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Analysis of passenger airlines' cargo business models

João Nuno Vilela da Silva

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Supervisor: Professor Vasco Domingos Moreira Lopes Miranda dos Reis

Examination Committee

Chairperson: Professor João Torres de Quinhones Levy

Supervisor: Professor Vasco Domingos Moreira Lopes Miranda dos Reis

Members of the Committee: Professor Maria do Rosário Maurício Ribeiro Macário

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Abstract

Air cargo industry suffered considerable developments over the last decades. One of the main agent that changed this industry were passenger airlines. Performing cargo operations, airlines wishes to improve operational results providing a service that complements or supplements the passenger business.

Unveiling cargo business from passenger airlines, Osterwalder's business model proposition was adopted. This model examines company's essential attributes in their *modus operandi*. A market analysis was also performed inquiring cargo agents. These provided the necessary information to fill the canvas proposed by Osterwalder.

In order to achieve the main goal of this document, classify and define passenger airlines cargo business models, information was scrutinized and categorized according to business models blocks.

Taken into consideration previous studies in air cargo business models, these were reformulated and provided extra attributes according to the information evaluated. At the end of the document, it is revealed a new framework for passenger airlines cargo business models, in which airlines could follow three main models subsidiary high-end, subsidiary low-end and unit business.

Key words

Business models; Air cargo; Passenger airlines; Osterwalder's business model canvas; Passenger airlines cargo sector; Market analysis

Resumo

A indústria da carga aérea tem sofrido consideráveis desenvolvimentos nas últimas décadas. Um dos principais agentes que alteraram esta indústria foram as companhias aéreas de passageiros. Estas, ao integrarem operações de mercadorias, procuram melhorar os seus resultados operacionais no fornecimento de um serviço que possa complementar ou suplementar o negócio de passageiros.

Desagregando as operações de carga foi adotado o conceito de modelo negócios proposto por Alexandre Osterwalder, no qual olha para o interior de uma empresa e revela características relativas ao seu modo de operação. Na recolha de informações foi necessário uma análise de mercado através de inquéritos a agentes de carga.

Adoção do modelo de Osterwalder para as operações de carga de companhias aéreas, permitiu perceber elementos fundamentais na performance de um sector de carga. Preenchendo o quadro proposto pelo autor, informação relativa ao modo operacional foi escrutinada e analisada para assim atingir o principal objetivo deste documento, classificar e definir modelos de negócios das companhias aéreas de passageiros no sector de carga.

Tendo como base modelos de negócios de carga aérea resultante de estudos anteriores, estes foram reformulados e detalhados com a apresentação do modelo final, qual propõe que estas transportadoras áreas possam seguir um modelo subsidiário de alto nível, modelo subsidiário de baixo nível ou modelo de unidade de negócios para o seu sector de carga.

Palavras-Chave

Modelo de negócios; Carga aérea; Companhias aéreas de passageiros; Modelo de Osterwalder; Sector de carga; Análise de mercado

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1. Introduction

1.1. Motivation

The fastest mode of transport in overcoming long distances, air cargo has evolved and gained market over the last decades. In 2011, air cargo industry registered an overall revenues tonne kilometres of 202.4 billion, according to Boeing's World Air Cargo Forecast, recovering from a severe sector's financial crisis from 2009. This document also indicates that over the next 20 years, world air cargo traffic will grow 5.2% per year, achieving more than 558.3 billion RTKs in 2031.

Air cargo industry is characterized by ceaseless competition, increasing pressure in airlines management to achieve cost reductions and propel profits, thus improving the overall performance of an air company. Bearing that in mind, these companies are required to take advantage of opportunities in previously unexplored markets and other sector business, particularly in cargo operations.

Besides the heavy competition from cargo only carriers, passenger airlines with cargo operations have been betting in cargo business, enhancing commitment levels this area, showed in sectors revenue (Figure 1.1).

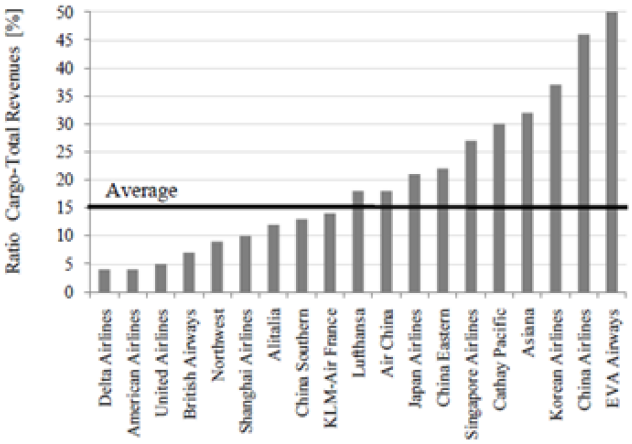


Figure 1.1 - Ratio cargo-total revenues

Source: Serpen and Mirza (2009)

An air passenger company contemplating passenger and cargo services implies the sharing of procedures and resources among these two types of business. The sharing process is hard to obtain, given that strategies and business models associated to passenger and cargo services are challenging to interconnect.

Motivations in this dissertation consist mainly in perceive how passenger airlines relates to their cargo business. How they intend to evolve towards a sectors' competitive business model and which procedures justify the growth level of commitment to cargo business by management boards. The growing of cargo sectors' relevance on overall structure revealed a business niche, where several passenger airlines should examine in order to improve their overall business performance.

1.2. Objectives

Knowledge regarding business models in cargo operations from passenger airlines is quite limited. After a literature review, scarce information related to business models was found.

This dissertation has the main goal of evaluating and defining business models in cargo operations from passenger airlines. In order to achieve this objective, Osterwalder's (2010) business model proposition will be adapted and refined to air passenger business. The ultimate objective of this dissertation is to contribute for a better understanding of passenger airlines' cargo business models.

1.3. Methodology

Methodology adopted in the course of this dissertation was segmented in four topics: business models and strategies evaluation, market analysis relatively to cargo operations in passenger airlines, appropriate adaptations to Osterwalder's business model canvas, and business models comparison and final model definition.

1. Business models and strategies evaluation

Every sustainable business should be coupled with a business model and strategy in order to attain the most of their activities. Air cargo business from passenger airlines is no exception, and in order to study this subject, is necessary to review and explicit previous projects in this particular area.

Business models will be based on Osterwalder's proposition while strategy aspects will follow the point of view from Wouter Dewulf, since the author already studied this subject to air cargo carriers.

2. Market analysis relatively to cargo operations in passenger airlines

Not only being confined to previous studies and projects, this project intends to have a proactive attitude on gathering information from passenger airlines. Revealing current practices on cargo transport, market analysis will consist on collecting information from cargo executives as possibly when allowed.

This information will allow to access their company's mode of operation in this particular market segment, deciphering airlines position on cargo transport, essential on designing airlines' business models canvas.

3. Appropriate adaptations to Osterwalder's business model canvas

Gathered information from previous studies and market analysis, this will be processed and scrutinized according to Osterwalder's business model proposition. As an important part of this research, adaptations will be made combining business models attributes to cargo procedures.

4. Business models comparison and final models definition

Finally with the construction of airlines' cargo business models, parameters of business models will be related to cargo operations, finding the best responses to market specifications. Comparison between business models blocks will be analysed, attaining final forms of business models.

Starting with previous business models classifications, these will suffer an adaptation according to this project information evaluation, revealing particularities and commonly attributes.

1.4. Dissertation structure

This dissertation will follow the structure present on Figure 1.2. Divided into three sections, with the respective subsections analysis, intends to accomplish its main goal on defining current cargo business models in passenger airlines.

Strategy and business models sections will be merged to passenger airlines analysis section, achieving a business model canvas adapted to cargo operations performed by passenger airlines. The created canvas will allow further analysis, culminating in a new models perspective.

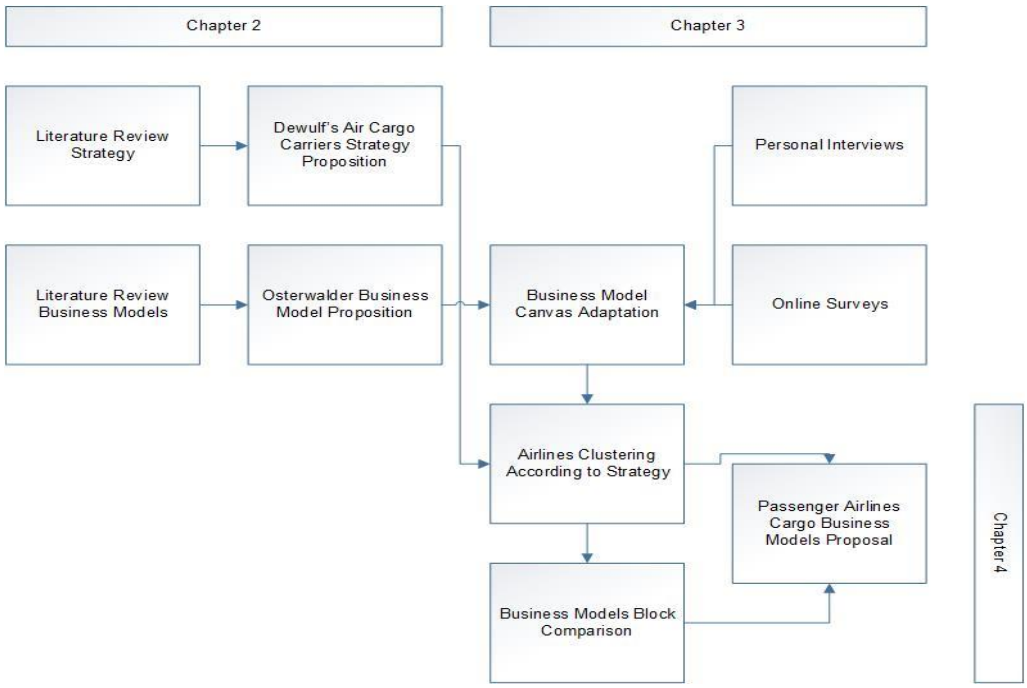


Figure 1.2 - Dissertation structure

2. Strategy and business models

2.1. Strategy

2.1.1. Concepts

Strategy is commonly used as a method or plan in order to execute an action, bringing the desired future and achieving the foreseen objective or solution to the initial problem.

Several authors studied this subject providing their perspective in strategy definition. Ansoff indicates that strategy is an attempt to explain company's future. Considering that, managers have to analyse the past in order to predict future happenings (Ansoff, 2007).

Another renowned author in this field is Henry Mintzberg, contributing to strategy definition with Mintzberg's Five Ps of Strategy. The five Ps correspond to five definitions of strategy encompassing plan, ploy, pattern, position, and perspective. Strategy is a plan, representing a guideline to deal with a specific situation, surpassing competitors while adapting the company to new environment requests (Mintzberg, 1987).

Porter took a more mathematical approach on his strategy definition. Providing a framework for business strategy development, Porter's Five Forces, author's strategy definition refers to a detailed analysis of adopted models. These models determine company's markets positioning relatively to their competitive context (Porter, 2008).

DeWitt and Meyer also addressed this issue, revealing the dimensions of strategy and their organizational purpose, embracing real-life strategic problem situations. Strategy dimensions can be categorized into three groups: strategy process (flow of strategy activities), strategy content (result of strategy activities) and strategy context (conditions surrounding strategy activities) (de Witt and Meyer, 2010).

More recently, Max Mckeown emphasises that *"Strategy is about shaping the future"*, creating a sequence of actions that will shape the future of a company. Strategic measures can adopt two sides, a more creative and human side or a more analytical and mathematical side. Nevertheless, depending on the company's business, strategists have to adapt to the side of that particular situation (Mckeown, 2011).

Overall, strategy consists on the systematic analysis of associated factors from external environments (customers and competitors) providing the basis to reach optimum management practices. It also

promotes alignment and implementation of favourable company's policies in order to correspond to real life requirements.

2.1.2. Dewulf's Proposition

2.1.2.1. Cargo airlines strategy

Following strategy studies from deWitt and Porter, Dewulf studied this subject to air cargo carriers. His approach will be adopted throughout this chapter, with the appropriate modifications to passenger airlines. Major influential drivers will be analysed regarding strategic cargo options.

Author asserts that management decisions will fall into three groups corresponding to product, market and network strategies. Bearing that in mind, author filled up each category with preponderant variables relatively to the three strategic clusters (Figure 2.1).

Figure 2.1 - Influencing variables in the development of a strategy

Source: From Carpet Sellers to Cargo Stars… A typology based on management strategies of air cargo carriers, Wouter Dewulf, 2011, pp 6.

