfreight, road and rail logistics as well as contract logistics with more than 7 million square meters and 75 million square feet of worldwide warehouse space. According to their own website, Kühne + Nagel developed from an international freight forwarder into a provider of integrated end-to-end supply chain management solutions. It is their aim to help their customers "turn their logistics challenges into a real competitive advantage". Kühne + Nagel employs around 55,000 staff in 900 offices in more than 100 countries worldwide (Kühne + Nagel 2010).

Panalpina also offers forwarding and logistics services. According to its own definition, Panalpina is specialised in the fields of "end-to-end supply chain management and intercontinental air freight and ocean freight shipments" (Panalpina 2010). In 2009 Panalpina transported 731,000 tonnes of air freight and 1,103,000 TEUs of ocean freight, which positioned it among the global top five freight forwarders in both fields. Furthermore it moved 1.15 million tonnes of non-containerized freight, resulting in a total net forwarding revenue of: CHF 5 958 Mio. in 2009 (Panalpina 2010).

The Rhenus Group is one of Europe's biggest logistics service producers with a turnover of EUR 2,7 billion in 2009. With 290 locations Rhenus employs 16.300 people. Its business covers the areas of road, rail, overseas, intermodal, customs service and consulting. Rhenus "offers customised solutions within the ranges Contract Logistics, Freight Logistics and Port Logistics for a raft of industries, optimising the entire logistics process by devoting attention to individual needs" (Rhenus 2010).

Perception Of The Air Cargo System

When describing their business, all three companies emphasise that their products are developed according to their customers', the shippers', requirements – unlike the standardised products of integrators. Their products are tailor-made, up to the point of the operation of aircrafts on customer specific routes. Whereas most of flown transportation is done by IATA carriers, Panalpina pointed out that for about 20 % of its routes aircrafts are leased in so-called wet-lease[33] (interview Panalpina). This is an expensive yet attractive solution for the freight forwarder on routes that offer no regular service operated by commercial carriers, when these routes are of central importance for a freight forwarder's customer.

Another characteristic of the freight forwarders business pointed out during all interviews is the importance of personal relationships developed over many years of co-operation. This is especially valid for the relationship between freight forwarders and airlines, but equally for the interface freight forwarder/shipper.

A source of increasing concern for freight forwarders is the rate- and yield-erosion in air cargo (interview Kühne + Nagel). The continuously reduced rates for freight, especially under the pressure of reduced demand for air transportation in connection with the economic crisis, is resulting in a diminishing price difference between smaller and bigger lots. Economies of scale disappear and it is less and less attractive for freight forwarders to bundle shipments for air transportation. Consolidation of freight for air transportation is therefore done by the airline, with the consequence that security checks, which are conducted when goods are prepared for shipping, have to happen at the airport. This slows down the air cargo process as a whole: space at the airport is often very limited and these checks lead to a "bottle neck" situation. In fact, time and quality of the air cargo business as a whole are "driven by ground-handling" (interview Kühne + Nagel). Further to the lack of space and the resulting bottle-neck effect, the handling process at the airport is the most complex interface of air cargo: it involves the co-operation of truckers who are delivering cargo at the ramp, handling agents who are preparing cargo for the flight, customs who are clearing the goods, and airlines plus freight forwarders who are coordinating the transportation to the airport. In addition to this challenge of coor-

33 Wet lease is a short-term lease of a fully equipped and insured aircraft, ready to be flown, including the crew needed to operate it over a limited time.

dinating all players, handling agents at arrival are paid by the airline but their direct co-operation partner when it comes to handling goods, their "customer relationship" is with the freight forwarder. Similarly truckers are working on behalf of the forwarding agent with the result that the customer relationship between trucker and consignee is often insufficient (interview Rhenus). While the consignee is the ultimate "customer" of the transportation, he is without influence on the choice of trucker and also tracking the awaited goods is not happening in direct contact between trucker and consignee.

Another challenge mentioned during interviews is the high number of players involved in air cargo transportation in conjunction with increasing security demands. The World Customs Organisation has introduced the concept of the Authorised Economic Operator, AEO[34], who is authorised to certify that security standards are met. At the moment, it is handling agents who can qualify for this role. This means that especially smaller freight forwarders, without their own handling operation, need to process goods through a ground-handling agent. As a result goods need to pass through too many individual transportation stages. Storage in warehouses for goods awaiting to be re-grouped and re-packed for transportation is unavoidable, slowing down the entire transportation process (interview Kühne + Nagel).

All interview-partners mentioned insufficient quality of information and lack of communication, mainly direct communication with shippers, as the source of information on cargo transported, as central challenges to air cargo. Also interfaces with shippers are not standardised enough. Ideally shippers should feed all information required for air cargo into the system in a standardised format. At the moment though there is hardly any contact between shippers and handling agents or airlines (who often also cover the handling of the goods). As a result a lot of information needed for the shipment is either incorrect or incomplete. Often freight forwarders don't even know for whom they are transporting goods (interview Panalpina).

34 An Authorised Economic Operator is "a party involved in the international movement of goods in whatever function that has been approved by or on behalf of a national Customs administration as complying with WCO or equivalent supply chain security standards. Authorized Economic Operators include inter alia manufacturers, importers, exporters, brokers, carriers, consolidators, intermediaries, ports, airports, terminal operators, integrated operators, warehouses, distributors" (WCO 2007). The AEO certificate is an internationally respected quality mark, which a company can apply for when it fulfils clearly specified criteria for compliance, record keeping and solvency. There is also a security and safety or combined certificate, which requires additionally the fulfillment of certain security criteria (Businesslink 2010).

The challenges described reflect that at the moment structures within air cargo are still linear as is the flow of information. The result of these structures is considered one of the most poignant shortcomings of the air cargo industry. This issue is further increased as the historically developed structures of the air cargo transportation process itself, the sequence shipper-freight forwarder – handling agent – air carrier – freight forwarder – consignee does not allow to meet today's requests towards speed and security of transportation at the same time. On the other hand all freight forwarders showed that a network structure of communication would be desirable as this would improve the quality of information and thus the quality of the entire air cargo process.

Implications Of The Introduction Of Electronic Documentation

Given the importance of personal contacts and communication within the air cargo business, the attempt to introduce electronic booking tools is considered problematic and has not been very successful in the past (interview Panalpina). Another aspect that proved to be an obstacle for the introduction of an electronic booking tool is the fact that sales and distribution departments within airlines often are not directly linked. As a result, rates offered in electronic booking tools are not always up to date as they tend to be set by the air carriers' head quarters. With most carriers being afraid of yield-erosion, these head quarters-fixed rates in electronic booking tools tend to be on the higher end of offerings, not floating quickly enough with the market. Instead, personally, and usually locally, negotiated rates can reflect the actual conditions of a specific market as they are offered on an ad hoc basis. They are therefore usually more competitive. British Airways though, who introduced an electronic booking tool in 2000, has managed to overcome these obstacles and is rated a "reliable e-rates system for cargo" (interview Panalpina). It is therefore to be assumed that under the pressure to cut costs following the economic crisis there will be more interest in electronic booking tools as it offers the potential to reduce staff (interview Panalpina). However, the concern still remains, that with the introduction of electronic bookings the stability of established customer relationships will suffer and that customers will be lost to the competition easily.

