

ELECTRONIC MARKETS IN HONG KONG'S AIR CARGO COMMUNITY: THANKS, BUT NO THANKS

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ABSTRACT

This paper takes a critical look at electronic markets. Through an examination of Hong Kong's air cargo industry, where an electronic network recently has begun its operation, we argue that none of the key industry stakeholders stand to gain from an electronic market. Instead we found that the existing electronic network has limited its service to carefully preserve the distribution of power among the stakeholders, it has done so to be successful and to attract a critical mass of users. The network now has a de-facto monopoly in Hong Kong's air cargo community. The monopoly and the stakeholders will seek to block any attempt to establish an electronic market in the future.

INTRODUCTION

Electronic means of communicating market information is raising a considerable interest in the business community and academia alike. What has become known as electronic markets are predicted not only to assist organizations or individuals in doing business more efficiently, but it will also change the very way business is done (Lee & Clark, 1996). In that sense most people concur that electronic markets constitute a significant innovation that will radically alter markets in the future. However two key questions remain. Who will stand to benefit from electronic markets? And how should various existing market players position themselves in regard to initiatives to establish such markets?

We examine these questions by studying the air cargo industry in Hong Kong. The Hong Kong air cargo industry is chosen because an electronic network has recently been launched with considerable success. We analyze how and why this electronic network became an instant success and we also address whether the network will

evolve into an electronic market. Furthermore what stakeholders are in favor of such a move and who will seek to resist it.

The provision of air cargo services is complicated by the fact that an airplane can only lift a maximum weight. The volume capacity is of course fixed. For efficiency reasons, it is therefore extremely important that a plane is always loaded with the optimal weight when airborne. In practice this is achieved by setting a maximum weight for each aluminum air cargo container or pallet that is loaded onto a plane (this way, the weight is also be evenly distributed).

These restrictions on weight and volume are also reflected in the provision of air cargo space to customers (shippers). For example, textile products easily fill a container without exceeding the maximum weight, while machine parts reach the weight limit long before a container is full. To maximize utilization of cargo space, it is therefore imperative that weight and volume match. As a consequence, cargo items from different sources are often matched to fit the best volume/weight ra-

tio. High weight, low volume cargo (e.g. machine parts) is packaged with low weight, high volume cargo (e.g. designer textiles) into one container or pallet. As we shall see this fact has a tremendous impact on the provision of services and business processes in the air cargo industry.

THE HONG KONG AIR CARGO COMMUNITY

In the beginning of the 90's the profit margin emanating from passenger traffic via air was constantly decreasing and the competition among various airlines was fierce. As a response many airlines turned to new business opportunities to complement declining profits. One answer was the air cargo business, which became an important supplement for many airlines.

In Hong Kong the air cargo transportation industry has developed substantially in the 90's and it is quite a mature business. Approximately 20 per cent of Hong Kong's external trade pass through Hong Kong's Kai Tak airport as air cargo. This means over HK\$1.5 billion worth of cargo is handled through Kai Tak on a daily basis.

BUSINESS PROCESSES

Hong Kong's air cargo community consists of a number of stakeholders, which perform a number of complementary tasks. Table 1 summarizes the players and their roles.

Stakeholder	Function
Shipper	Has cargo to send
Freight forwarder	Handles cargo from sender to receiver
Air cargo terminal	Controls the cargo while at the airport
Customs	Releases cargo for import or export
Airport	Handles the physical movements of cargo
Airline	Provides air transportation for cargo

Table 1
Stakeholders and their roles
in the air cargo industry

Air transport is capital intensive since each plane constitutes a significant investment. Air cargo is carried both on dedicated freighters and on passenger planes. Operating costs are high but relatively fixed (mostly maintenance and human resources). The high operating costs and the significant investments means the supply (of air cargo capacity) is rather constant throughout the year.

In contrast there are huge seasonal fluctuations in the demand for air cargo capacity in Hong Kong. During the peak seasons the demand exceeds the supply, while in the low season the opposite applies. This creates an environment of mismatch between supply and demand (see figure 1).

To minimize the effect of this mismatch between supply and demand, airlines have out-sourced the risk and the responsibility of having an efficient usage of their cargo capacity to freight forwarders. They have done so by selling their space in big chunks (allotments) distributed throughout the year. This way they circumvent the discrepancy in demand and supply. One industry representative explained the situation this way:

"In certain times of the year, getting a full load is highly certain. This is in the peak season, which runs from the end of September to Christmas. In this period you cannot get space without a lot of money. The airlines run a system, which they call a lock-in system with their major customers. The airlines guarantee to provide so much space in the peak season, the freight forwarder then promises to book a certain amount of space in the low season."