- Product strategy

Product strategy is based on the resources that an air company has, and how they can be exploited in order to obtain a competitive advantage against opponents. Variables representing this category are mainly product differentiation, yield management, route network, customer relation management, environment and alliances.

Product differentiation is a significant variable on defining product strategy. Traditionally, air cargo transportation was seen as a complementary service from the passenger sector. Nowadays, this industry is more important than ever, having a preponderant role in transport systems.

Yield management supports product differentiation, increasing revenues per FTK. This variable manages the available and booked capacity in each route. Downward pressure on yields were achieved through computer reservation systems, providing transparency and clarity on price and capacity aspects through e-commerce procedures (Dewulf, 2011).

Route network variable is also related to product differentiation and yield management. A network with more routes propels air cargo growth.

Customer relation management (CRM) is also an important variable, granting customer satisfaction and commitment. CRM benefits in a more accurate planning procedures, improving yields and capacity management. With a dedicated sales team, cargo operators become more involved in CRM, allowing a better product differentiation (Dewulf, 2011).

- Market strategy

This category corresponds to market variables that an air company should evaluate regarding strategic options, incorporating market conditions to their decisions. Are deemed the following variables: capacity management, competitive market behaviour, hub choice, route network, relationship with integrators, e-portals and alliances.

A crucial variable in market strategy is capacity management, adjusting capacity to the required service. Air cargo is strongly influenced by external forces, so an air cargo operator needs to adapt to market tendencies, according to demand verified in real-world situations (Dewulf, 2011).

For an efficient capacity management, short and long term contracts should be provided. Long term contracts are essential to ensure the viability of cargo operations, while short term contracts can be practiced at higher prices, thus yielding profits (Dewulf, 2011).

Market strategies also relate to the global position that the company wants to achieve. Global position definition resides in establishing a network of routes and hubs for cargo sector. A company should also take into consideration airport's charges, fees and level of ground operations.

Another market consideration is what type of relationship the company wants to have with integrators. Due to the difficulties in competing with up-market door-to-door services provided by these agents, an air company can opt to compete or cooperate with them (Dewulf, 2011).

- Network strategy

The development of a network strategy considers unit costs, fleet management, airport choice, hub choice, route network, frequencies of service and alliances variables.

A network should be build up according to unit costs, and these should be minimized or at least compensated by the overall system. Unit costs can be split into direct (flying expenses, maintenance and overhaul and aircraft depreciation) or indirect (station and ground costs, sales and promotion and general administration) operating costs (Belobaba et al., 2009).

Fleet management consists in administrating aircrafts with the purpose of air cargo transportation. A company could operate with passenger aircrafts, exploiting their belly cargo proposition, a fleet of freighter aircrafts or the combination of both, depending on the level of commitment in air cargo services (Morrell, 2011).

Adhering to alliances, joint-ventures or cooperation's with other air companies can generate customer value, increasing and densifying network's range of proposals. Joining alliances improves revenues and cost synergies, strengthening the available network and filling up unused capacity (Dewulf, 2011). Another important aspect, through vertical alliances, airlines reduce competition among direct opponents.

According to the analysed strategic factors, a list of possible airlines' cargo strategic objectives was compiled, showed in Table 2.1.

Table 2.1 - List of possible strategic objectives

Product Strategy	Market Strategy	Network Strategy
Competitive advantage against competitors	Capacity adjustment to market demands	Minimize unit costs
Product and services differentiation	Adapt to market tendencies	Fleet expansion
Improve cargo operational structure	Right mix of short and long term contracts	Maximize fleet performance
Improve IT services	Expand airline's global positioning	Adjust route network
Satisfy customers	Improve ground services	Join alliance
Ensure customer commitment	Relationship with competitors	Expand partnerships

2.1.2.2. Influencing elements of strategy development

Strategy definition is a vast theme with cyclical fluctuations over time. Strategic measures defined today could not correspond to management boards will or industry requirements in the near feature. A proactive posture is taken, evaluating industry performance and stakeholder's intentions regularly.

Management objectives aim to answer requirements from intervenient agents, ensuring the equilibrium and approval among players in overall business decisions. Key drivers in air cargo industry introduce market's tendencies and characteristics to management strategies delineation (Dewulf, 2011). The conjugation of these two parameters allows air cargo carrier's strategy definition according to their intentions in product, market and network objectives (Figure 2.2).

Figure 2.2 - Management strategy process

Source: Key Factors Contributing to Management Strategy Development at Air Cargo Carriers, Wouter Dewulf et al., 2011, pp 2,

Decisions in airlines management are mostly affected by the presence of other players, also known as stakeholders. These entities can belong to airports, governments, customers, alliances, suppliers, unions or competitors (Figure 2.3). Their presence implies requirements diversification, with different mixes of priority overtime (Dewulf, 2011).

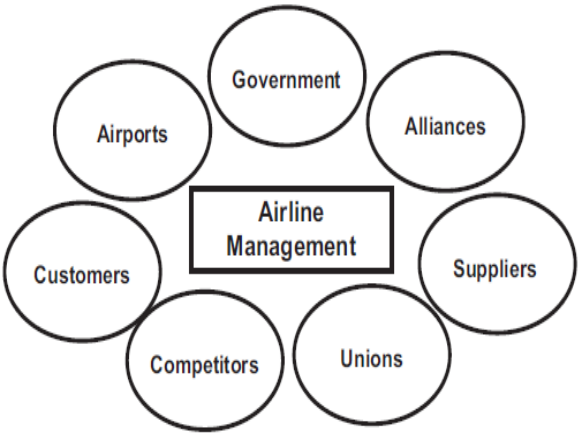


Figure 2.3 - Different agents acting in management objectives

Source: Modelling Applications in the Airline Industry, Ahmed Abdelghany, 2010, pp3

Each of these players has their own goals and agenda, most of them incompatible with each other's. So compromises have to be made among priorities of the involved parts, thus harmonizing the overall system. Therefore assuring this delicate equilibrium is one of the major challenges of a company's management. Consensus among objectives has to be guaranteed among stakeholders for strategy's establishment (Abdelghany, 2010). Overall, management objectives could be strengthen managers' position, improve company's market share, maximize cash-flows, stimulate regional economic development and minimize environmental impacts.

The establishment of any strategic measures, organizations, must first characterize industry's market trends. Describing air cargo market characteristics, Annex 1, portrays the most important market elements. Industry key drivers industry are closely related to the commodities carried, registered market environment, industry agents, modal transportation choices, actual and future panoramas in air cargo industry.

Main variables delineating this industry are regions gross domestic product (GDP) growth, jet fuel prices, modal competition and the presence of direct competitors, also addressed in Annex 1.

2.2. Business model

2.2.1. Concepts

There is no overall established theory defining business models, instead there are several designations proposed by different authors. Business model designation has been used to classify numerous subjects from architecture, design, pattern, plan, methods, assumptions and statements (Morris et al., 2003) making it difficult to define and classify. Deprived of a unanimous definition, this chapter focus on reviews of current business models approaches, provided by relevant authors based on business and academic literature.

Business model concept is relatively new, making its first peak at the beginning of this millennium, during the Internet pinnacle in the emerging of e-commerce transactions (Macário et al., 2010). Driving forces such as outsourcing and offshoring procedures, better economic perception and huge financial restructuration's also boosted business model notions (Teece, 2010).

Frequently associated to business webs (b-webs), representing a network of suppliers, customers, distributors, services and infrastructures providers acting on Internet basis (Taspscott, Ticoll, et al., 2000). Internet access became standard on our lives leading business model concepts merging with further areas, thus innovating the original concept.

Some authors refer that business models are the way that a company creates value. Linder and Cantrell (2000) state that business model is how an organization creates value, considering three types of models (components of a business model, real operating business models and change models). Petrovic, Kittl, et al. (2001) definition resembles the previous one, believing that business models are the logic of business from the system, as long as value is created. They also reveal that is a complex social system among actors, relations and processes. Applegate (2001) also considers the creation of value criterion, adding that these are complex systems, resembling real life situations.

Other authors take a more economic approach on business models definition giving more significance to financial aspects. That is the case of Hawking (2001), revealing that business model is the company's commercial relationship among products and services provided into market. Rappa (2001) also shares the same view, revealing that business model is a method of doing business, by a company, to sustain itself and generate revenues. Afuah (2004) also puts in evidence profit issues, stating that business model is a framework for making money, hence has to perform a set of activities to comply with customer's requirements.

Flow of information is also a parameter recognized by some authors. Timmers (1998) reveals that a business model is the definition of a product, service or information flow, describing the intervenient

agents, as well as their main roles, source of revenues and potential benefits. Weil and Vitale (2001) also back's up Timmers view, considering that business models consist in the description of roles and relationships between customers, allies and suppliers with principal flows identification.

Business model is how an organization creates and delivers value to customers, delineating the business logic necessary to generate profit. This view is shared by several authors such as Stähler, Magretta and Osterwalder. Stähler (2002) also complements that business model is a simplification of reality, allowing entrepreneurs to understand and plan the organization's mode of operation. Magretta (2002) adds that a business model is like a story or logic, explaining how an enterprise work. It is a combination and transformation of resources with the purpose of generating a value proposition, benefiting all the involved entities.

Osterwalder sees business models as a collection of organizational roles, system functionalities, detailed mechanisms descriptions and relationships among parties. He introduced a detailed analysis of business models in a simplified format with the nine block canvas proposition. According to his point of view, business model is usually associated as the company's blueprint, revealing how an organization does business and interacts with other entities in order to generate profit (Osterwalder, 2005). This author also adds the parameter of partner's network (Grasl, 2009), asserting that these are not simply the necessary agents to produce products, partnerships are also important in market and distribution tasks.

2.2.2. Osterwalder model proposal

After analysing business models propositions from different authors, Osterwalder's proposition reunites the necessary attributes for the purpose of this project research. Contemplating factors from value creation, financial features, flow information, network of partners and business logic delineation. Its point of view will be adopted and adapted to cargo operations in passenger airlines.

2.2.2.1. Concept and definition

"A business model describes the rationale of how an organization creates, delivers, and capture value"
in Business Model Generation by Osterwalder (2010)

The essence of business models is to create value for companies, customers and society. Osterwalder created an ontology for business models description, exploiting synergies and avoiding conflicts among the involved agents.

In business model creation, information was arranged in two steps: the first step relates to main areas, representing key issues in business model definition; second step consists in breaking down the four

issues areas into a series of nine reciprocal building blocks, enabling business model formation and comprehension.

First step consisted on defining four pillars addressed by business models. These are product, customer interface, infrastructure management and financial aspects. Products area consists in the type of business that the company operates, representing the value propositions offered to the market. Customer interface is how a company targets, delivers and relates to their customers. Infrastructure management resides in what type of partners a company wants to rely on, how the company performs infrastructure and logistic subjects and what type of network they want to provide. The last area, financial aspects, consists in revenue models and cost structures guarantying the models sustainability and generating profit for the enterprise (Osterwalder, 2004).

One of the major problems that Osterwalder encountered on business models formulation, was the lack of consistency in the description of the company's business model. So the second step was created with the purpose of facilitating description, visualization, assessing and changing business models.

Table 2.2 - Nine business model building blocks

Pillar	Building Block of Business Model	Description
Product	**Value Proposition**	A Value Proposition is an overall view of a company's bundle of products and services that are of value to the customer.
Customer Interface	**Target Customer**	The Target Customer is a segment of customers a company wants to offer value to.
	Distribution Channel	A Distribution Channel is a means of getting in touch with the customer.
	Relationship	The Relationship describes the kind of link a company establishes between itself and the customer.
Infrastructure Management	**Value Configuration**	The Value Configuration describes the arrangement of activities and resources that are necessary to create value for the customer.
	Capability	A capability is the ability to execute a repeatable pattern of actions that is necessary in order to create value for the customer.
	Partnership	A Partnership is a voluntarily initiated cooperative agreement between two or more companies in order to create value for the customer.
Financial Aspects	**Cost Structure**	The Cost Structure is the representation in money of all the means employed in the business model.
	Revenue Model	The Revenue Model describes the way a company makes money through a variety of revenue flows.

Source: The Business Model Ontology, Alexander Osterwalder, 2004, pp 43

Second step consisted in broken down the four pillars into nine interrelated business models elements, synthesizing the business model literature researched and evaluated by this author. Table 2.2 reveals the connection among pillars with their respective business model elements, and Figure 2.4 unveils the relation among specific elements, accomplishing the nine block business model canvas.

In addition, Osterwalder excluded elements related to the competitive landscape in his business model canvas proposal. Author asserts that these subjects are important issues, but not an internal part of business models, acting externally of a company.