The introduction of electronic documentation is met with differing reactions:

Despite the fact that for the interface freight forwarder / airline it is relatively easy to implement e-freight as the standardisation of processes is quite advanced (interview Panalpina), a lot of freight forwarders are hesitant to join in at the moment. Costs for introducing electronic documentation are high for a lot of freight forwarders, as they require the investment in new, compatible IT systems. Given the current pressure on the market following the economic crisis, such substantial investments have been put on hold. Furthermore, airlines are those who are likely to benefit most at the moment from a digitalisation of documents as they would no longer lose transportation space on their aircrafts due to the transportation of papers. For freight forwarders the improvements resulting from electronic documentation will only become visible on a longer term, especially as there is no lack in time for processing the necessary data on paper (interview Kühne + Nagel). At the moment the AWB is often still needed in printed form and a speeding up of process for freight forwarders will onlybe possible once the paper-AWB has been fully replaced with an electronic document (interview Kühne + Nagel).
Rhenus, who introduced electronic documentation on a step-by-step basis, described their experiences with electronic documentation as very positive. They joined in with the digitalisation of documents from the very beginning, when only a few shipments were concerned. Participating in these first trials allowed staff to be involved in the new routine on a slow, step-by-step basis, without having to change the entire cargo procedures in one go. As far as technical adjustments are concerned, these also could be done step-by-step, which allowed the avoidance of a cut-off and full replacement of an existing IT system. Regarding the challenge of printed documents with original signatures still needed in some countries, Rhenus sends the original documents as paper documents with the goods, while all other documents are sent electronically. It was also suggested, that in order to overcome the obstacle of costs related to a move to the digitalisation of documentation airlines should pass on some of their savings to freight forwarders, especially as freight forwarders find themselves more and more under pressure by integrators (interview Rhenus).

Despite the different approaches towards the introduction of electronic documentation for air cargo, all interview partners pointed to the fact that since the beginning of IATA's C2K and e-freight project more and better information is being exchanged between all players of the air cargo business. They all emphasised that in particular IATA's Messaging

Improvement Programme, MIP, has improved the quality of information drastically. They also all agreed that it is as a result of these projects that all players of the air cargo system have got together for the first time to discuss the processes and procedures of their industry and its needs for improvement.

Vision Of Air Cargo's Future

As far as future developments of air cargo are concerned, these can be divided into more operational, process related aspects and more general, visionary aspects. With regard to the operational aspects, all three freight forwarders mentioned that a change to the structure of the air cargo process is needed in order to achieve leaner processes. Only then air cargo can be improved as a whole and become competitive again. Airlines should concentrate on moving goods and refrain from other elements of the process, especially from handling goods. Generally security checks should be moved away from the airport in order to avoid the current "bottle-neck" problems there. Bigger logistic providers should be allowed to become AEOs as this would allow them to carry out security checks for smaller freight forwarders whose shipments they could consolidate (interview Panalpina). Such a change in processes would render airport processes leaner and faster as goods could be delivered straight to the aircraft (interview Kühne + Nagel).

For a real improvement of the air cargo business it would be important for more information to be exchanged throughout the process (interview Kühne + Nagel). Clear standards and quality requirements for data supplied for by shippers, a standardised shipping order, would reduce loss of time at interfaces. This would improve the overall transportation time and render air cargo more competitive again. Furthermore it would ensure that at the point of export clearing all needed information required is available and at hand without having to go back to the shipper for it (interview Panalpina).
At the moment most of the quality standards set regard the quality of information from airline to airline, and not, for example, from shipper to consignee (interview Panalpina). A standardised shipping order would therefore also result in a significant improvement for air cargo and subsequently in cost reduction, thus contributing to a more competitive air cargo. Such a standard, applicable on a global level, cannot be introduced by a single freight forwarder though (interview Panalpina).

As all freight forwarders mentioned, it would have to be promoted by a third party, a player from outside the air cargo system, instead: either by an organisational body of the freight forwarding industry or of the air cargo business system. The IATA-initiated C2K project for an improvement of communication within the air cargo system is regarded as such an independent venture due to its independent management. It is therefore widely supported within the industry. As described by von Helldorff, participation in the C2K project is considered a "must" today, an "integral part of a pro-active attitude in regards to track and trace of cargo" (interview Kühne + Nagel). All interviewed freight forwarders pointed out that beyond an introduction of e-booking and standardised shipping orders, easier and more standardised requirements towards the storage of documentation for non-customs requirements (mainly tax) would be highly desirable.

The processes in place within the air cargo system date back to the 1960s. All freight forwarders agreed that new processes and information standards are needed as well as a 3rd party "Design Supervisor" for their development. Ivo Aris of Rhenus even went as far as to say that an entirely new business model is needed for air cargo. IATA has initiated changes to air cargo via a 3rd party organisation in the form of the C2K initiative. Participation in C2K though is by choice and agreements can only be binding for its members.
The separation of the flow of goods from the flow of information rendered possible through digitalisation of information is a central device to improve and speed up processes (interview Rhenus). A 3rd party, from outside the air cargo system, who could enforce or even just promote such an introduction throughout the entire air cargo process, has not found yet been found. In order to gain further support from the freight forwarding industry for the introduction of digitalised documentation, IATA is negotiating with FIATA[35] a standard agreement for the use of an electronic AWB, the FWB, on a global level (interview Rhenus). It is difficult for FIATA and IATA to develop and establish globally applicable procedures for freight forwarders. Since the EU council, the US ministry of justice and the Swiss ministry of economics have accused freight forwarders of price-fixing (Spiegel online 2008), FIATA is working more as a consulting council aside IATA. Therefore, whereas IATA can issue resolutions, which are binding for its members, FIATA is operating

35 FIATA is the "Fédération Internationale des Associations de Transitaires et Assimilés" or International Federation of Freight Forwarders Associations

merely as a forum for its members.

Generally freight forwarders expect a further consolidation within the air cargo business and a centralisation within the freight forwarding industry with the big freight forwarders being likely to own the business process. Such a development would be similar to the consolidation that can already be observed for transportation by sea: Whereas 10 - 20 years ago around 80 % of all container space for transport by sea was sold via shipping companies, today it is around 65 % (interview Panalpina).

5.1.2 Handling Agents

Interviewed Company

Swissport Cargo Services is "the world's largest dedicated air cargo ground services company". It is part of Swissport International Ltd., which is owned by the Spanish infrastructure and service corporation Ferrovial. Swissport Cargo Services offers traditional ground handling services, including acceptance and delivery, document handling, build and break-down, transfer, bypass and trucking services at around 90 locations world wide. On average, Swissport Cargo Services handles about 2,8 million metric tonnes of cargo for over 300 customers per year (Swissport 2010).

Perception Of The Air Cargo System

The air cargo market is a low cost business: fixed costs are high, margins are low and huge volumes are required to run a profitable business. As volumes in 2009 were 30 % below the previous year, the pressure on shippers as well as on all players within the air cargo system was enormous (interview Swissport). There was less cargo to fly while costs for air carriers remained at an unchanged level due to their high and fixed fleet costs. Handling agents have felt the dramatic pressure of the economic crisis on the air cargo market: "The cargo market went through a dramatic change during 2009 and this made everybody look at the value of Cargo Handling Agents" (Swissport 2010). And with no real improvement in sight for 2010, according to Philipp Joeinig, Swissport had to differentiate their offering in order to create a competitive advan-

tage. In reaction to the challenges resulting from the difficult market situation, Swissport has taken a pro-active step and "reinvented" itself (Swissport 2010). This reinvention is reflected in three major initiatives for 2010 with a strong focus on customer relationship management and improved services to Integrators.

As far as the general structure of the air cargo market is concerned, one of the central challenges from Swissport's perspective is the fact that currently it is very fragmented: too many different players are involved in the market at the moment and processes and procedures need to be re-designed. Also Swissport, like the freight forwarders, pointed to a need for new and different structures especially at the airport as current set-ups result in the described bottle-neck effect: at the moment freight forwarders and handling agents are both air-side, with freight forwarders off-loading and splitting goods air-side. As a result too many cargo-related activities are taking place air-side at the airport where only very limited space is available.

Another issue for handling agents has been mentioned by freight forwarders: the fact that the customer relationship exists between the airline and handling agent, while at the same time freight forwarders negotiate the modalities of air transport with the air carrier. These negotiations between freight forwarder and air carrier though also include quality standards applicable to the service of the handling agent. As a result, handling agents find themselves measured against agreed service levels which can be imprecise or unrealistic. A typical example is the agreed time of arrival and of departure for goods. If not specified, these times can refer to "Landing time" of an aircraft or "on blocks"[36] and to "off blocks"[37] or "air-borne"[38]. The time needed for taxiing on the tarmac, between the touch down of an aircraft and its final parking position for unloading cargo, can take up to 90 minutes. As "on-time" is one of the most important quality criteria by which the handling agent's work is measured, and as timeframes are very tight, such aspects of a handling agreement can be a source of major issues (interview Swissport).