Freight forwarders also reallocate space among themselves, and it is common for a freight forwarder (co-loader) to borrow/lend/sell/buy space to/from a colleague. Another common way used to optimize a shipment is in the packing of the cargo items. This is to make a profit by matching shipments with inverse density and then repackaging them for the highest allowable density, as described earlier. A

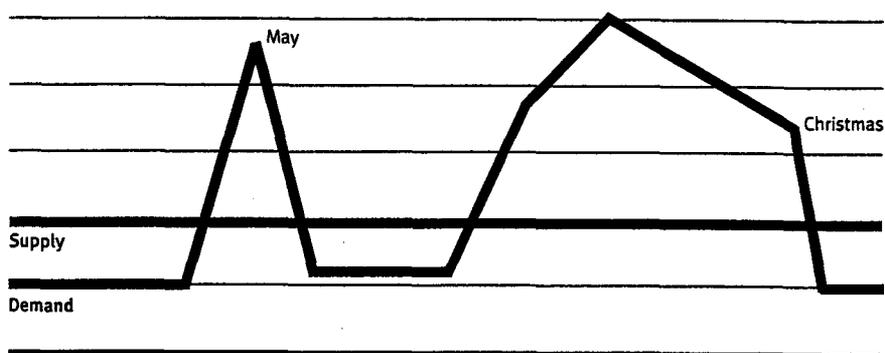


Figure 1
Graph of supply and demand for air cargo capacity distributed throughout the year. Peaks occur in May and in September through Christmas.

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quoted price for a shipment, therefore, does not reflect an actual fixed price, but it is carefully calculated according to the specific freight forwarder's immediate knowledge about departures, demand for transportation, seasonal fluctuations, and available space.

The freight forwarders' business is therefore based on detailed and time critical knowledge of the industry. These factors combined leave the air cargo market very competitive and opaque. The pricing is complex and to an outsider the market is impenetrable. This way the freight for-

warders have found a niche in the market in which they profit from detailed knowledge and opportunistic behavior. However it also means there is a high degree of interdependence between the forwarders and the airlines.

THE NEED FOR AN ELECTRONIC NETWORK
Time is the single most important factor in an industry where the distribution of goods moves close to the speed of sound. Any delays in administrative procedures or handling of goods are costly and may even degrade the value of goods (e.g. cut flowers or fruit).

In the early 90's the average shipment time for airfreight was six days. Of that time, ninety per cent was spent on the ground. Something had to be done to improve this unsatisfactory situation. As one freight forwarder passionately explained:

"We must do something about this or we will all face a huge problem. All participants in the air cargo industry will have to keep abreast of emerging technologies if they want to survive. Competition will become increasingly fierce."

The need to coordinate, streamline and optimize all the land based activities was clear. This prompted four international airlines to take action. They took the initiative to form a company that should address the coordination and communication needs of the growing and complex air cargo industry.

TRAXON ASIA LTD.

In 1991 Cathay Pacific, Air France, Lufthansa, and Japan Airlines formed an international electronic network for coordinating transactions between freight forwarders, air cargo terminals, and airlines. The four airlines set up three companies: Traxon Asia Ltd., Traxon Europe Ltd., and Traxon World Wide Ltd.

Traxon Europe is mainly run by Air France and Lufthansa, and Traxon World Wide. In Asia, Traxon Asia is run by Cathay Pacific, Air Japan, and Traxon World Wide. Traxon World Wide plays a minor role, its main function is to provide coordination between the two regional companies and the founding airlines.

The founding airlines wished to form one single coherent worldwide network and therefore they tried to persuade other airlines to join their network. However the other airlines read the initiative as a strategic maneuver to hi-jack the lucrative air cargo market. They feared a situation where a few founding airlines would dominate (as some airlines had done in the past for passenger flight reservation systems). Therefore, a lot of defensive actions were launched and competing airlines set up similar systems around the world. Starting with only a portion of the market, Traxon needed to carefully plan the design and implementation of its system. Two key factors explain Traxons immediate success.

Firstly, their implementation process took advantage of the respective airlines' strong holds. Thus the locally based Cathay Pacific was in charge of the roll out in Hong Kong, while in Japan it was Japan airlines. A similar approach was applied in Europe. Furthermore each local Traxon system had the other shareholder airlines as initial customers, which constituted a significant share of the air cargo market.

The second factor was Traxons ability to attract a majority of users (both airlines and freight forwarders). The Traxon service has high network externalities. In short,

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this means that in the beginning the benefits of joining are lower and the risks higher, but as more adopts, the more attractive and less risky it becomes to join the network. The best analogy is that of having a telephone: if you are the first one to have a telephone, whom are you going to call? But as more people (relatives, friends, and business relations) join the more beneficial it becomes to join the adopters. At the same time it is attractive to wait to adopt until it can be determined whether the technology will become a standard technology (e.g. the historic fight between Betamax and VHS in setting the standard for VCRs). Therefore the more adopters Traxon gets, the more attractive it becomes to join. The dilemma was that the airlines would adopt the system insofar as a majority of the forwarders did. At the same time the freight forwarders would only adopt if most of the airlines did. The major challenge was how to get this spiral of self-enforcement going in favor of Traxon. The number of adopters needed for the spiral to automatically evolve is often referred to as "critical mass".