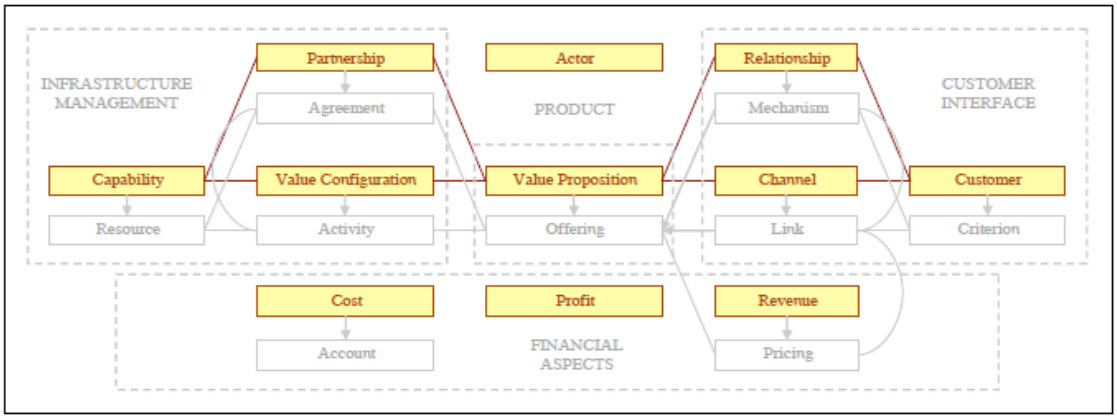


Figure 2.4 - Business model components relationship

Source: The Business Model Ontology, Alexander Osterwalder, 2004, pp 44

2.2.2.2. Nine blocks canvas

Business model canvas proposed by Osterwalder consists in nine interrelated building blocks, showing how a company or organization plans to make a profit. This canvas can be used to design business models but can also function as a diagnostic tool, helping in planning scenarios. The nine building blocks consist in Customer Segments, Value Propositions, Channels, Customer Relationships, Revenue Streams, Key Resources, Key Activities, Key Partnerships and Cost Structures (Figure 2.5).

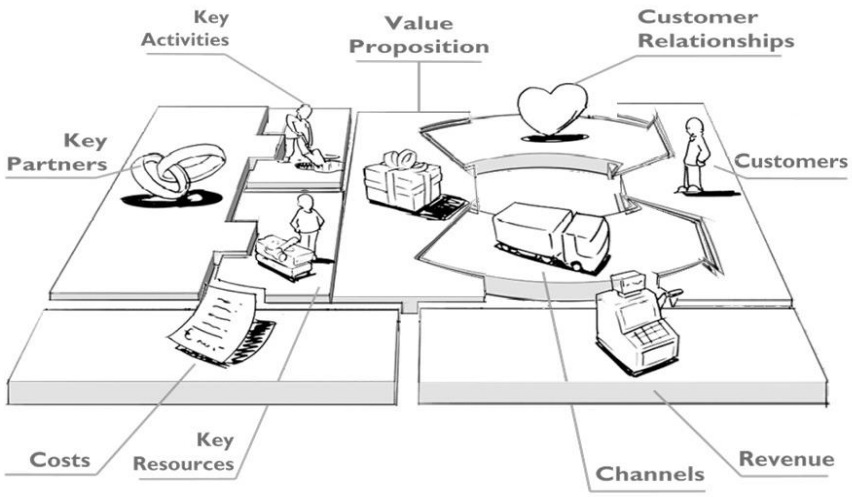


Figure 2.5 - Nine blocks canvas

Source: Business Model Generation, Alexander Osterwalder, 2010

- Customer Segments

Customer segments define which clients or group of people the company intends to reach and serve with their products or services. No business model can survive without customers, being the core of any business. This block is usually the starting point of designing a business model (Osterwalder, 2010).

Organizations have to take the conscience decision which customers want to serve or ignore. Promoting a better service, companies need to group customers into segments according to similar attributes, needs or behaviour. Customer segments are usually established according to market characteristics, where the company acts on.

In a mass market basis, customers are usually undistinguished. Thus, customer relationships, distribution channels and value propositions are defined for a large group of customers with similar attributes and needs (Osterwalder, 2010).

In niche markets, business models are built for specific markets and specialized customer segments. Customer relationships, distribution channels and value propositions have to be tailored for each segment or market (Osterwalder, 2010).

A company can also opt to segment customers according to market's needs. Providing a better sectioned response, customer relationships, distribution channels and value propositions must be market segmented oriented, so it could cope with changeable needs and problems (Osterwalder, 2010).

- Value Propositions

The value proposition block describes a variety of products and services, or a combination of both, that an organization could do, creating added value to a specific customer segment. Value propositions aim to satisfy and solve customer's problems. These could be innovative, representing a disruptive offer, or simply adding features and attributes to existing market offers (Osterwalder, 2010).

Value can assume quantitative (price) or qualitative (design) forms (Osterwalder, 2010). Elements contributing to customer value creation can be products/service's newness or customization, improved performance, accessibility or usability, lower prices or superior design.

- Channels

This building block represents how an organization reaches its customer segments, delivering value propositions. Customers reach company's products and services through communication, distribution and sales channels.

Channels may or not be owned by the organization. Owned forms provide higher profit margins, especially in the direct mode, but are also costly to operate and maintain. Channels can also be obtained by partnership with other entities, reaching clients in an indirect form, usually under subcontract agreements (Osterwalder, 2010).

Channels allow an organization to bring the value proposition to market. For that is necessary to find the right mix of integrated direct and indirect channels to satisfy customer segments.

- Customer Relationships

This building block consists on the type of relationship that an organization wants to have with their customer segments. There are several categories of customer's relationships, from personal to automated services (Osterwalder, 2010).

Personal assistance can assume simple or dedicated forms, both involving human interaction wherein customers communicate with a real agent during the sales process or post-sale's issues. Dedicated personal assistance differentiates by having a dedicated customer representative to the individual client. It is the most intimate type of relationship that an organization could provide, usually developed over a long period (Osterwalder, 2010).

Self-service relationships are established without any direct contact with customers, usually associated with sophisticated and automated mechanisms allowing customers to help themselves.

- Revenue Streams

This block of the business model canvas represents the cash flow generated by offering a product or service to customer segments. Revenue streams can be generated through asset sales, usage fees, renting or leasing. Pricing mechanisms can differ according to customer segments, defined through fixed or dynamic procedures (Osterwalder, 2010).

Based on predefined static variables, fixed priced can adopt the following forms: list price (fixed prices for individual products/services), product feature dependent (price depends on the number or quality of the value proposition), customer segment dependent (price depends on customer segment characteristics) and volume dependent (price as a function of the quantity purchased) (Osterwalder, 2010).

Dynamic pricing allows prices to change according to market tendencies. These can adopt negotiation (haggling prices among entities) and yield management (fluctuation of prices according inventory and time of purchase) methods (Osterwalder, 2010).

- Key Resources

Key resources represent the required assets to practice a certain business model. These resources allow a company to create and offer value propositions into market, through customer segments, profiting with this operation (Osterwalder, 2010).

Key resources usually assume physical forms residing in capital intensive assets, such as buildings, vehicles and distribution networks. Besides physical, resources can also adopt intellectual, human and financial forms.

- Key Activities

For a business model to work, a company must produce or provide key activities to their customers. Key activities combined with key resources must offer a value proposition, reaching customer segments through channels (Osterwalder, 2010). Key activities can adopt production or problem solving methods.

Production area resides in a set of activities related to designing, producing and delivering a final form of products or services (dominated by manufacturing firms). Business models involving problem solving situations (consultancies, logistic companies) requires knowledge in management activities so it could come up with new solutions to customer requirements (Osterwalder, 2010).

- Key Partnerships

Creating alliances with important suppliers and partners enables business model's optimization, reducing risks and acquiring resources. Partnerships with relevant entities have become essential elements in many business models.

Partnerships can be: strategic alliances (between non-competitors), coopetition (strategic partnerships between competitors), joint ventures (on behalf of business developments) and buyer-supplier relationships (assuring reliable suppliers). In a competitive environment, reduction of risk and uncertainty can be achieved through these methods (Osterwalder, 2010).

- Cost Structures

Operating a business implies costs from the company that performs it. This building block describes the most important induced costs of running a business model. In order to generate revenues, a company must support the running costs of making and delivering products. Cost can be calculated after the definition of key resources, key activities and key partnerships building blocks (Osterwalder, 2010).

Cost structures have two broad classes: cost-driven or value-driven. Cost-driven structures focus on reducing overall costs (whenever possible) through leanest cost structures and resorting to intensive automation and outsourcing. Value-driven structures focus more on value creation than in cost implications. These are usually premium value propositions with a tailor made value-driven business model (Osterwalder, 2010).

Cost structures can be defined with fixed costs (same costs despite value or service provided), variable costs (cost variation according to volumes or services provided), economies of scale (cost advantages of adopting a business output expansion) and economies of scope (cost advantages of widening the scope of operations) (Osterwalder, 2010).

2.2.3. Airlines business models

As a starting point and creating a bridge between business models and air cargo industry, this dissertation includes the perspective of Rigas Doganis in his book *"The Airline Business"* adapted to Zondag's nomenclature in his thesis *"Competing for Air Cargo"*. Airlines are constituted by several business sectors. Doganis studied this subject, wherein the cargo business is generically described, giving a primary basis on cargo business models definition.

Airline business models are composed by several non-core departments. Those could be controlled in or out by the organization, depending on the level of importance given. These non-core areas correspond for the complementary services that the company could provide, improving overall business.

Non-core departments are usually: engineering, sales and distribution, revenue accounting, informatics, ground handling, in-flight catering and cargo. Leaving the company's core business to be passenger flight operations (Doganis, 2006).

Traditionally an airline controlled all the non-core services mention above, but with several economic crises, intensification of competition or simply revenue enhancement lead to original models modifications (Morrell, 2011). Cargo business is no exception, many companies consider it differently. These are usually constituted according to the sector's structure given by management boards, in which could follow an outsourced model, unit business model or a subsidiary model.

2.2.3.1. Outsourced model

This model resorts to the outsourcing policy for non-core services. Outsourced concept was one of the first changes in the traditional model. Emerged as a differentiated services solution facing the uprising competition and diminishing operational costs in those sectors (Doganis, 2006).

Uses a simple concept model, wherein passenger airlines focus in flight operations (core business) leaving complementary activities (non-core business) to external service providers (Figure 2.6). So with a better economic proposition due to the complexity and added cost of running external departments, plenty airlines prefer to delegate this service to outsourced companies (Morrell, 2011). Commitment levels relatively to cargo transportation and other sectors are relatively low, usually considered as a by-product of the passenger service (Zondag, 2006).

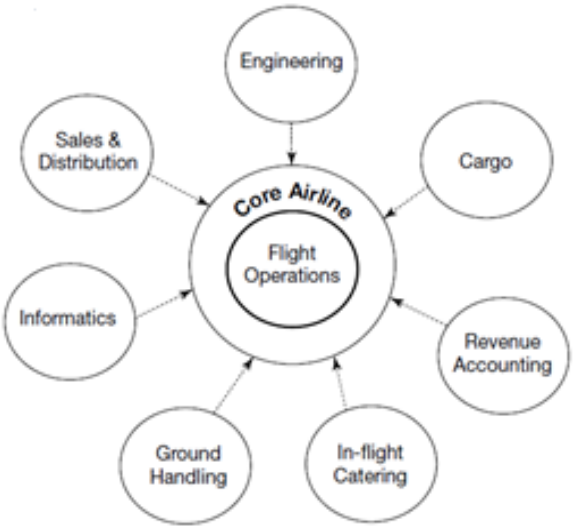


Figure 2.6 - Outsourced model scheme

Source: The Airline Business, Rigas Doganis, 2006, pp 284

The operational cost reduction, focus on flight operations and the improvement of the adjacent services (giving it to specialized companies) are the main advantages points of this model. These models are usually associated with low cost airlines that perform cargo operations, such as Southwest Airlines and Air Asia.

2.2.3.2. Unit business

Unit business model provides several levels of commitment to non-core departments, depending on management boards' strategic choices.

Overall there is a medium level of commitment to some non-core services, including cargo business, delegating operations to an own department (Figure 2.7). Providing the majority of services within the organization promotes airlines self-sustainability. This model reveals that the company understands the importance of having the complementary services, thus controlling them directly for an efficient running of operations (Doganis, 2006). Example of airlines practicing this model in their cargo operations could be TAP Portugal and Brussels Airlines.