With handling agents being placed at the most complex interface within

36 i.e. in its final parking position for off-loading.
37 i.e. the moment, the blocks are taken away from the aircraft, giving it free for taxiing to the runway.
38 i.e. the moment the aircrafts wheels don't touch the tarmac anymore, the moment of take-off

air cargo – the point of hand-over from freight forwarder to airline including customs clearing – good communication to all other players of air cargo, at least prior to the air transportation or following the air transportation, is of central importance in order to be able to deliver a good and competitive service. The obvious complexity of this situation and the multiple contacts involved for a handling agent, require handling agents to "see the bigger picture". They therefore contribute to their perception of air cargo as a network if not a system.

Implications Of The Introduction Of Electronic Documentation

With transparency of its services being one of the central focuses of Swissport for a differentiation in the cargo market, it is important for Swissport to offer full track-and-trace of goods to its customers. The introduction of electronic documentation is therefore welcome as it enhances track-and-trace facilities and as mentioned by Swissport in the interview, electronic documentation for air cargo is a "must", the only question remaining is therefore when the implementation of digitalised documentation will be completed by.

Vision Of Air Cargo's Future

To improve air cargo and optimise the processes and structures, "the supply chain character" will have to be further established (interview Swissport). In particular, a closer co-operation with freight forwarders is a development handling agents would appreciate - an issue also mentioned by freight forwarders. Handling will remain a business in its own rights though due to the special know-how required for the handling and storing of a lot of goods transported by air cargo (interview Swissport).

5.1.3 Air Carriers

Interviewed Companies

The air carriers interviewed for this research are Air France / KLM, Cargolux, Emirates SkyCargo, Lufthansa Cargo and Swiss WorldCargo. Their products and services vary with Cargolux being a cargo-only carrier and the other carriers being the cargo division of an airline, therefore operating belly-freight as well as cargo-only aircraft. Both Lufthansa Cargo and Swiss WorldCargo are part of the Lufthansa Group. Table 1: "Interviewed Air Carriers – Background Information" gives an overview of the different size of the interviewed cargo carriers and their businesses:

Name of Airline	Air France / KLM[39]	Cargolux[40]	Emirates Skycargo[41]	Lufthansa Cargo[42]	Swiss WorldCargo[43][44]
Main Hub	Charles-de-Gaulle Airport, Paris, FRSchiphol Airport, Amsterdam, NL	Luxembourg Airport, Luxembourg	Dubai, UAE	Frankfurt Airport, D	Zurich Airport, CH
Cargo transported in 2009 in tonnes	1.44 million tons	4.8 million FTK627'814 metric tonnes	1.6 million tonnes	Freight and mail: 1.52 million FTK FTK sold: 7.42 million FTK	Freight and mail:1.260 million-Tonne Kilometres Transported TKT
Revenue	2.8 billion EUR	1.552 billion USD	1.7 billion USD	1.951 billion EUR	225 million EUR
Employees	5'000	1'482	No data found	4'568	305

Table 13: Interviewed Air Carriers - Background Information

Like the size of the companies, the way these carriers position themselves in the market and how they sell their products varies.
Emirates SkyCargo, the air freight division of Emirates Airline, offers its customers "comprehensive cargo solutions". With the aid of their own electronic logistics system "SkyChain", Emirates enables its customers, the shippers, to check flight schedules, space availability, make bookings on-line, submit and print air waybills, print bar-code labels, file

39 source: (Air France 2010)
40 source: (Cargolux 2010)
41 source: (Emirates Skycargo 2010)
42 source: (Lufthansa 2010)
43 source: (Swiss Cargo 2010)
44 Data for 2008.

and track claims, and set up their default contact details to receive automatic notifications on the movement of shipments as well as to track consignments in real-time. As Emirates describes itself, they are thus "changing the way the cargo business works, empowering our customers with the tools they need to control their consignments better" (Emirates SkyCargo 2010).

CSwiss WorldCargo defines itself as an "innovative service provider", "focussing on care intensive solutions for logistics companies". Next to being a "wholesaler for airport-to-airport airfreight", Swiss WorldCargo offers regular truck connections between key business centres (Swiss Cargo 2010). Swiss WorldCargo operates in a niche market, focusing on pharmaceuticals and high value goods for transportation. Their contact with shippers is one of their assets and therefore more intense and frequent than that of other airlines (interview Swiss Cargo). Due to this focus, Swiss WorldCargo has developed a close co-operation with specialised, selected freight forwarders. This co-operation allows a joint optimisation of their transportation service towards shippers. This close co-operation is further enhanced by a sophisticated quality management system that Swiss WorldCargo developed, based on the "milestones of the C2K project" (interview Swiss Cargo). Furthermore, along Emirates SkyChain, Swiss Cargo has developed its own electronic logistics system Swiss-works (interview Swiss Cargo).
Lufthansa Cargo, Swiss Cargo's sister company, has also established close relationships with selected freight forwarders: in 1997 Lufthansa launched a "global and regional top customer program" to improve co-operation between the airline and freight forwarders. In the meantime, several forwarding companies have interlinked their business processes closely with the services provided by Lufthansa Cargo (Lufthansa 2010). Similar to Swiss Cargo, Lufthansa Cargo is directly acquiring contracts from shippers and freight forwarders. As a consequence of this, efficiency can be improved drastically due to shorter ways of communication, resulting in better cost-effectiveness (interview Lufthansa Cargo).
Air France is part of the Air France/KLM Group. Like the other carriers, Air France/KLM also offers road feeder services. This service is offered in Europe with connections to the carriers' main hubs at Paris Charles de Gaulle Airport and Amsterdam Airport Schiphol. Like the other cargo carriers, Air France emphasises the importance of quality of service, referring to C2K for quality measurement and management (Air France 2010).

Cargolux, with a background of "40 years of experience" is the largest all-cargo airline in Europe and one of the biggest air cargo carriers worldwide, offering scheduled as well as charter cargo transportation. As described on its own website, Cargolux is a dedicated cargo airline and therefore "able to offer tailor-made services to our customers worldwide. We provide them with flexibility, reliability, and above all with expertise" (Cargolux 2010). In addition to flying goods, Cargolux is offering extensive road feeder services in several countries, mainly in Europe and North America. Whereas Cargolux pointed out in its interview that it sells most of its capacity via freight forwarders and logistic providers and does not necessarily need consignees to know who is flying the goods (interview Cargolux), if requested, they do arrange pick-up and delivery to and from their shipper's production facility (Cargolux 2010).

Perception Of The Air Cargo System

During the past 20 years processes and procedures have remained generally unchanged and despite its undisputed advantages, even C2K is still a relatively "small club" (interview Cargolux). This is in part attributed to the fact that there has not been much pressure for the industry to adapt: air cargo is used because of its speed and reliability and for a long time customers had no alternative for transporting goods at high speed over long distances. This has changed though; in part due to competition within the air cargo industry itself, given the overcapacity of transportation space following the economic crisis and in part due to competition from other transportation providers. Whereas Air France considers integrators clearly as the biggest competition for air carriers as they currently control the air cargo chain (interview Air France), Cargolux sees a much bigger threat to air cargo in long distance train connections such as the Shanghai-Hannover route, which can transport goods from China to Germany within 14 days (interview Cargolux). Opposed to Air France's view, in Cargolux' experience, integrators haven't really taken a share of their traditional air cargo market.