The systems designers knew that a majority of the potential actors had to simultaneously decide to participate for Traxon to become a success. It was, therefore, essential that all parties would see the benefits from the arrangement and decide to participate. Traxon, therefore, designed its system to accommodate the needs of the airlines, forwarders, and air cargo terminals, but also carefully preserved the sensitive distribution of power and responsibilities between them. The people behind Traxon thus decided only to optimize existing procedures and not to add new services. The Traxon system consequently does not carry any information about prices or discounts. This leaves the market opaque for outsiders and preserves the roles and power balances between airlines, freight forwarders, and shippers.

After its first years of operation Traxon was able to enlarge and sustain its position as the dominant electronic trading network provider in Hong Kong's air cargo community. As of January 1998 there were 187 freight forwarding agents connected to the system resulting in more than 8.8 million electronic messages per year (1997). A number of airlines have given up their defense actions and they are now taking active part in the co-operative venture giving Traxon a de-facto monopoly in the air freight community in Hong Kong. The result is that 94% of the air cargo volume lifted out of Hong Kong is coordinated through Traxon's network.

LOOKING TO THE FUTURE

Traxon has been very successful in building up a basic electronic infrastructure in the air freight industry. The distribution of power in the air cargo industry is maintained with the introduction of the electronic business network for coordinating air cargo services. A next step could be the establishment of an electronic market. However as we will demonstrate, none of the major stakeholders stands to benefit from such an arrangement, and an electronic market is thus not likely in the near future.

The airlines argue that the establishment of an electronic market will drive down profits, because space availability and prices can be checked easily. This will make the market more uniform and the competition fiercer. This has happened in the passenger transportation business, where prices can be checked through various electronic network systems at most travel agents. In the passenger traffic business, one counter measure has been to introduce frequent flyer points. Frequent flyer mileage adds haze to the market, it drives down incentives to look for optimal prices, and thus locks in customers. The discrepancy between demand and supply, and the weight/volume restrictions have a similar effect for air freight services.

The freight forwarders are not interested in creating an electronic market for coordinating air cargo services, because they (as brokers) gain from the non-transparency, and they make their profit from coordinating the market. The freight forwarders also stand to lose the profitable business of re-packing shipments, and of buying and reselling space among themselves if such an electronic market is established. In the future they are ready to pursue every attempt to delay the arrival of a full-scale electronic market system. The situation was clarified in this way:

"An air freight futures market has been suggested in Europe along the lines of foreign exchange market. Airlines would put available space on the market. I doubt if it will be the future, because people wish to keep control of their marketplace. They will not voluntarily give away control to the market...The air cargo is not a high yield business, the rates now are exactly the same as they were 10 years ago, so in real terms the rates are declining steadily. The only thing that would come out of an open market is that the rates would be declining faster."

In the Hong Kong air cargo market it is in the complex selection process that the freight forwarders make their profit. The complexity of air cargo brokerage is the

single most important reason for the very existence of the freight forwarders. Furthermore, the establishment of an electronic market will drive down profits for the airlines and it will jeopardize the existence of the freight forwarders. Thus it is understandable that the airlines and freight forwarders will not push for an electronic market.

The consumers of air cargo services (the shippers) are the ones who will benefit from an electronic market containing all information about prices, services, and space. They will enjoy lower prices due to higher transparency and increased competition among freight forwarders and airlines. An electronic market will also open the possibility for the shippers to entirely bypass the freight forwarders. It is therefore expected that the shippers would ceaselessly push for more transparency and an open market, and that they will seek to disintermediate the freight forwarders, but this will be an uphill battle given the monopoly of Traxon.

We find support for our argument in Christiaanse and Huigen (1995). They describe an attempt to establish an electronic market in the Dutch air cargo community. The attempt was launched by the University of Amsterdam and implemented by Reuters (newsagent). The initiative focused on creating transparency in the provision of air cargo space and services. The system failed due to a misfit of interests between stakeholders, which was ignored by the initiators. The authors explain that the freight forwarders hesitated and finally withdrew their support for three reasons. A) Fear of elimination of the freight forwarder. B) Fear of decreasing profit margins, and finally C) Negative attitude towards electronic business. In this study we easily find support for A) and B), but in Hong Kong the forwarders have been enthusiastic about using the electronic network. We believe that this is mainly because the Traxon network was introduced in a manner, which preserves and supports forwarders' business processes.

CONCLUSION

Despite the success of the electronic network, setting up an electronic market will upset the sensitive distribution of power in the air cargo community and drive profits down. Therefore we do not believe that an electronic market will be launched in near future. We believe that key industry players will resist an establishment of such a market. They would simply not adopt/participate and the electronic market will fail due to low number of potential business partners reachable in the market by electronic means. The existing monopoly is also a significant hindrance since it voids an immediate need for a fast and efficient electronic market mediation of the air cargo market.

We therefore call for caution when appraising electronic markets. They may not be in the interest of existing market players, and they may not create the desired effects. Instead electronic markets may jeopardize the distribution of power, create new or destroy existing business processes, and lower profit margins to the benefit of consumers but at the expense of established market players. In the future we therefore expect to see a growing number of initiatives launched by threatened industry players aimed to hinder the establishment of electronic markets.

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