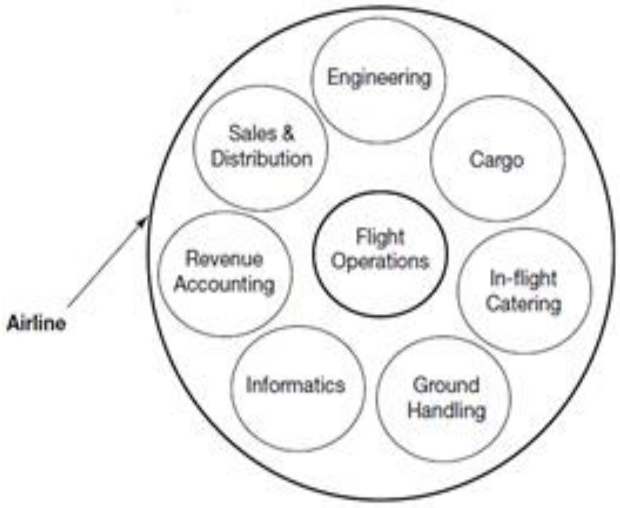


Figure 2.7 - Unit business scheme

Source: The Airline Business, Rigas Doganis, 2006, pp 284

2.2.3.3. Subsidiary model

This model indicates an airline can provide different business sectors, supporting or not the passenger service (Figure 2.8). Subsidiary model has the highest commitment level related to non-core services and could be detained as a wholly or partly by the main company, normally sharing the same corporation name (Zondag, 2006).

The subsidiary model has an independent and autonomous strategic model, defining their own types of services, operations and equipment's, giving priority to in-house resources (aircraft, personnel, and infrastructure) (Zondag, 2006). If in-house solution is unviable, for the company or the customer, then agents can resort to subcontract other companies to perform the needed service (Doganis, 2006).

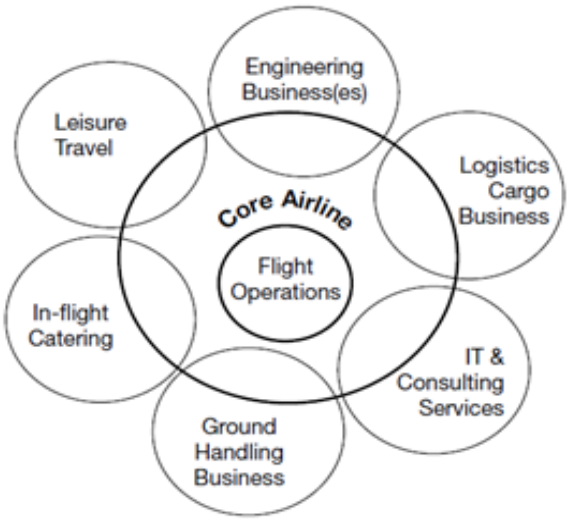


Figure 2.8 - Subsidiary model scheme

Source: The Airline Business, Rigas Doganis, 2006, pp 285

The semi-separation of the cargo department from the main company, benefits the company and customers, reaching more efficient solutions in terms of cost controlling and improving focus on the final consumer with a fitted solution for their intentions (Doganis, 2006).

The first companies starting to use this model where Lufthansa and Singapore Airlines. After the economic crises registered at the beginning of the 90s and with an effort to improve air cargo with a differentiated strategy, they adopted this model later that decade (Morrell, 2011).

The subsidiary model developed by Lufthansa implies a whole division for cargo transport (Lufthansa Cargo AG), entirely controlled by the main company (Deutsche Lufthansa AG). In order to obtain major control of operations, the cargo department was divided into three sections (Figure 2.9).

The first section, Global Cargo Net, is responsible for inside negotiations with the department that operates passenger services. They usually buy the belly capacity for them, so later they could sell it to customers. The second section, the Global Cargo Handling Services, manages ground handling, human resources and other operations dedicated in this sector. The last section is related with the cargo only service that Lufthansa provides. This one manages freighters, maintenance and crews (Morrell, 2011).

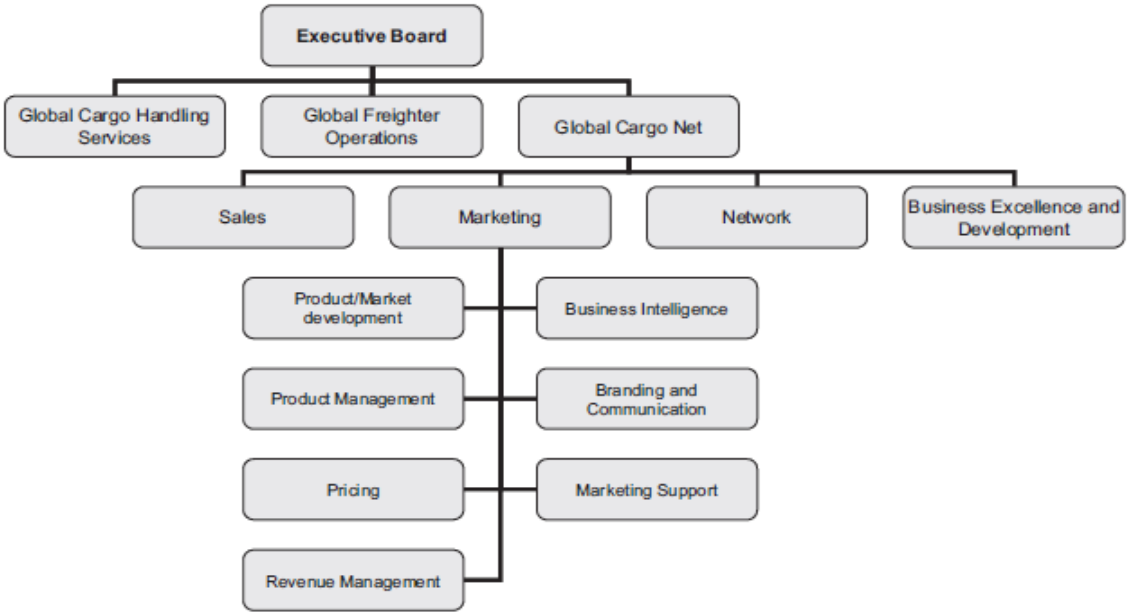


Figure 2.9 - Lufthansa cargo management structure

Source: Lufthansa Cargo AG: Capacity and Dynamic Pricing, Hellermann, 2002

The advantages of using this model consist in a greater customer focus, financial transparency and improve planning operations with better consumer relations. There are a few disadvantages, being a major one, the loss of economies of scale. Economies of scale need their own human resources, financial teams and informatics departments. Subsidiary model has those departments integrated with other consignments, compromising this type of economy (Morrell, 2011).

2.3. Integration of strategy and business model

Concepts of business model and strategy are often conflated. Usually when a company beats their competition is due to their strategic choices, not in their business model propositions. Business models are independent of competitors or market state, describing how the company is structured and their methods to capture revenue, assuring value to customers. That is the essence of a good business model, providing value to customers and collecting revenues with the offered service.

Nowadays, developing a successful business model is not enough to assure competitive advantage. Implementing a business model clarifies and reveals the gross elements of a potential successful business, making it vulnerable to competitor's reproduction. Adding that to market's convergence, performing similar procedures, enables imitation by opponents. A differentiated and hard to imitate business model, allows enterprises to run efficiently, diminishing rivalry and generating higher revenues (Teece, 2010).

Business models reveal the overall and generic procedures of the organization. This generic aspect reveals to be a weak point, exposing the logic of operations to opponents. To persevere logic, business models need to be coupled with strategy measures to protect the initial competitive advantage created. Merging these subjects, when complemented and well-articulated, creates advantages for customers and enterprises.

Strategy describes how the company engages competitors and responds to market environments. Also sets the course, objectives and performances for implementing a specific outcome (Noren, 2013).

An organization establishes their strategic programs so it could understand business environments, thus outperform competitors. Companies can adopt the same business model and obtain different results based on different business strategies (Noren, 2013).

Business environments are continuously changing and increasing complexity. Management strategy procedures are being applied in business models so an organization can cope with internal and external environments, therefore, improving their control of processes and operations (Teece, 2010).

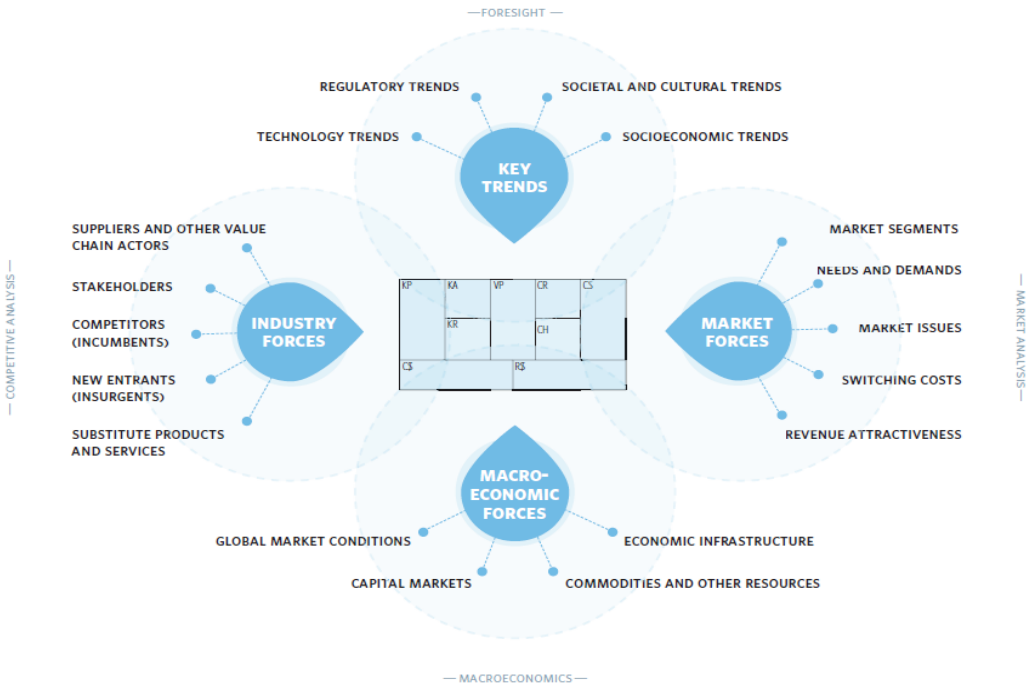


Figure 2.10 - Business model environment influences

Source: Business Model Generation, Alexander Osterwalder, 2010, pp 201.

Competitive landscape is composed by suppliers, customers, rivals, potential new entrants and substitutes. Company's business model should be designed taken into consideration the company's strategy and markets requirements. Understanding the environment allows for a stronger and competitive business model, but can also be of greater uncertainty, complexity and with market disruptions. Knowing and controlling environmental aspects leads to a more efficient and up to date business model (Osterwalder, 2004).

Business model environment fits in market forces (analysing markets), industry forces (analysing competition), key trends (foresight trends) and macroeconomic forces (macroeconomic perspective) (Osterwalder, 2010). Figure 2.10 and Table 2.3 identify and describe the key external forces that influences business models, respectively.

All companies, explicitly or implicitly, perform a particular business model dealing with internal attributes. In the other hand, strategy analyses the company's external environments, dealing with customers and competitors. These two fundamental business aspects can be deeply interrelated among each other. Defining business model's parameters will reflect on company's strategic approaches, and vice-versa, in order to achieve a strategic objective we might need to redefine the business model. All depends in the type of measures that management boards' wish to implement in their business.

Table 2.3 - Description of the key external forces that influence business models

Market forces	Market issues	Identify key issues driving and transforming markets from customer and offer perspectives
	Market segments	Identify the major market segments, describes their attractiveness, and seeks to spot new segments
	Needs and demands	Outline market needs and analyses how well they are served
	Switching costs	Describe elements related to customers switching business to competitors
	Revenue attractiveness	Identify elements related to revenue attractiveness and pricing power
Industry forces	Competitors	Identify incumbent competitors and their relative strengths
	New entrants	Identify new, insurgent players and determines whether they compete with a different business model
	Substitute products and services	Describe potential offer substitutes
	Suppliers and other value chain actors	Describe market's key value chain incumbents and spots new, emerging players
	Stakeholders	Specify which actors may influence organizations and business models
Key trends	Technology trends	Identify technology trends that could threaten business models - or enable it to evolve or improve
	Regulatory trends	Describe regulations and regulatory trends that influence business models
	Societal and cultural trends	Identify major societal trends that may influence business models
	Socioeconomic trends	Outline major socioeconomic trends relevant to business models
Macroeconomic forces	Global market conditions	Outline current overall conditions from a macroeconomic perspective
	Capital markets	Describe current capital market conditions relating them to capital needs
	Commodities and other resources	Highlight current prices and price trends for resources required for business model operations
	Economic infrastructure	Describe the economic infrastructure of the market in which business operates

Source: Business Model Generation, Alexander Osterwalder, 2010, pp 201-209.