Generally it is agreed by all interview partners though, that the competitive advantage of air cargo based on its speed of transportation – a formerly undisputed strength– is challenged by its competitors, even more now as the importance of price for transportation and environmental aspects are also taken into account by customers when deciding on the best solution for its transportation needs. Time is therefore crucial

for air cargo. It is the "fourth dimension" of air cargo and has become an integrated dimension of the business process (interview Emirates), especially as most companies do not keep any inventory stock anymore. Paper documents though slow down the air cargo process, mainly due to lost, incomplete and incorrect documents. These missing or incomplete documents also pose big problems to freight forwarders as fines are issued by customs for goods arriving with incomplete documents or even without any documents. Often these goods have to be stored in a warehouse at customs until documentation is complete or they are even sent back to their point of departure, being denied customs for clearing. Apart from fines and delivery delays the goods quality can suffer and for both the shipper and consignee hassle, delay and costs are the result. All carriers interviewed pointed to the fact that better data quality therefore is needed. Insufficient information and documentation is still one of the central challenges of air cargo at the moment, despite agreed quality standards which are, as for example with Swiss Cargo, even integrated part of the Service Level Agreements between the air carrier and its partners. Interfaces in particular are still a major challenge and the quality of information attained is poor in comparison to what should be attainable (interview Swiss Cargo).

As mentioned by freight forwarders, personal relationships are of central importance in the air cargo business with most relationships being built over a long time between the local employees of the carrier and those of the freight forwarders (interview Lufthansa Cargo); these are very "organic" developments (interview Cargolux) and they seem to dominate structures within the air cargo industry. Despite their strength, all interviewees mentioned that these relationships are mostly local and bilateral. Generally the industry is considered as very fragmented.

Implications Of The Introduction Of Electronic Documentation

All carriers consider the biggest potential saving in regards to time to lie within IT. Electronic documentation will allow access to real-time information (interview Emirates). Moving to electronic documentation would therefore be a way to improve data quality: Electronic documentation is "in the heart of what the industry needs" (interview Swiss Cargo); or as Lufthansa states on its website: "Lufthansa Cargo actively supports C2K and manages the StB project for the introduction of "e-freight" in Germany. As a result, Lufthansa Cargo will in future be able to offer

better data quality, a more effective supply chain, as well as better customer service at lower costs" (Lufthansa 2010).

From Lufthansa's experience it is particularly shippers who are interested in e-freight due to improved information quality and the reduction in missing documentation (interview Lufthansa Cargo). All carriers pointed to the fact that electronic documentation will allow to meet this request of the shippers for improved information quality, as it would even require a further standardisation of documentation and procedures.

Despite these advantages, there are various obstacles which so far have slowed down the introduction of electronic documentation by air carriers: Some of them are human factors, some of them have a legal background or are related to questions of data security, some are of technical nature.

The readiness to participate in electronic exchange of documents and information is a mindset (interview Emirates). On one hand, the air cargo industry is slow in adapting to change and the necessary shift in mindset is perhaps easier to obtain over time, with the natural change of generation in staff and management which might make it easier to gain support for a change in processes and procedures (interview Cargolux). On the other hand, a lot of managers focus primarily on processes directly regarding their own organisation, given the economic pressure under which their organisations are. There is therefore a lack of interest in developing and implementing a solution for the entire air cargo system. Leadership and strong communication would be needed in order to implement e-freight over the entire air cargo business (interview Swiss Cargo). IATA's projects are considered as a huge improvement, but it is also mentioned that as an air carrier organisation, it cannot enforce the participation of all players and the execution of changes is up to the individual participants.

Another human factor is an important social issue: the project is a source of fear with regards to job losses within freight forwarders, air carriers and customs. A support of the introduction of electronic documentation by a strong change management is therefore necessary (interview Air France).

Reservations in regards to the IT solutions available, mainly in regards to data security, form a further source of obstacles for the introduction of electronic documentation (interview Lufthansa Cargo). Several players are concerned that customer contacts and negotiated rates and conditions might become easily accessible to competitors if documents

are digitalised and separated from the goods.

Another concern voiced is related to insecurity in regard to complex information systems, accessible by various players simultaneously. Paper documents containing incorrect or insufficient data are corrected manually as errors are identified during the transportation process. All changes are visible as the same document is always amended. However, on an electronic FWB it is not easy to identify which amendments were made when (interview Air France). Furthermore most changes introduced by e-freight are "translations" of existing processes documented on paper to an electronic format; the process in itself remains unchanged (interview Cargolux). Also at the moment, FWBs are still printed in three copies: one for accounting, one for exportation documentation and one that is sent to the next receiver of the goods in question along their transportation movement (interview LH). Information from FWB could get lost if data processing systems of air carriers and freight forwarders are not fully compatible (interview LH).

Furthermore, there is a technical challenge to the introduction of electronic documentation: when goods are trucked –apart from when the trucking is part of freight forwarding, some "flights" are carried out as trucking - the provision of information for controls and checks is still causing difficulties if the accompanying documents are in an electronic format (interview Lufthansa Cargo). For the moment it is therefore only flights that are accompanied by electronic documents, neither road feeder services nor cargo trucked under a flight-number can be accompanied by electronic documents.

Also some legal requirements are still a source of hesitation for the introduction of electronic documentation: the requirements to store data securely is resulting in the need to implement and maintain enormous databases, causing development costs (interview Air France).

Last but not least, air carriers are struggling to find the necessary financial devices and manpower to implement a change to electronic documentation within their organisations due to the enormous pressure resulting from the financial crisis (interview Lufthansa). A lot of players are under financial pressure and therefore focus on investments that contribute to an instant increase of revenue. In addition, freight forwarders feel that air carriers should push for the move to electronic documentation and that they should carry the biggest share of investments required as they will be those to profit most from this change (see Paragraph 5.1.1 "Freight Forwarders"). Air carriers however feel that currently they are the only ones financing a move to electronic documentation, while freight forwarders and other players of the air

cargo system are profiting from the improvement in data quality this move is providing (interview Air France).

Despite all obstacles and hesitations, the industry's interest in electronic documentation is growing and all carriers mentioned that discussions around the introduction of e-freight have resulted in improved communication within the air cargo industry. It is considered one of IATA's biggest achievements that they managed to bring all players of the air cargo system together (interview Swiss Cargo).

Other promoters for a move to electronic documentation from the air cargo system's environment, next to IATA, are Customs. Whereas an earlier attempt, initiated by IATA some 20 years ago was stopped by customs (interview Lufthansa Cargo), at the moment they are the ones that are promoting the implementation of electronic documentation and standardised information requirements. Customs in many countries are keen on implementing e-customs in order to ease and improve security checks, as their main task is shifting from financial protection to protection from crime and terrorism (see also paragraph 5.2.2 "Governments: Customs"). This promotion of electronic documentation for cargo is expected to have a strong impact on the further development of air cargo as a whole: starting from e-customs, electronic documentation will eventually be implemented throughout the air cargo system and air carriers will have to adapt (interview Cargolux).
Drive and support from the consignees' and shippers' side for an implementation of electronic documentation is felt as less strong at the moment and some carriers mentioned that they would consider it supportive if more shippers pressed for a move to electronic documentation by freight forwarders. At the moment it is mainly customers with perishable goods – like pharmaceuticals (see also paragraph 5.2.4 "Customers: Shippers and Consignees") – for whom electronic documentation is attractive as for them it is of interest to have full transparency over the transportation (interview Cargolux). Track-and-trace allows those shippers to know at any point in time, where goods are and to follow up on whether climate and transportation conditions are optimised throughout the entire process. Perishables contribute only to 10 % of the entire air cargo industry though. Also from the freight forwarders side a "critical mass" will be needed in order to achieve a change in the industry.

All carriers agreed that electronic documentation is considered an

improvement to air cargo. Some of them are sceptical though as several aspects of processes, mainly regarding customs and taxation, are not standardised yet. There was also criticism that the move to electronic documentation is being developed along existing paper-documented processes. Air carriers feel that modern electronic information and communication technologies offer possibilities to improve the air cargo system which cannot be realised to their full extent when these technologies are applied to existing structures. Instead, they would welcome if the entire air cargo processes and procedures were re-defined.

Vision Of Air Cargo's Future

With IATA's projects the various players of the air cargo system, including customs, came together for the first time to jointly discuss how to improve processes and procedures. Their joint discussions have triggered an independent dynamic within the air cargo industry (interview Lufthansa Cargo). These discussions will have to continue and be further intensified: according to Air France, air carriers still haven't defined clearly enough what information they need and as a result the data received via FWBs is not sufficient at the moment. To develop a tool that really supplies all the information needed for air transportation it would be important to develop this in closer co-operation with freight forwarders and customs (interview Air France).

Regarding the future development of air cargo, better capacity management is needed together with a clearer definition of the roles undertaken by the various players within the air cargo business process, according to Ram Menen of Emirates. Furthermore, multi-modal and integrated intermodal transportations will be more frequent in order to combine different modes of transportation more effectively. In literature these are described as parallel and serial multi-modal transportation[45]. The parallel use of airfreight and seafreight, for example, can significantly reduce the need to keep safety inventories. And serial multi-modal transportation allows optimal the use of the advantages of individual forms of transportation for a specific sector of a route (Abele 2008). Generally, a "modal liberalisation" is needed in the cargo industry according to Ram Menen.

45 According to Abele, "parallel multi-modal transportation can reduce logistics costs by up to 50 percent for goods with a value density between EUR 15 and EUR 80 per kilogram" (Abele 2008).

The expectations of possible future roles of the various players within the air cargo system vary: some consider it as difficult for freight forwarders to own the air cargo system as they don't know which facilities and capacities are available. Furthermore there will be liability issues if freight forwarders own the process (interview Cargolux). Others however pointed to the fact that the freight forwarders' role in the supply chain has already evolved– for example in the case of DHL and Schenker through acquisitions of the logistics providers Exel and Bax - and that airlines will focus in the future on their expert role of transporting goods through the air in supply-chains defined by shippers and consignees (interview Emirates). According to Ram Menen, it is not air carriers that define air cargo, but the air cargo's customers: Shippers and consignees with their inventory management and logistics which are crucial for the success of the supply chain overall will set the expectations for the air cargo industry.
During the interviews all carriers welcomed the fact that IATA's projects brought all players of the air cargo business process together. They all agreed that this was an important step to overcome structures of the air cargo business that had developed historically but that no longer suffice today's requirements towards a competitive air cargo industry anymore. Also, all carriers mentioned how a more systemic approach towards the air cargo system is considered desirable by the players themselves.
They all said that they would welcome more joint discussions and closer co-operation - especially with freight forwarders – within the air cargo system. They also all emphasised that further quality standards for information and documentation and a more network-like structure for the exchange of information would be desirable as these would allow to accelerate transportation and thus render air cargo more competitive again.

Interestingly enough, all carriers feel that future developments of air cargo as a business are likely to be driven by players of the air cargo system's environment, either IT-providers, shippers, customs or a yet to be found neutral 3rd party. Whereas some expect the development of supply-chains to be the most shaping aspect, others are of the opinion that customs' requirements, especially safety regulations, will drive the development of processes and procedures. Others again felt that technical developments mainly in the field of information technology would determine how air cargo will evolve.

5.2 Stakeholders Of The Air Cargo Systems' Environment

5.2.1 Suppliers: IT Providers

Interviewed Organisation And Its Role In The Air Cargo System

Under the tradename of Traxon, Air France, Lufthansa, Cathay Pacific and Japan Airlines launched the "Global Logistics System Europe Company for Cargo Information Services GmbH" in 1990. The aim of Traxon was to provide a global communications system, "facilitating the exchange of information between airlines and cargo agents" (Traxon 2010). Today Traxon operates in Europe, the US, India, Mexico and Morocco. Traxon is one of IATA's co-operation partners in the e-freight project.

Traxon has been working on the development of an IT solution for electronic documentation of cargo for over 15 years and was involved in the development of IATA's e-freight project as one of the first IT providers (interview Traxon). Products of Traxon include document processing, track- and trace facilities, network, schedule and booking tools. The solutions currently offered for the exchange of electronic data are an exchange via Electronic Data Interchange EDI or via a cargo specific communication system. As an alternative, Traxon offers a web-based solution where e-freight information and data are exchanged via the Internet in the form of a central document and message management system, based on shipments and including archiving according to national rules.

Implications Of The Introduction Of Electronic Documentation

At the beginning of IATA's e-freight project, no possibility for capturing and processing data electronically existed and documents were exchanged in paper format between the players of the air cargo system. Communication between the players of the air cargo system was therefore bilateral and linear, and the industry seemed very fragmented, when

Traxon first joined IATA's e-freight project. Insufficient data quality of these paper-documented processes was one of the central issues of the air cargo industry.
The development of the e-freight project was described by Traxon as a maturing process: whereas in the beginning it was mainly air carriers and freight forwarders who were involved, it soon became apparent that shippers also needed to be included in the e-freight development process (interview Traxon). Traxon's involvement in the e-freight project was described as focused on developing technical solutions for the air cargo process in response to the needs identified in the course of the e-freight project. IATA was the driving force in bringing all players of the cargo system together and in initiating the introduction of electronic data processing within the air cargo system.

According to Traxon, the e-freight project brought all players of the air cargo system together for the first time. For the first time therefore, all involved parties exchanged their views, needs and pre-occupations in regards to the air cargo process. These exchanges and the developments around e-freight have changed the way other players view the introduction of electronic documentation for air cargo (interview Traxon): airlines worried that customs would be one of the major challenges for an electronic air cargo process in so far as a handwritten signature and stamp are required for the verification of documents, namely the Certificate of Origin, for customs clearing. In the meanwhile though, one of the biggest changes triggered by the discussions around e-freight is the fact that customs have realised that a move to electronic documentation is feasible and realistic, especially where exports exportations are concerned.

Vision Of Air Cargo's Future

As far as future developments of IT solutions for air cargo are concerned, Traxon promotes especially its concept of a central communications platform that will "guarantee seamless electronic air cargo communication along the entire airfreight chain" (Traxon 2010). Such a solution would allow all players of the air cargo system to access one central data bank for the exchange of information regarding a shipment. Access would be password-protected.
Before this concept of a central platform can be introduced, two challenges of central importance will have to be overcome: one is the general

scepticism towards data security of such web-based applications and IT providers will have to make sure that identification and access to these databases are absolutely secure (interview Traxon). The other challenge is regarding the diversity of international legal requirements. A further standardisation of import and export processes and procedures will be needed on an international scale in order to successfully implement electronic documentation for the entire air cargo system (interview Traxon).

5.2.2 Government: Customs

Interviewed Organisation And Its Actual Role In The Air Cargo System

Global trade has been growing at exponential rates during the last decades: while international trade took a period of 100 years from 1900 to 2000 to double in value, it has doubled again since 2000 (Hoekman, Kostecki 2009). Within the customs space of the European Union (EU) alone – currently the largest trading space in the world with a population of nearly 500 million - 183 million customs declarations were completed in 2007, equalling 5.5 declarations every second. Around 1,545 million tonnes of sea cargo and 11.7 million tonnes of air cargo are checked each year within the EU customs space (EU Customs 2010). Also cross border flow of direct foreign investments has grown at an impressive rate: since 2000 it grew 10 times faster than world production (Hoekman, Kostecki 2009). It is therefore to be expected, that despite the current recession and the related slow down in world trade, the global exchange of goods is likely to continue to grow.
Ensuring the application of relevant legislation whenever this amount of goods is moved across borders is the general role of customs. Looking at some of the customs own websites across the globe it becomes apparent that not only the legislation applicable might differ but also the way customs describe and define their role. For example US Customs and Border Protection, which is part of the US Department of Homeland Security, has "a priority mission of keeping terrorists and their weapons out of the U.S. It also has a responsibility for securing and facilitating trade and travel while enforcing hundreds of U.S. regulations, including immigration and drug laws" (cpb 2010). China's customs' working guidelines describe as central focus the responsibility to "exercise law-based administration, keep the national gateway, serve the national economic

interests and promote social development". Working guidelines further describe its team-building principle ("to make Customs personnel politically staunch, professional and reliable") and the desired spirit for its workforce: to "be loyal and upright to revitalize the Customs and rejuvenate China" (China Customs 2009). Then again, the Taxation and Customs Union of the European Community describes its role as follows: "Customs are in a unique position today to be able to facilitate trade and protect the interests of the European Union and its citizens. Customs authorities implement EU policies in almost every field connected with international trade. They are in the front line in the fight against fraud, terrorism and organised crime" (EU Customs 2010).
Whereas US customs puts a strong emphasis on the defensive and anti-terrorist aspect of their activities, Chinese customs emphasises the administrative importance of its customs, and EU Customs begins its own description by lining out its role as trade facilitator. Despite these very different definitions of their role and primary focus, the different customs authorities show a lot of joint activities aimed at standardising processes and procedures internationally on a supra-national level, e.g. EU Customs Union[46] or the World Customs Organisation.