3. Air cargo market research and analysis

3.1. Data collection

After literature research in this specific area, passenger airlines cargo information was collected in academic and business basis. Academic resources were quite reduced in providing the necessary information relative to cargo operations. Instead, business information relying on stakeholders' reports, annual reports and available online information provided a broader range of data related to airline operations.

Nevertheless, information collected was not enough to access cargo business models, it was crucial to adopt other gathering information techniques. Achieving market adjusted responses, used methodologies consisted in personal interviews and online surveys to managers in the cargo business of passenger airlines.

These agents were reached through telephonic contact with the goal of attaining an interview. Thus personal interviews were made in March of 2014, with a duration of 60 minutes. Without restricting questions to pre-elaborated survey (Annex 2), these and other subjects were debated allowing an improved perspective of Portuguese and International air cargo markets.

Interviews were performed in the company's offices in Lisbon's Portela Airport Cargo Terminal and Oporto's Francisco Sá Carneiro Airport Cargo Terminal. The interviewed cargo executives were Amilcar Horta from AF-KLM Cargo, Bruno Aires from TAP Cargo, Fernando Gomes from Emirates SkyCargo, Mário Ferreira from Lufthansa Cargo, Paulo Quelhas from British Airways World Cargo and Teresa Mourão from Iberia Cargo, these last two combined compose the IAG Group. Straightaway my sincere acknowledgment to these administrators, their participation contributed highly to this project viability.

Interviews included six of the seven passenger airlines with cargo branch offices located in this country. TAAG Cargo representative was unable to be reached and general sales agents were considered out of the scope of this dissertation.

Besides addressing the global air cargo business of passenger airlines, interviews also permitted questionnaire refinement, focusing on essential business model questions on online surveys.

Online survey was created, present on Annex 3, so passenger airlines not acting in Portuguese market could be reached. With an approximate answering time of 15 minutes, a generic and academic purposed survey was made available to 25 European air passenger companies with cargo sectors. Five passenger airlines participated in this survey, being them Turkish Cargo (Onur Simsek), SWISS Worldcargo (Jan

Odermatt), Finnair Cargo (Linus Virtanen), Brussels Airlines Cargo (Herman Hoornaert) and SATA Cargo (António Sousa). All of these, my acknowledgment in their participation. Extra efforts to attain more responses was made, although without success.

Complementing business model information and characterizing the sample, Table 3.1 was created. Summarizing key cargo business variables, it also reveals the level of commitment to cargo operations and exposes value figures related to cargo transport in 2012.

Table 3.1 - Cargo business characteristics

	Cargo			**Traffic Figures (2012)**		
	Structure	Network	Sector Revenue Share	Cargo and Mail Transported (Thousand tons)	FTK Sold (Millions)	Cargo Load Factor
AF-KLM Cargo	Subsidiary Model	Established in function of cargo business destinations	11,0%	1 383	10 600	64,5%
Emirates SkyCargo			15,2%	2 100	9 270	-
Lufthansa Cargo			8,8%	1 700	8 700	69,6%
IAG Cargo			8,4%	814	6080	-
Turkish Cargo			12,7%	463	2 306	-
SWISS Worldcargo			11,0%	-	1 500	80,0%
Finnair Cargo			14,0%	148	-	-
TAP Cargo	Unit Business Model	Established in function of the passenger business destinations	4,7%	84	335	45,2%
Brussels Airlines Cargo			-	-	179	-
SATA Cargo			4,3%	6	-	-

3.2. Survey’s structure

Enabling data collection, surveys were composed by 29 questions encompassing Osterwalder’s nine business blocks with an additional block referring to the overall business characteristics. Inquiries for interview and online purposes were based in the structure present in Table 3.2a and 3.2b.

Table 3.2a - Survey's structure and questions purpose

Block	Question	Purpose
Business Characteristics	Which of the following models better suits your company's cargo business?	In reference to cargo business models defined, knowing which one better adjusts to cargo operations
	How the cargo network is established?	In which bases the cargo network is defined, according to passenger or cargo business
	Every passenger destinations have cargo services?	Availability of cargo destinations in passenger's network
	Considering the company's cargo business volumes, how important are the following markets?	Relevant cargo business markets, establishing the company's geographic specificity and served regions
Key Activities	What type of services are offered in the cargo sector?	Services offered in order to determinate product portfolio
	How representative are the following product categories in volume transportation?	Determinate the products transportation share, revealing the ones that generate higher yields
Customer Segments	How relevant are the following customers on your company's business model?	Determinate company's main and secondary customers
	How are usually considered other air companies with whom your company works?	Perceive other airlines participation in cargo business
Channels	Which sales channels are used?	Type of assistance provided to customers
	Which are the main contact methods?	How cargo representatives connect with customers
Value Propositions	What distinguishes your company's cargo services from competitors?	Which attributes differentiates the company from opponents (block complemented by collected information)

Table 3.2b - Survey's structure and questions purpose

Block	Question	Purpose
Customer Relationships	What is the most common type of contracts established with customers?	Common contract types contributing to company's revenue
	What is the typical time-frame of the contract chosen above?	Contracts time-frame, operations driven by long or short term agreements
	Does your company allows customers involvement in route definition and cargo operations?	How is the system structured, established to customers to use or allows their interaction
Key Partners	Which type of agreements does your company usually practice with other air companies?	How the company works with partner airlines
	How does your company perform Road Feeder Services?	How is complemented the airfreight service with other modes of transportation
	How does your company perform handling procedures?	Which basis handling procedures are defined
	Does your company has other relevant partners?	Other partnerships that may be important, completing the overall supply chain
Key Resources	How is the business volume distribution according to the type of aircraft?	Cargo volume distribution, share of transported cargo in passenger and freighter aircraft
	How many freighters has the cargo business? What is the aircraft type?	Determinate the level of commitment and importance of cargo operations in company's structure
	At the moment, does your company practice any Charter/ACMI cargo contract?	Assess lack of resources in air cargo demands
	Does your company holds other physical resources besides aircraft?	Extra resources and services related to air cargo operations
	Are financial resources a fundamental element in your company's business model?	Perceive the importance of financial resources
Revenue Streams	From the following agents, who can generate more revenues streams?	The importance of main customers and other airlines participation in revenues wise
	Which price mechanisms are usually established with customers?	How the company prices their services
Cost Structure	Which economic type suits your company's business model?	Dominating economic type, wherein capacity corresponds to economies of scale and destinations corresponds to economies of scope
	In which basis, does your company assign cargo costs?	Cargo cost allocation in passenger aircraft
	How relevant are the following elements in your company's cost structure?	Actions performed besides pure air transportation, representing significant structure costs
	Is there any route, where the passenger sector is cross-financed by the cargo sector?	The relevance of cargo sector on groups procedures

3.3. Business Model Canvas Adaptation

Starting from the point of view of Osterwalder's business model definition, information concerning cargo operations had to be adapted for each single block. According to patterns revealed in information treatment, new subcategories were created, standardizing airlines cargo business particularities.

Collected data was compartmentalized into Key Partners, Key Activities, Key Resources, Value Propositions, Customer Relationships, Channels, Customer Segments, Cost Structure and Revenue Streams business model blocks.

3.3.1. Key Partners

Describing the network of suppliers and partners, air cargo key partnerships are driven by other airlines, belonging or not to cargo alliances, under pre-stipulated cooperation agreements. In any business model customers are vital pieces, thus partnership with them could also be advantageous for both entities.

Airports and handling companies could also be considered as key partners, mainly in ground operations procedures. Airfreight transportation has evolved to other modes of transportation less cost-driven, which is the case of truck transportation. Partnerships can also be established with road transport companies providing own and subcontracted forms of road feeder services. Improving air cargo management, airlines can also partnership with IT software companies. These are the principal partnerships that a passenger air carrier has related to cargo operations, but others could arise, in order to enhance the overall cargo transport supply chain.

3.3.2. Key Activities

Cargo activities are controlled by logistic management teams, marketing the company's available resources (aircraft and trucks assets). These manage the capacity according to company's product portfolio with normal, special and charter services.

3.3.3. Key Resources

Resources are the fundamental assets in order to make the business model work. In the air cargo environment, fleet and hubs are essential transportation resources. Complementing these could be IT cargo software and physical resources besides aircraft.

3.3.4. Value Propositions

One of the most important blocks, value propositions, define a set of products or services that the airline could do, creating value for customers. This segment is divided into three categories: differentiation from competitors, cargo markets and complementary propositions.

Differentiation from competitors reveals the company's principal attributes, highlighting their market positioning and advantageous qualities in this aggressive environment. As a result from uniformity of responses, cargo markets group had to be included, revealing the company's geographic specificity and served regions. Other elements worthwhile mentioning, are fitted into complementary propositions section.

3.3.5. Customer Relationships

This segment describes which relationship the airline provides to its customers. Which type of cargo contracts are available, and the ones commonly established. In general, how the company relates and interacts with their customers.

3.3.6. Channels

How the cargo department communicates with its customers and which channels are used to deliver their services. In this business, clients are highly dependent from the type of relationship provided by airlines, through their branch offices and GSAs agreements. Customers are reached through the representatives' actions and contact methods.

3.3.7. Customer Segments

Splitting customers into segments according to their operational specifications is the main objective of this business model block. In air cargo business, these are usually separated according to revenue aspects, established into main and secondary customer segments.

3.3.8. Cost Structure

Describing costs in operating business models, cargo's cost structure consist in revealing main operational costs, determining which economic type is driven by the company (scale, scope or a compromise among them). In this segment, is also mentioned how a passenger airline allocates cargo transportation costs in passenger business.

3.3.9. Revenue Streams

A major block's indicator is the cargo department revenues, revealing overall group's share in the business structure. Main revenues are attained through customers and airlines business participation. In this segment, it is also accessed customers' pricing features and most lucrative actions. Revenues could be enhanced through the participation of other airlines with specific cooperation agreements. Other substantial revenues could be achieved, usually linked to resources use.

3.4. Market Analysis

3.4.1. AF-KLM Cargo

Cargo transportation is modelled in airport to airport basis, uniting cargo operations from Air France and KLM, with the participation of Alitalia Cargo and Martinair. Adopting a subsidiary model structure, cargo network is established according to its business, wherein passenger's network only complements cargo operations.

Improving efficiency and adapting to market conditions lead the company in entering different strategic cooperation partnerships. Working with cargo departments from Air France, KLM, Alitalia and Delta Airlines with the objective of conquering North Atlantic air cargo traffic. The company differentiates from competitors in their network, geographic specificity and overall transit time efficiency.

Current cargo sector is composed by 392 passenger aircraft from Air France, KLM and Alitalia. In the Italian airline, non-regional cargo operations are controlled by AF-KLM Cargo. The company has at its disposal 15 freighter aircraft, originally belonging to Air France, KLM and Martinair. Adopting a strict capacity discipline and new commercial strategies, company's board wish to reduce investments and improve load factors on passenger and cargo only flights. Fewer investments could result on definitive retirement of old and unused freighters.

Restructuring short and medium haul operations by adapting routes and stop-overs were necessary to optimize revenues. AF-KLM Cargo provides joint cargo teams covering network management, communication, marketing, distribution and sales on their own, partners and RFS network. Uses CHAMP Cargospot IT cargo software providing developed capabilities, channels and booking systems to cargo operations.

Partnerships with other airlines could be established inside SkyTeam's Cargo alliance, engaging cargo departments from Aeroflot, Aeromexico, CSA, Korean Air, China Southern and China Airlines. Outside the alliance AF-KLM Cargo also has agreements with Etihad Cargo and Kenya Airways Cargo. Cargo transportation with the participation of partner airlines are usually under special prorate agreements where profits are equally distributed among the involved air carriers. AF-KLM Cargo also provides a worldwide road feeder service network enhancing profitability and new markets entrance. RFS are available in intra-Europe, Asia, Africa, North and South America regions. These are usually performed with own resources, delegating subcontracts forms in less relevant markets.

AF-KLM Cargo dominates the European market due to its presence and control of two significant hubs, Paris Charles de Gaulle Airport and Amsterdam Schiphol Airport. In these hubs, the cargo company also owns warehouses and in Amsterdam Schiphol handling procedures, are performed by an affiliated

company from KLM (Cobalt Ground Solutions). Roma Fiumicino Airport, Paris Orly Airport and Lyon Saint Exupéry Airport are considered secondary hubs, extending the European control.

Concentrating in the group's geographic specificity on connections among Europe, Asia, North and South America, AF-KLM Cargo also serves Australian and African regions accomplishing a network of 280 destinations all over the world. Offering its customers a single contact point in order to stipulate contracts, cargo services are presented through direct contacts and campaigns among freight forwards all over their 52 branch offices and 66 general sales agents.

Customers consist in international and regional freight forwarders, integrators, other cargo agents and producing companies. AF-KLM Cargo intends to satisfy them through efficiently contractual conditions on guaranteed space contracts (allotments), spot on contracts, priority contracts and promotional contracts. These can be attain through dedicated, personal assistance and automated services, with a highly developed e-booking channels for spot on contracts ("Click and Book").

Promoting a rationalized and simplified range of services, product portfolio encompasses normal, special and charter services. Normal services consist in general airfreight transportation, in express (Equation) or regular (Dimension) time frame. Special services can adopt two forms, Cohesion for fully customizable solutions and Variation for cargo with regular requirements (BIG – Large, heavy or atypical products, DGR – Dangerous goods, Fresh – Temperature sensitive products, Live – live animals, Pharma – Pharmaceutical products, Safe – valuable goods and Wheels – for all types of vehicles). In order to maximize profits, some of the unused freighters could be chartered to other companies through AF-KLM Cargo Charter Services agency.

With worsening market conditions, business financial performance deteriorated despite a series of commercial and cost-saving initiatives on reducing previous debts and operational losses. Cargo sector uses a compromise between destinations (economies of scope) and capacity (economies of scale) economic type. Main costs resulted from performing freighter services, cargo transported in passenger aircraft (joint product cost structure), own and subcontracted road feeder services, administrative and agency costs, and costs from handling procedures.

In 2012, AF-KLM Cargo transported 1.383 million tons of freight and mail, corresponding to 10.6 billion freight tonne kilometre sold of the available 16.4 billion, making a cargo load factor of 64.5% for that year. Cargo sector showed a revenue of 3 057 million euros, representing 11% of total group's revenue. General cargo transportation, from Asia and Americas under spot on contracts within a short time frame, reveal to be the most lucrative actions for the company. Revenues from cargo charter services and special prorate agreements with partner airlines also improved the overall cargo sector revenues.

Table 3.3 - AF-KLM Cargo business model

			AF-KLM Cargo
Key Partners	Airlines	Cargo alliance	SkyTeam Cargo
		Other airlines	Etihad Cargo and Kenya Airways Cargo
	Airports		Paris Charles de Gaulle, Amsterdam Schiphol and Roma Fiumicino
	Customers		International freight forwarders
	Handling	Main hub	Cobalt Ground Solutions
		Other airports	Outsourcing model
	RFS		Europe, Americas, Asia and Africa
Key Activities	Product portfolio	Normal	Dimension (general airfreight) and Equation (general airfreight express)
		Special	Cohesion (fully customizable solutions) and Variation (BIG - large, heavy or atypical products, DGR - dangerous goods , FRESH - temperature sensitive products, LIVE - live animals, PHARMA - pharmaceutical products, SAFE - valuable goods and WHEELS - all types of vehicles)
		Charter	AF-KLM Cargo Charter Services
	Marketing capabilities	Pax. aircraft	Air France, KLM and Alitalia
		Cargo aircraft	Air France, KLM and Martinair
		RFS	Own and subcontracted
	Logistic management		Joint cargo teams covering sales, distribution, marketing, network management and communication
Key Resources	Fleet	Passenger	392 Aircraft
		Freighter	15 Aircraft
	Hub	Main	Paris Charles de Gaulle and Amsterdam Schiphol
		Secondary	Paris Orly Airport and Roma Fiumicino Airport
	IT cargo software		CHAMP Cargospot (CHAMP Cargosystems)
	Physical resources besides aircraft		Cargo terminals and warehouses
Value Propositions	Differentiation from competitors	Main attributes	Network, geographic specificity and overall transit time
		Complementary attributes	Reputation and personal relationship with customers
	Cargo markets	Geographic specificity	Connecting Europe, Asia, North and South America
		Served regions	Europe, Australia, Africa, Asia, North and South America
	Complementary propositions		Offers its customers a single contact point for a unique network
			Worldwide RFS network enhancing profitability and new markets
Customer Relationships	Contracts	Types	Guaranteed space (Allotments), spot on, priority, promotional
		Most common	Spot on contracts within a short time frame
	Customer interaction		Allows customer involvement (customizable solutions) through several agencies over the world with local customs understanding
Channels	Category		Personal assistance and automated services (e-booking)
	Contact methods		Direct, telephone and E-mail
	Performed actions		Direct contact and campaigns among freight forwarders
	Agencies	Branch offices	52 Countries
		GSAs	66 Countries
Customer Segments	Main customers		International freight forwarders
			Regional freight forwarders
	Secondary customers		Integrators
			Producing companies (final clients)
Cost Structure	Economic type		Compromise between economies of scale and economies of scope
	Cost allocation in Pax. aircraft		Joint product cost structure
	Main costs		Performing freighter services
			Operational, Administrative and agency costs
			Costs from handling procedures and road feeder services
Revenue Streams	Overall cargo revenues (€)		3 057 000 000
	Customers	Pricing mechanisms	Negotiation
		Pricing time frame	Prices defined seasonally (except for promotional rates)
		Higher yield markets	Asia and Americas
		Most lucrative actions	General cargo transportation
	Airlines	Considered as	Partners
		Agreement type	Special prorate agreements
	Other		Revenues from cargo charter services

3.4.2. Emirates SkyCargo

Emirates main activities comprise in commercial air transportation, including passenger, cargo and postal carriage services. Cargo operations, responsibility of Emirates SkyCargo department, are considered as an integral part of overall operations, growing hand-in-hand with the passenger sector. Operating a huge network with high markets standards, cargo operations reach all four corners of the globe quickly and efficiently across six continents, having European, African and Asian markets as a geographic specificity. Cargo sector also serves Australian, North and South America regions accounting a total of 132 destinations in 77 countries.

Besides Emirates' SkyCargo extensive network, they also offer an innovating concept to its customers' distinct requirements. These attributes are complemented by the quality of overall operations, distinguished by various air cargo excellence awards. Despite marketplace challenges, the cargo department intends to grow. With better predictions of market's uncertainties and prioritizing route expansion, mainly in other modes of transportation, achieving a compromise between capacity (economies of scale) and destinations (economies of scope).

The cargo air carrier provides non-stop freight services with wide-body and custom built fleet in Emirates 207 passenger aircraft and 14 freighter aircraft belonging to the cargo sector. In order to enhance air cargo services, an extensive road feeder service network is also offered, allowing service to regional offline points. Own RFS services are available in the Middle East, Europe, Australia, Brazil, China, India, Malaysia and USA. In less representative regions, RFS are performed by subcontracted road transport companies.

Air and road cargo transportation are integrated having airport hubs as referral points. The company's objective is to solidify Dubai's position as a global hub. Consequently main hubs are located in two Dubai's Airports, Dubai International Airport for cargo in passenger aircraft and Dubai World Central Airport, for cargo in freighter aircraft. In these airports, besides having their own ground handling company (dnata), Emirates also possesses facilities for cargo purposes. Betting in European markets, Emirates secondary hub is located in London Heathrow, where they also have the presence of dnata and own cargo warehouses. In other regions, cargo handling procedures are operated by outsourcing companies.

Improving brand value and the service quality, cargo sector is structured as a subsidiary model, where network is established according to cargo business. Network is dimensioned to serve major continent hubs and smaller airports, integrated with other transportation modes and without passenger's network overlay. In passenger aircraft, the transported cargo experience joint product cost structure.

Providing worldwide logistics in which air freight is complemented by a vast RFS system, the sophisticated logistics management requires advanced IT software system. Co-developed with DHL, Mercator's IT cargo software, SkyChain controls all cargo operations related, optimizing the supply chain and levels of service, allowing real time access to customers and all parties across the supply chain through online cargo management systems.

Emirates SkyCargo provides a larger freighter fleet. This aspect contributes for the reasonably low number of partner airlines, where the company prefers to provide the service than delegated to other airlines. At the moment, Emirates SkyCargo practices cargo special prorate agreements with Jet Airways, Qantas, Fiji Airways, SriLankan Airlines, Japan Airlines and South African Airways.

Emirates SkyCargo product portfolio encompasses normal, special and charter services. Normal services consist on general, priority and courier freight transportation. Special services offer to customers' value added, protected, temperature sensitive and live animals services. Charter services allow the company to charter their freighter aircraft to other entities in order to maximize profits.

Captivating long term customers and strengthen relationships with existing ones are the strategic objectives customers wise. For that, Emirates provides a set of aligned contracts (guaranteed space contracts (allotments), spot on contracts, priority contracts and promotional contracts) which are offered to customers via personal assistance and automated services (e-booking). Personal assistance (contacting clients personally, telephonic and e-mail) is the most common type, contacting directly and campaigning among customers, usually freight forwarders. Main customers are international and regional freight forwarders while secondary customers consist in integrators and producing companies. Having 50 branch offices and 37 general sales agents all over the world enables the company in providing a service with local customs understanding.

Overall Emirates Group strategy prevails a mitigation of jet fuel prices. Main costs from cargo sector consist in administrative costs (air freight logistic management), costs from road feeder services, agency costs (worldwide branch offices and GSAs agreements), cost from handling procedures and costs inherent from performing freighter services. The cargo department main objective for the next years is to maintain the position of the largest air freight carrier by tonnage, with 9 270 million of freight tonnes kilometres sold in 2012, SkyCargo transported 2.1 million tons of air freight and mail. These values lead to a total revenue of 2 032 million euros achieving a group's share revenue of 15.2%. These numbers were accomplished due to special products transportation between European, African and Asian markets established through spot on contracts defined within a medium time frame. Revenues from cargo charter services and special prorate agreements from partner airlines also propelled final results.

Table 3.4 - Emirates SkyCargo business model

			Emirates SkyCargo
Key Partners	Airlines	Cargo alliance	-
		Other airlines	Jet Airways, Qantas, Fiji Airways, SriLankan Airlines, Japan Airlines, South African Airways
	Airports		Dubai International Airport, Dubai World Central Airport, London-Heathrow Airport
	Customers		International freight forwarders
	Handling	Main hub	dnata (affiliated company)
		Other airports	Outsourcing model expect in London-Heathrow (dnata)
	RFS		Middle East, Europe, Australia, Brazil, China, India, Malaysia and USA
	Other		DHL (e-freight services)
Key Activities	Product portfolio	Normal	General Freight, Priority and Courier
		Special	Value Added, Protect, Temperature Sensitive and Live Animals
		Charter	Emirates SkyCargo
	Marketing capabilities	Pax. aircraft	Emirates
		Cargo aircraft	Emirates SkyCargo
		RFS	Own and subcontracted
	Logistic management		Worldwide logistics in which air freight is complemented by a vast RFS
Key Resources	Fleet	Passenger	207 Aircraft
		Freighter	14 Aircraft
	Hub	Main	Dubai International Airport and Dubai World Central Airport
		Secondary	London Heathrow
	IT cargo software		SkyChain (Mercator)
	Physical resources besides aircraft		Cargo terminals and warehouses
Value Propositions	Differentiation from competitors	Main attributes	Innovating concept and provided services
		Complementary attributes	Quality of the provided services
	Cargo markets	Geographic specificity	Connecting Europe, Africa and Asia markets via Dubai's hub
		Served regions	Europe, Africa, Australia, Asia and North and South America (132 destinations in 77 countries)
	Complementary propositions		Operating a huge network with high markets standards
			Provide non-stop freight services with wide-body and custom built fleet
Customer Relationships	Contracts	Types	Guaranteed space (Allotments), spot on, priority, promotional
		Most common	Spot On contracts within a medium time frame
	Customer interaction		Allows customer involvement (customizable solutions) through several agencies over the world with local customs understanding
Channels	Category		Personal assistance and automated services (e-booking)
	Contact methods		Direct, telephone and E-mail
	Performed actions		Direct contact and campaigns among freight forwarders
	Agencies	Branch offices	50 Countries
		GSAs	37 Countries
Customer Segments	Main customers		International freight forwarders
			Regional freight forwarders
	Secondary customers		Integrators
			Producing companies (final clients)
Cost Structure	Economic type		Compromise between economies of scale and economies of scope
	Cost allocation in Pax. aircraft		Joint product cost structure
	Main costs		Performing the freighter service
			Operational, administrative and agency costs
			Costs from handling procedures and road feeder services
Revenue Streams	Overall cargo revenues (€)		2 032 000 000
	Customers	Pricing mechanisms	Negotiation
		Pricing time frame	Prices defined seasonally (except for promotional rates)
		Higher yield markets	Europe, Africa and Asia
		Most lucrative actions	Special products transportation
	Airlines	Considered as	Partners
		Agreement type	Special prorate agreements
	Other		Revenues from cargo charter services

3.4.3. Lufthansa Cargo

Focusing on airport to airport airfreight business, Lufthansa Cargo offers a service adapted to market conditions, product and customer oriented services, providing a solution to any logistical challenge. Cargo sector is structured following a subsidiary model, where network is established according to cargo business, without any passenger's network overlay.