Next to these efforts for internationally applicable standards for border processes and procedures, developments regarding customs have been characterised by ever tighter security checks and safety requirements since the terror attacks of 11th September 2001. Similarly to those put in place by the US Customs and Border Control, the European Commission has issued legislation requesting information related to cargo coming in by sea to be submitted before vessels leave their harbour of departure. Customs of the intended off-loading country has to issue a permission to import these goods or import is denied (so-called "no load decision"). As far as cargo by air is concerned, all information needs to be submitted to customs at the airport of arrival four hours before goods arrive. The intention of these changes is to avoid the landing of unwanted goods in the port of arrival – a security measure. It also contributes to avoiding delays of transportation which can derive from finding unwanted imports within a shipment. At the same time it allows leaner and faster clearing processes, as the speed of customs clearing is highly important in regards to the attractiveness of a harbour or an

46 EU Customs Union, with Dutch Customs being part of it, is a system constructed with the intention of creating "a unique economic and political partnership between 27 democratic European countries" in order to achieve "peace, prosperity and freedom for its 498 million citizens — in a fairer, safer world" (EU org 2010).

airport. With information being supplied before the arrival of the incoming goods, their clearance can be prepared and administered before they reach the harbour or airport. These requirements promote a move towards electronic documentation for international cargo shipments as they require the separation of information and documentation from the goods they concern. For this research Dutch Customs at Schiphol Airport, Amsterdam, was interviewed. The Netherlands are member of the EU Customs Union and Schiphol Airport is one of the most advanced customs within the EU, and worldwide, in regards to the implementation of electronic documentation for cargo.

Implications Of The Introduction Of Electronic Documentation

Since the creation of the EU Internal Market on 1 January 1993, excise goods in duty-suspension within the EU had to be accompanied by a paper-based document called the Accompanying Administrative Document (AAD) and a guarantee securing the movement financially. The purpose of this system was to monitor goods so it was ensured that duty was paid whilst rendering the movement of goods within the EU easier by avoiding repeated duty payment procedures. Due to high levels of fraud, mainly regarding tobacco and alcohol, a computerised trader-to-trader link via customs was put in place thus avoiding manual interfaces and allowing better control. This system is called EMCS and was a first step towards "e-customs", which is the aimed for clearing process by EU customs (EU customs 2010). Related to the "e-customs" project is the so-called "Free-zone Type 2" development, designed five years ago by the European Commission and already implemented by some of the EU countries.[47] Free-zone Type 2 limits the obstacles to the movement of goods across borders to an "administrative fence" (interview Dutch Customs). Within the Free-zone Type 2, goods are only checked on a random basis and most border-crossing traffic is dealt with only administratively by customs.

Despite these advantages, gaining support for e-customs proved to be rather difficult as any introduction of new technologies and reorganisation around new processes and procedures imply the involvement of costs and staff time. As most companies have extremely lean processes

47 Countries with type II free zones: UK, The Netherlands, Italy, Ireland, Germany, Finland, Estonia, Czech Republic, Cyprus (EU Customs 2010).

and limited staff, finding resources to test and implement these new technologies is often difficult (interview Dutch Customs). On the other hand, discussions around the development and implementation of Free-Zone Type 2 have already led to a "boost in communication" between customs and airlines (interview Dutch Customs). Though customs would like to stay outside the (air) cargo business as the business and its developments should be driven from within the system (interview Dutch Customs), momentum triggered by customs and its organisations contribute substantially to a change within the air cargo business system.

Vision Of Air Cargo's Future

Similarly to freight forwarders, customs promotes the idea of moving the verification of compliance of imports with applicable legislation of transit and final destination countries away from the airport, closer to the original shipper. In fact Dutch Customs' goal is no longer to interfere between "wheels touching the ground and delivery to consignée" (interview Dutch Customs). Instead goods shall be cleared via "e-customs", an electronic data exchange where freight forwarders and preferably shippers supply all relevant information for the goods concerned electronically and prior to their arrival. Such a development as e-customs clearing requires the co-operation and support of all the involved goods moving players of the air cargo system: freight forwarders and truckers, handling agents, shippers and airlines as they need to provide all the required information correctly and on time.
A development reflecting how security checks, which used to be conducted at the airport of departure, have moved towards the shipper is the introduction of the previously mentioned Authorized Economic Operators. According to the WCO, AEOs allow faster processing of goods by customs mainly through reduced examination rates. They are part of the development of international security standards developed under the so-called "SAFE Framework" in order to achieve "uniformity and predictability" and thus reduce multiple and complex reporting requirements (WCO 2007).

Another change in processes and procedures of the air cargo system which is promoted by Dutch Customs is the development of a shared database fed with data by the producing units of the shippers when they are preparing shipments. This way comprehensive and correct

information for the clearing of goods could be sourced directly from one central databank for the entire transportation. With regards to exports, establishing such a central database is a very realistic option and, in fact, for clearings at Schiphol Airport Amsterdam, the product "Cargonaut" is a widely accepted technical solution for it. Producers feed their information into this database, which then feeds export control systems. Also one of the most critical factors in projects like this could be solved here: the question of who is financing which elements of the development. In the case of Cargonaut, shippers pay a membership fee plus a fee per generated export control message. As a result, exportation formalities can be improved drastically: information is available instantly and errors due to manual data processing at interfaces as well as delays due to incomplete information forwarded to customs can be avoided.

Much more problematic though is the situation when it comes to the import of goods. To apply a similar concept, as currently applicable for exports from Schiphol Airport, it would be necessary for other countries to also operate such central databases such as Cargonaut and for all countries to open their databases to foreign customs authorities. The WCO is already promoting the idea of a global database. Jos Ensing of Dutch Customs expects such a solution to be realised within the next 3 - 10 years (interview Dutch Customs).

All these developments confirm that customs' organisations on a national as well as on an international level consider the improvement of communication at interfaces within the air cargo system of central importance for safer and speedier transportation. This perception of the role of communication at the air cargo systems interfaces implies that customs are aiming for a fully integrated communication network with an interconnected exchange of information, preferably covering all players from sender to consignee. Departing from the element of customs clearing, a strong demand for a systemic approach within air cargo system is instigated here.

5.2.3 Competitors

The air cargo carriers' most important competitors are, as previously mentioned, integrators, long distance train connections and sea-freight. Integrators have set the new benchmark for air cargo: door-to-door transportation services via one contact with full track-

and-trace possibilities. As pointed out by air carriers in the interviews, the integrators' product suffers the competitive disadvantage of being standardised and therefore not able to accommodate specific transportation requirements shippers may have. On the other hand, due to the fact that their aircrafts carry freight only, integrators don't have to fly to airports relevant for travellers. As a consequence, DHL could move their operational hub in Europe to Leipzig, where they can operate flights 24 hours a day on seven days of the week and where, due to an unemployment rate of 25 %, any business activity is welcome and supported (interview Swissport Alan Wright).
The way integrators have approached, and approach, the market reflects a very encompassing perspective. With the new standards for speed, transparency and lean communication they have set, they have fundamentally reshaped the expectations towards air cargo in general and triggered major changes within the air cargo system.

As far as long-distance train connections and sea-freight are concerned, their strongest impact on the air cargo industry at the moment is price pressure and therefore pressure to improve efficiency and effectiveness of air cargo.

5.2.4 Customers: Shippers And Consignees

Interviewed Organisation And Its Actual Role In The Air Cargo System

The company interviewed for this research was Roche, based in Mannheim, Germany. Roche, Mannheim, is Roche's second largest location, with 7000 employees working there. Around 30,000 products are sent from Mannheim to 150 different Roche locations worldwide, as well as directly to customers based in Germany and Europe. Mannheim is the site of galenical production and wrapping of pharmaceuticals for the Roche holding, including the global centre of excellence for sterile production of biotechnical pharmaceuticals (Roche 2010 and interview Roche). Pharmaceuticals is a product typically transported by aircraft as it often needs to be delivered under time pressure and has a relatively high value per volume. Roche lent itself as a "typical" customer, as shipper as well as consignee, of air cargo, being a customer of one

of the four main categories of goods transported by air: perishables (including meat, flowers, fish, other perishable foods and live animals), chemical products, "high tech" products (including optical goods) and machines (including engines and automotive components) (Allaz 2004). For the transportation of its goods, Roche appoints a limited number of carriers and freight forwarders which are selected via tender process. Air Carriers are appointed for specific destinations and are to be used as carrier for any shipment to that destination. Freight Forwarders are appointed for specific regions, e.g. EMEA, North America, Asia Pacific or South America. Currently Roche Diagnostics cooperates with four appointed carriers which between them cover 80 % of Roche's overall tonnage sent via air cargo.

Once air carriers and freight forwarders are appointed, they are invited to a joint meeting in order to discuss together how Roche's specific transportation requirements can best be realised. Together with Roche the air carrier and freight forwarder for a specific destination and the related area optimise their co-operation throughout the transportation. These joint meetings have proved to substantially improve the quality of transportation and to ensure that the required transportation conditions of Roche's highly sensitive goods can be assured throughout the entire transportation, including all interfaces and handovers (interview Roche). It is important though, as Mr. Schneider emphasised, that both partners, freight forwarder and air carrier, participate jointly in this meeting with Roche Diagnostics. Apart from optimised transportation collaboration from a technical perspective, the reliable appointment of air carriers for specific destinations ensures better air freight rates as goods can be bundled per destination. In the beginning it proved to be difficult to gain the support of air carriers and freight forwarders for such joint meetings. During the past three to four years though the interest and support for these joint discussions aimed at optimising co-operation throughout the transportation system has drastically improved and today all partners involved confirm the positive impact on the quality of co-operation (interview Roche). It only seems that sometimes frictions arise within freight forwarders and their own organisations: the local representative participates in the joint meetings with air carriers and Roche, and cases have arisen where needs have surfaced in a meeting which the local representative would have liked to satisfy, but which where not in line with headquarters' general guidelines and policies.

Roche has not only successfully brought freight forwarders and airlines

together, it has also tightened the communication net between other players of its transportation network. Today Roche issues 95 % of AWBs, straight to customers or other production sites of Roche, affiliates and agents, thus communicating directly transportation relevant information to the receiver of their goods.
Another way, currently tested by Roche on transportations to Argentina, is to shorten communication channels via the reduction of involved parties: Roche is currently working with one freight forwarder, who is working as a 4th party logistics provider for Roche in this market. As a result, full transparency and uninterrupted track-and-trace can be achieved for Roche over the entire transportation. However, as freight forwarders usually only cover door-to-door or airport-to-customer bits of the transportation, a lot of customer-specific requirements get lost or remain unknown to the freight forwarder. Roche estimates that currently only 30 % of all air transportations in which freight forwarders are involved are door-to-door transportations.

Implications Of The Introduction Of Electronic Documentation

From Roche's perspective, a move towards electronic data processing within air cargo is highly desirable as Roche expects harmonised clearing processes and therefore speedier transportation processes through the introduction of electronic documentation. Furthermore they are convinced that fewer errors are likely to happen in regards to data processing as less manual interference is required. Also Roche has found that the support of projects such as e-customs and e-freight is an indicator of transportation providers for their capacity for innovation. Some years back Roche would ask whether a player would participate in IATA's C2K project in their tender processes for the appointment of preferred transportation partners. Today participation in C2K is mandatory and Roche asks about the readiness for electronic documentation or e-freight (interview D. Schneider). Last but not least Mr. Schneider mentioned the ecological improvement due to reduced paper consumption, though this was rated as a side-effect

However, Roche is concerned that the full implementation of leaner processes, uniform standards and especially electronic documents will be a lengthy process. The economic crisis and the resulting pressure to differentiate from competitors might drive some players though to re-shape their processes faster and to open up to more communication

and information exchange within the transportation system, aspects which are very much needed according to Roche.
The biggest challenges for introducing new processes and electronic documents are, according to Roche, the question of whether air carriers have sufficient financial resources to invest in the required technologies (a concern voiced in a very similar way by Dutch Customs, compare paragraph 2.2 "Governments: Customs"). Furthermore the legal aspects related to electronic documents are not yet all answered: will financial departments, e.g. tax offices, accept invoices for goods if signed off electronically? And how safe will electronic documents be, especially in countries where fraud levels are higher than in others. For Roche the impulse and push for electronic documentation for air cargo transportation should come from IATA, whereas freight forwarders should support this development via their national organisations.

Apart from all practical advantages related to electronic documentation for air cargo, the openness to move towards new processes and procedures is considered as an indicator for how attractive an organisation is as a co-operation partner. For Roche, organisations open to changes would be a more attractive co-operation partner (interview Roche).

Vision Of Air Cargo's Future

All described developments – the joint discussions between Roche, their freight forwarder and the related airline, the forwarding of the AWB and the appointing of a 4th party logistics provider – confirm the importance Roche gives to the shortening of communication channels. Roche pro-actively, and on various levels, is initiating steps to introduce more transparency into their air transportation system. Like customs, it is one of the players of the air cargo system's environment that is giving a strong impulse to reshape the system itself and its processes and procedures.

5.2.5 NGO: IATA

Interviewed Organisation And Its Role In The Air Cargo System

As described in its own words, C2K "re-engineers the air cargo transportation scheme from shipper to consignee ... cutting down

on operational costs and enhancing customer service" (IATA 2009b). Whereas IATA has taken on the role of initiator and mentor in regards to the C2K project, the introduction of electronic documentation for air cargo under the e-freight project is an IATA owned project. Furthermore, as the quality of information has to be very high when paper documents do not accompany goods, IATA established a quality-monitoring tool for the standards put in place as part of e-freight, the Messaging Improvement Program MIP. Traditionally there were no standards at all in place for the commercial documents of a cargo shipment. Standards were set for transportation and customs documents only (interview IATA). Together e-freight and C2K are IATA's biggest cargo industry related projects.