Besides being an undisputed cargo leader in Germany, with a market share of more than 20% on this important European market, the cargo air carrier also as a strong presence on Asian markets, particularly on China. Lufthansa Cargo geographic specificity consists on connecting Europe to Asia, North and South America. Service to other regions, such as Australia and Africa, is also provided accomplishing a network of 300 destinations in over 100 countries. In order to promote a profitable and sustainable traffic growth, regions with weak demand will suffer a capacity decrease, dropping the volume of freight transport.

In 2012, Lufthansa Cargo achieved a cargo load factor of 69.6% which they still want to improve, developing better logistic management procedures and improving fleet elements. At the moment, the cargo department has at its disposal 380 passenger aircraft from Lufthansa and Austrian Airlines and 17 freighter aircraft, belonging to Lufthansa Cargo. At weekends and when necessary, Lufthansa Cargo maintains a joint venture with Aerologic providing extra freighter aircraft, corresponding to market's peak demands.

Lufthansa Cargo Group encompasses the cargo departments of Lufthansa, SWISS, Brussels Airlines and the cargo airline Aerologic (joint venture with DHL). Outside the group, they also have partnerships with LAN Cargo and Air China Cargo. Cargo transported in partner airlines is usually under special prorate agreements and block space agreements.

Air freight network is enhanced by a vast road feeder services, serving customers in offline points and maintaining operational profitability. Own road feeder services are available in major intra-Europe hub connections and flows between Iraq, Dubai, Jordan, Israel, Egypt, Iran and Libya to Europe. Other regions in Asia, North and South America are also served by road feeder services, in subcontracted arrangements. Aside from all the available destinations, Lufthansa Cargo wants to expand cooperation's expanding groups' overall network.

Lufthansa Cargo main hub is located at Frankfurt-Hahn, having their own cargo terminal, warehouses and an affiliated ground handling company, Handling Counts. Secondary hubs, located in Asia (Shenzhen International Airport and Shanghai Pudong International Airport), South America (Mexico City International Airport) and Europe (Munich Airport, Vienna Airport and Koln Airport) reveals the geographic specificity preponderance of these regions. Koln Airport operations resulted from Frankfurt-

Hahn's Airport night flight restrictions. Handling procedures outside Frankfurt-Hahn's airport are performed through outsourced companies. iCargo IT cargo software resulted from cooperation with IBS Software Services. iCargo increased automation in e-booking sales and streamlined the interface with freight forwarders improving supply chain synergy effects.

Normal services refer to general air cargo (td.pro) and express air freight services (td.flash). Special services were established in order to respond customers main transportation requirements for temperature sensitive products (cool/td), perishable products (fresh/td), dangerous goods (care/td), live animals (live/td), valuable products (safe/td) and airmail. Customizable solutions are offered when customers have special requirements usually in time sensitive issues, Courier.Solutions (cooperation with time:matters) and Emergency.Solutions (offering rapid transit times). Having a considerable number of freighter aircraft enables the company to offer charter cargo services, these are managed by Lufthansa Cargo Charter Agency.

Well positioned to offer its customers extensive global connections, customer agreements can be established through guaranteed capacity contracts, capacity purchasing contracts, spot on contracts and promotional contracts. Those are offered through 44 branch offices and 53 general sales agents all over the world providing personal assistance and dedicated personal assistance.

Lufthansa Cargo considers main customers not only as customers but also as partners, including them in "Global Partnership Program". Providing special relationship with 11 largest international freight forwarders, satisfying their regular freight requirements (DHL Global Forwarding, UPS, Kuhne+Nagel, Panalpina, Uti, Agility, CEVA, Expeditors, Hellmann, Dachser and DB Schenker). Integrators (DHL Worldwide, UPS and Fed-Ex) and other cargo agents are also considered as customers but in a secondary basis.

In terms of cost structure, the cargo sector adopts an economic type in which capacity (economies of scale) and destinations (economies of scope) are compromised. Lufthansa Cargo's main costs comprise in performing the cargo freighter services, road feeder services, administrative and agency costs, handling costs and cost from cargo transported in passenger aircraft (joint product cost structured).

In 2012, cargo sector registered 8.7 billion of freight tonne kilometre sold of the available 12.5 billion, having a cargo load factor of 69.6% corresponding to 1.7 million tons of freight and mail transported. These numbers resulted in a revenue of 2 688 million euros representing 8.8% total share revenue of Lufthansa Group. Main customers generated around 50% of total revenues, mainly carrying high-tech and intermediary products between Europe, Asia and Americas established through promotional contracts within a short time frame. Cargo charter services and special prorate and block space agreements with partner airlines also contribute largely to company's final revenues.

Table 3.5 - Lufthansa Cargo business model

			Lufthansa Cargo
Key Partners	Airlines	Cargo alliance	Lufthansa Cargo Group: Lufthansa Cargo, SWISS WorldCargo, Brussels Airlines Cargo and Aerologic
		Other airlines	LAN Cargo, Air China Cargo
	Airports		Frankfurt-Hahn Airport, Shenzhen International Airport, Shanghai Pudong International Airport and Mexico City International Airport
	Customers		11 International freight forwarders
	Handling	Main hub	Handling Counts
		Other airports	Outsourcing model
	RFS		Major intra-Europe hub connections and Middle-East to Europe
	Other		Jettainer (container specialist) and Time:matters (courier services)
Key Activities	Product portfolio	Normal	td.pro: general air freight, td.flash: general air freight express
		Special	airmail, fresh/td: for perishable products, care/td: for dangerous goods, live/td: for live animals, safe/td: for valuable products
		Charter	Lufthansa Cargo Charter Agency
	Marketing capabilities	Pax. aircraft	Lufthansa, Austrian Airlines, SWISS WorldCargo
		Cargo aircraft	Lufthansa Cargo (87 freighter flights across the world)
		RFS	Own and subcontracted
	Logistic management		Worldwide logistics in which air freight is complemented by a vast RFS
Key Resources	Fleet	Passenger	467 Aircraft
		Freighter	17 Owned aircraft + 8 aircraft form Aerologic joint venture
	Hub	Main	Frankfurt-Hahn Airport
		Secondary	Shenzhen International Airport and Mexico City International Airport
	IT cargo software		iCargo (IBS Software Services)
	Physical resources besides aircraft		Cargo terminals and warehouses
Value Propositions	Differentiation from competitors	Main attributes	Service adapted to market conditions
		Complementary attributes	Quality of the provided services and network
	Cargo markets	Geographic specificity	Connecting Europe to Asia, North and South America
		Served regions	Europe, Australia, Africa, Asia, North and South America
	Complementary propositions		Strong presence on Asia, particularly on Chinese markets
			New routes implementation in short time with flexible and demand-oriented capacity management
Customer Relationships	Contracts	Types	Guaranteed Space (Allotments), Spot On, Priority, Promotional
		Most common	Promotional contracts within a short time frame
	Customer interaction		Global Partnership Program
Channels	Category		Personal assistance, dedicated personal assistance and automated services
	Contact methods		Direct, telephone and E-mail
	Performed actions		Direct contact and campaigns among freight forwarders
	Agencies	Branch offices	44 Countries
		GSAs	53 Countries
Customer Segments	Main customers		11 International freight forwarders with regular air freight requirements
			Regional freight forwarders
	Secondary customers		Integrators
			Other cargo agents
Cost Structure	Economic type		Compromise between economies of scale and economies of scope
	Cost allocation in Pax. aircraft		Joint product cost structure
	Main costs		Performing the freighter service
			Operational, administrative and agency costs
			Costs from handling procedures and road feeder services
Revenue Streams	Overall cargo revenues (€)		2 688 000 000
	Customers	Pricing mechanisms	Negotiation
		Pricing time frame	Prices defined seasonally (except for promotional rates)
		Higher yield markets	Americas and Asia
		Most lucrative actions	Main customers generate around 50% of total revenues
	Airlines	Considered as	Partners
		Agreement type	Prorate agreements, code-share agreements and block space agreements
	Other		Revenues from cargo charter services

3.4.4. IAG Cargo

IAG Cargo results from the integration of British Airways World Cargo and Iberia Cargo in commercial sales, support and management services in the provision of airfreight transportation. Offering a single set of aligned products sold by single sales team across the globe, IAG Cargo promotes airline's consolidation on a regional and global scale.

Cargo operations assume a subsidiary model structure where network is established according to cargo business, offering optimal value for shareholders and customers. The company differentiates from opponents through its network, geographic specificity and service adapted to market requirements being complemented by the quality of the provided services at competitive prices.

The merger of British Airways and Iberia, constituting the IAG Group, allowed for a larger range of operations, particularly an extensively combined network improving previous services. British Airways World Cargo serves North American, Indian and Pacific Asian markets while Iberia Cargo serves South American markets, benefiting customers from an extensive and geographical diversification. Other regions, such as Africa and Australia are also served, culminating in a network of 280 destinations all over the world.

Making resource allocation decisions in order to optimize and consolidate financial results, freighter services are dimensioned to support the extensive passenger belly-hold network, delivering extra capacity in peak seasons and expanding route options for customers at an improved unit cost. Freighter service is provided by 3 aircraft from British Airways World Cargo and charter agreements with other cargo air carriers, such as DHL Worldwide Express and Qatar Airways Cargo.

Belly-hold cargo transportation is provided by 374 passenger aircraft from British Airways and Iberia. In order to expand destinations and maintaining profitability, IAG Cargo also provides a vast road feeder services in Europe, Americas, Asia and Africa. In less representative markets, this service is also provided, under subcontracted forms. All logistics and transportation aspects are assisted by CHAMP Cargospot IT cargo software.

Establishing prorate and codeshare agreements with partner airlines such as Japan Airlines Cargo, Finnair Cargo and Qatar Airways Cargo, the group intends to expand their cargo sector's coverage. IAG Cargo has recently adopted a strategy of attracting other airlines into the group, retaining the original brand an operational culture with the purpose to meet market demands.

Uniting the two flag carriers from England and Spain, enabled group's leadership in London-Heathrow and Madrid Barajas hubs. In both airports group owns warehouses, and in London-Heathrow ground

operations are performed by BA Ground Handling (affiliated company). Dominance in these countries is supported by secondary hubs, such as Gatwick Airport and Barcelona El Prat Airport.

IAG Cargo main customers reside in international and regional freight forwarders, relegating to second plan integrators and other cargo agents. Creating value for stakeholders and customers, IAG Cargo cooperates with WACO System developing business synergies among the cargo sector and freight forwarders.

Customer contracts, usually with freight forwards, can be established through guaranteed space contracts (allotments), spot on contracts, priority contracts and promotional contracts under personal assistance or automated services (e-booking). Personal assistance is given by 45 branch offices and 53 general sales agents all over the world, directly contacting and campaigning among customers.

IAG Cargo's product portfolio consists in general cargo, prioritize, pharmaceuticals & life sciences, perishables, specialist cargo and charters. Specialist category is for cargo with special and regular requirements, being segmented into airmail, courier, dangerous goods, secure, live animals and human remains. This unusual products division results from the group's specialization on premium products transportation such as pharmaceuticals and perishables. Despite the low number of freighter aircraft, the group can also provide charter services through IAG Cargo Charter Agency.

Adopting a policy of competitive cost position across the cargo business, allowed the company to have an adjusted economic type, where capacity (economies of scale) and destinations (economies of scope) are equally important.

Mains cargo costs consist in performing the freighter service, freighter charter agreements, costs from cargo transported in passenger aircraft (joint product cost structure), own and subcontracted road feeder services, administrative and agency costs and costs from handling procedures.

In 2012, the following year of group's foundation, IAG Cargo sold 6 080 million freight tonne kilometres, representing 814 thousand tons of freight and airmail. This operation resulted on 1 217million euros of revenues accounting a share of 8.4% relatively to group's total revenues. Most lucrative actions were the transportation of pharmaceuticals, express and perishable products in Asian, North and South American routes through spot on contracts defined within a short time frame.

Latin America flows represented around 30% of total revenues. Revenues from prorate and codeshare agreements with partner airlines also contributed for total cargo sector's profit. Management board has recently adopted strategies targeting a stronger Europe to Asia position, focusing on revenues and cost synergies.