Implications Of The Introduction Of Electronic Documentation

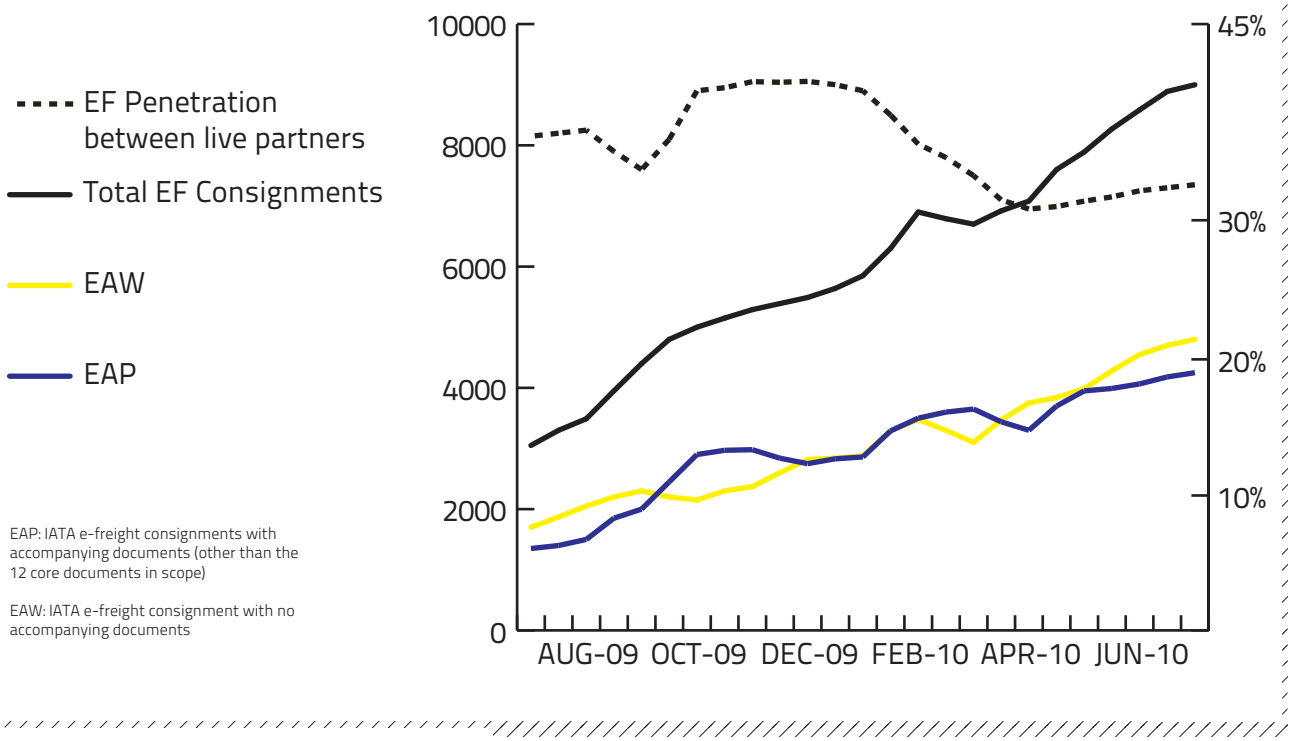
From the beginning of the e-freight project IATA's focus has been on the 20 documents throughout the air cargo process, which could be standardised on an international level. These documents were targeted for development and implementation of an electronic version by the end of 2010. Currently the certificate of origin is proving to be the most difficult to transfer into electronic format as a lot of customs still require an original signature and stamp on this document. Some customs organisations are however prepared to participate in the e-freight project and to adapt their requirements (see paragraph 2.2 "Governments: Customs"). In fact, customs' willingness to participate and their commitment to support this initiative is a pre-requisite for any country to join in the e-freight project. As some customs simply don't have the infrastructure to operate e-freight, e-freight is limited. Still, by the end of 2010, 44 countries will have had a first test run and those countries cover 80 % of global air cargo traffic (interview IATA). As far as non-customs related commercial documents are concerned, their approval is dependent on the individual government of an air carriers home country: the general process for implementing new documents requires that the IATA member airlines involved present these documents to their governments for approval (interview IATA).

Whereas C2K built the point of departure for reshaping the air cargo business, the development of e-freight is "an operational procedure" (interview IATA). E-freight is an IATA-led project with the participation of a number of airlines and freight forwarders. Freight forwarders

institutions did not want to participate directly in the project but sent their members. Whilst in the beginning of the C2K project, as well as the e-freight project, shippers and ground handlers were not included, this has changed over time and at IATA's conference in Vancouver in March 2010, for the first time, General Handling Agents were included in the Cargo Symposium. As far as integrators are concerned, they are also involved in e-freight, though at the moment only the freight forwarding part of their business. IT companies were involved from early 2007 as part of the "strategic partnership program" (interview IATA). Today, as described by IATA on its own website, e-freight is "an industry-wide initiative involving carriers, freight forwarders, ground handlers, shippers and customs authorities" and promises industry savings of up to US$ 4.9 billion (IATA 2010). By June 2010 126 airports in 25 countries, 27 airlines and 191 freight forwarders have gone live with the e-freight project.

Figure 25: "Development of Monthly E-freight Volume" reflects the developments of shipments accompanied by electronic documentation within the e-freight project on an international level with the countries with the highest number of shipments being Korea (South), Spain, United Arab Emirates, Singapore, Germany, United States of America and United Arab Emirates (IATA 2010 d).

Figure 25: Development Of Monthly E-freight Volume



EAP: IATA e-freight consignments with accompanying documents (other than the 12 core documents in scope)

EAW: IATA e-freight consignment with no accompanying documents

A central issue still slowing down the introduction of e-freight is the question of who will pay for the necessary IT infrastructure (interview IATA). In the past, airline and freight forwarders' data systems only had to serve their organisations needs and were therefore tailor-made and old. With the introduction of e-freight, compatibility suddenly became a necessity. The implementation of IT changes took therefore up to a year, as in a lot of cases the entire IT system of a company had to be replaced (interview IATA). Also, not all freight forwarders have EDI systems and with the pressure on the market because of the economic crisis, financial resources are limited. Documents can be scanned though, thus also allowing smaller players to move to electronic documentation. Currently around 40% of documents are sent via EDI in accordance with IATA standards, 20% are scanned documents sent as pdf-file and 40% of documents are sent via Internet portal (interview IATA).

Other obstacles to the introduction of e-freight mentioned by IATA are the rising concerns of security in regards to data protection as well as tightened security demands by customs. Furthermore, a consequence of the introduction of e-freight, less people will be needed for handling goods and handling agents will come under severe pressure. And some freight forwarders fear they might be passed over by shippers (interview IATA).

Vision Of Air Cargo's Future

In spring 2010, IATA again emphasised the critical importance of global quality standards and process simplification for air cargo for remaining competitive (Bisignani 2010). This request implies that the necessary quality standards for an efficient and effective air cargo are not yet in place, despite the advanced stages of the C2K and e-freight project. IATA is pressing for a further simplification of processes in order for air cargo carriers to remain competitive in the market (status April 2010).

As far as more technical aspects are concerned, IATA is in favour of a central data exchange for air cargo, as originally planned. In the past freight forwarders sent goods' documents to the air carriers who would then communicate with the handling agent. With the new communication channels opened following the developments of C2K and e-freight, freight forwarders also exchange documents with handling agents. The consequence is higher communication costs as IT providers charge a

part of the applicable fee per transaction. Next to the rising communication costs, players of the air cargo system do not want to depend on one software provider and freight forwarders in particular are anxious to protect their customers' names (interview IATA). For the future, IATA thinks that in general a change in mindset is needed within the air cargo industry, even more so as the industry is struggling to keep young qualified people (interview IATA).

5.3 Summary

Taking into consideration that only 20% of any air cargo process is executed by airline, with the remaining 80% being covered by other players of the air cargo business system (interview Panalpina), it was important to develop a better understanding of all players' perceptions of the air cargo system. Apart from the fact that the degree to which air cargo is perceived as a complex system is dependent on the individual interviewed and the culture of the organisation it is part of, the empirical findings reflected a growing awareness of a need for systemic thinking within the air cargo system. According to the information given by the interviewees, the impulses for the increase in systemic and network thinking came mainly from the players of the air cargo system's environment:

- Integrators set a new benchmark for the service level of transportation services;
- Shippers demand comparable service levels from their air cargo partners, expecting a degree of co-operation from partners within the air cargo system that allows them to develop a door-to-door service;
- Customs promote a move to electronic documentation in order to achieve higher levels of security and to speed up clearing processes to improve their airports' attractiveness as a hub for cargo on an international scale.

These impulses and developments from the air cargo system's environment have brought players of the system together for the first time, and initiated discussions about the needs and the currently perceived difficulties in the exchange of information. All interview partners, from shipper to air carrier, mentioned in the interview that the improvement of data quality achieved by MIP and the standardisation of the commercial processes and documents of air cargo, which are part of C2K and StB, are a major achievement of IATA's initiative. The meetings for the C2K and the e-freight project have not only improved communication within the air cargo system, as described by all interview partners but have opened up for the first time a forum for discussions on possible

joint future developments for all air cargo players. Accelerated by the pressure on the air cargo industry resulting from the economic crisis, these initiatives and impulses from the air cargo's environment have led to an increasing systemic thinking inside the air cargo system.

The extent to which players contribute to shaping the air cargo's environment varies, as does the degree of systemic thinking from organisation to organisation. Generally though it is mainly the players of the system's environment, namely IATA, customs and customers, that re-shape the air cargo system. And according to the views voiced by freight-forwarders, handling agents and air carriers, it is likely that also in the future impulses for changes of the air cargo system will have to be triggered by its environment.