Table 3.6 - IAG Cargo business model

			IAG Cargo
Key Partners	Airlines	Cargo alliance	-
		Other airlines	Japan Airlines Cargo, Qatar Airways Cargo, Finnair Cargo
	Airports		London Heathrow Airport and Madrid Barajas Airport
	Customers		International freight forwarders
	Handling	Main hub	BA Ground Handling (London Heathrow)
		Other airports	Outsourcing model
	RFS		Europe, Americas, Asia and Africa
	Other		WACO Systems (freight forwarder management network), long term charter commercial agreement Qatar Airways
Key Activities	Product portfolio	Normal	General Cargo, Prioritize, Pharmaceutical and Life Sciences
		Special	Airmail, Courier, Dangerous Goods, Human Remains, Secure and Live Animals
		Charter	IAG Cargo Charter Team
	Marketing capabilities	Pax. aircraft	British Airways and Iberia
		Cargo aircraft	British Airways World Cargo
		RFS	Own and subcontracted
	Logistic management		Single set of aligned products sold by a sales team across the globe
Key Resources	Fleet	Passenger	374 aircraft
		Freighter	3 aircraft
	Hub	Main	London Heathrow and Madrid Barajas
		Secondary	Gatwick Airport and Barcelona El Prat Airport
	IT cargo software		CHAMP Cargospot (CHAMP Cargosystems)
	Physical resources besides aircraft		Cargo terminals and warehouses
Value Propositions	Differentiation from competitors	Main attributes	Network, geographic specificity and service adapted to market
		Complementary attributes	Quality of the service and competitive market prices
	Cargo markets	Geographic specificity	North American, South American, Indian and Pacific Asian markets
		Served regions	Europe, Australia, Africa, Asia, North and South America (280 destinations all over the world)
	Complementary propositions		Specialization on premium products such as pharmaceuticals and perishables
			Customers can beneficiate from an extensive and geographical diversification
Customer Relationships	Contracts	Types	Guaranteed space (allotments), spot on, priority, promotional
		Most common	Spot on contracts within a short time frame
	Customer interaction		Allows certain customer involvement in cargo operations
Channels	Category		Personal assistance and automated services (e-booking)
	Contact methods		Direct, telephone and E-mail
	Performed actions		Direct contact and campaigns among freight forwarders
	Agencies	Branch offices	45 countries
		GSAs	53 countries
Customer Segments	Main customers		International freight forwarders
			Regional freight forwarders
	Secondary customers		Integrators
			Producing companies (final clients)
Cost Structure	Economic type		Compromise between economies of scale (capacity) and economies of scope (destinations)
	Cost allocation in Pax. aircraft		Joint product cost structure
	Main costs		Performing the freighter service
			Operational, administrative and agency costs
			Costs from handling procedures and road feeder services
Revenue Streams	Overall cargo revenues (€)		1 217 000 000
	Customers	Pricing mechanisms	Negotiation
		Pricing time frame	Prices defined seasonally (except for promotional rates)
		Higher yield markets	Latin America (30% of total revenues)
		Most lucrative actions	Pharmaceutical, express and perishable products transportation
	Airlines	Considered as	Partners (in some routes could be customers)
		Agreement type	Prorate agreements and code-share agreements
	Other		Revenues from cargo charter services

3.4.5. Turkish Cargo

Turkish Cargo, the airfreight division of Turkish Airlines, focus on cargo transportation on airport to airport basis. Focusing in Istanbul's hub, the company has a geographic specificity of connecting turkey to central Europe, Far East, Middle East and Africa. With a strong presence on European and Far Eastern markets, in 2012 company's cargo breakdown by regions was 43.6% in Asia, 38.3% in Europe, 8.6 in Africa, 8.3% in North America and 1.2% in South America, transporting cargo to more than 245 destination in more than 100 countries.

Establishing cooperation agreements with over 75 airlines, through special prorate agreements, opened new markets for Turkish Cargo and their customers. In the near future, management boards intend to establish collaborative agreements with a global alliance complementing the defined cargo network.

The passenger service provides 215 cargo destinations in 5 continents with its fleet of 224 passenger aircraft. Freighter service, composed by 9 freighter aircraft, provides 47 destinations, 17 in Asia, 11 in Europe, 10 in Africa and 9 in the Middle East. In the next years, the company is expecting to upgrade and expand their freighter fleet, to a young fleet with fuel saving attributes and adding 5 more freighter aircraft.

Complementing the airfreight service, the cargo company also provides road feeder services having more than 1000 truck destinations. Own RFS's are provided in Africa, North America, Asia, Europe, Middle East and Far East. Subcontracted forms of this service are also provided in less relevant markets, such in South America.

Turkish Cargo relies heavily on Istanbul's Ataturk hub position, in order to improve hub's international recognition, they concentrated operations in this location being the company's transfer point among Europe-Middle East, Europe-Far East and Asia, Europe-Africa and America-Middle East flows. In this location, the company owns cargo terminals and warehouses and also provides handling services through Turkish Ground Services (cooperation with HAVAS).

The cargo sector is established according to a subsidiary model structure, where the network is defined depending on cargo business, with no passenger's network overlay. Controlled by the IT cargo software COMIS (Cargo Operations Management and Information System) developed in cooperation with IBS Software Services, enables the company to provide worldwide logistic services coordinating regional and international trucking services. This state of the art transportation logistics enables the company to achieve their defined strategic objectives of growing in African markets, reducing flight time and introducing route flexibility options.

Turkish Cargo offers to its customer's three options in terms of product portfolio. Normal services encompass general and domestic cargo transportation. Special services are defined to special products with regular transportation requirements segmented into airmail, live animals, valuables, perishable goods, pharmaceutical, funeral transportation, dangerous goods and fragile goods. Special products usually generate more revenues due to the requirements needed to comply, concerning that, the company has adopted a strategy improving the transportation growth of live animals and valuable products.

Turkish Cargo also provides charter services through Turkish Cargo Charter department. In 2012, the company had 62 charter flights in operation, revealing to be an extra source of revenues.

The cargo company provides extended services with its scheduled and non-scheduled cargo flights and trucking services in order to develop regional commerce and meet expanding customer demands. Customers can enjoy Turkish Cargo's network, geographic specificity and tailor-made solutions to their demands at market prices.

Providing automated services (e-booking) and personal assistance through direct contact or campaigning among main customers, cargo transportation agreements could be established following guaranteed space contracts (allotments), spot on contracts, priority contracts and promotional contracts. Customers consist in international and regional freight forwards, integrators and other cargo agents. These could contact Turkish Cargo representatives through 12 branch offices or more than 100 general sales agents all over the world.

Main company costs' derive from performing the freighter service, cargo transported in passenger aircraft (under joint product cost structure), extensive own and subcontracted road feeder services, administrative and agency costs and costs from handling procedures. Having an economic of scope, where there are more destinations available than capacity. Turkish Cargo intends to improve capacity levels in entering in a cargo alliance and expanding their freighter fleet. Adopting a savings strategy, achieving low operational costs, the company wants to decrease sales costs by increasing personal and procedures efficiency in investing in cost cutting technologies.

Over the past 10 years, carried cargo volume increased 16% and in 2012 Turkish Cargo had sold 2 306 million tons of freight tonne-kilometres corresponding to 463 thousand tons of airfreight and mail. This operation showed a total revenue of 522 million euros representing a 12.7% of total group's revenue. The most lucrative actions were general cargo transportation between European and Far Eastern markets defined through spot on contract within a short time frame. The 62 charter flights and the special prorate agreements with partner airlines also contributed largely to the outcome.

Table 3.7 - Turkish Cargo business model

			Turkish Cargo
Key Partners	Airlines	Cargo alliance	-
		Other airlines	Over 75 cargo airlines
	Airports		Istanbul Ataturk Airport
	Customers		International and regional freight forwarders
	Handling	Main hub	Turkish Ground Services (HAVAS)
		Other airports	Outsourcing model
	RFS		Africa, Americas, Asia, Europe, Middle East and Far East
	Other		-
Key Activities	Product portfolio	Normal	General Cargo and Domestic Cargo
		Special	Airmail, Live Animals, Valuables, Perishable Goods, Pharmaceuticals, Funeral Transportation, Dangerous Goods and Fragile Goods
		Charter	Turkish Cargo
	Marketing capabilities	Pax. aircraft	Turkish Airlines
		Cargo aircraft	Turkish Cargo
		RFS	Own and subcontracted
	Logistic management		Worldwide logistics services with coordination of regional and international trucking services
Key Resources	Fleet	Passenger	224 Aircraft
		Freighter	9 Aircraft
	Hub	Main	Istanbul Ataturk Airport
		Secondary	Esenboga International Airport
	IT cargo software		COMIS (IBS Software Services)
	Physical resources besides aircraft		Cargo terminals and warehouses
Value Propositions	Differentiation from competitors	Main attributes	Network, geographic specificity and tailor-made solutions
		Complementary attributes	Provided services at market prices
	Cargo Markets	Geographic specificity	Connecting Turkey to Europe, Far East, Middle East and Africa
		Served regions	Europe, Africa, Asia and North and South America
	Complementary propositions		Taking advantage on Istanbul's geographical location, making it a worldwide strategic transfer point
			More than 1000 truck destinations
Customer Relationships	Contracts	Types	Guaranteed space (allotments), spot on, priority, promotional
		Most Common	Spot on contracts within a short time frame
	Customer interaction		Allows customer involvement in cargo operations
Channels	Category		Personal assistance and automated services (e-booking)
	Contact methods		Direct, telephone and E-mail
	Performed actions		Direct contact and campaigns among freight forwarders
	Agencies	Branch offices	12 Countries
		GSAs	100 Countries
Customer Segments	Main customers		International freight forwarders
			Regional freight forwarders
	Secondary customers		Integrators
			Producing companies (final clients)
Cost Structure	Economic type		Economies of scope (more destinations than capacity)
	Cost allocation in Pax. aircraft		Joint product cost structure
	Main costs		Performing the freighter service
			Operational, administrative and agency costs
			Costs from handling procedures and road feeder services
Revenue Streams	Overall cargo revenues (€)		522 000 000
	Customers	Pricing mechanisms	Negotiation
		Pricing time frame	Prices defined seasonally (except for promotional rates)
		Higher yield markets	European and Far Eastern
		Most lucrative actions	General cargo transportation
	Airlines	Considered as	Partners
		Agreement type	Special prorate agreements
	Other		Revenues from cargo charter services

3.4.6. SWISS WorldCargo

Focusing on airport to airport air freight business, SWISS WorldCargo markets hold capacity on SWISS International Airlines passenger aircraft and trucks between two or more points. Fully integrated division of SWISS Group, cargo sector differentiates itself from passenger sector on target customer group, responsibilities and business formulation.

Having its geographical specificity in European and North American markets, SWISS WorldCargo also serves Africa, Middle East, Asia and South America, accomplishing 120 cargo destinations in over 80 countries.

Network is established according to cargo business, with no rational to passenger destinations. Operated through 87 passenger aircraft from SWISS International Airlines, an extensive road feeder services chain and cooperation with partner airlines. Sustaining the cargo network, SWISS Worldcargo supplies 8 branch offices in Europe and USA and 43 general sales agents all over the served regions, providing local assistance to their customers.

Partner airlines could be inside Lufthansa Cargo Group (Lufthansa Cargo, Brussels Airlines Cargo and Aerologic) or outside the cargo alliance with LAN Cargo, Air China Cargo and Edelweiss Air. In both cases, the established agreements consist on special prorate and block space agreements.

Cargo sector is established according to a subsidiary model structure. Cargo transportation is mainly performed in passenger aircraft belly-hold. This service is reinforced by road feeder services and chartered ad-hoc full freighters, accomplishing a cargo network independently of passenger destinations.

Road feeder services are available in Europe and North America. In less representatives regions, subcontracted forms of this services are also available.

Cargo sector has special relationships with Zurich Airport, Genève International Airport and Basel Airport wherein ground services are performed by outsourcing handling companies (Swissport and Cargologic). Controlled by Mercator's cargo management IT software, SWISS Worx increased freight movement and improved service quality.

Improving company's cargo ranking and focusing on added value creation in order to satisfy customers are also strategic points from cargo's management board.

SWISS WorldCargo product portfolio includes normal and special services. Normal services consist in general air cargo while special services are for priority services and products with specific and regular

requirements, these could be categorized as X-Presso, XL-Presso, X-Presso “One hour option”, Valuables, Argus, Mail and ºCelsius active & passive.

Focusing on added value products and intensive care solutions, SWISS WorldCargo provides their customers a unique network complemented with services adapted to market conditions.

Main customers account for five international freight forwarders (DHL Global Forwarding, Kuhne+Nagel, Panalpina, Uti and DB Schenker) and regional freight forwarders. Secondary customers consist on integrators (DHL Worldwide Express, UPS and Fed-Ex) and logistic companies requiring care intensive shipments. In both customer segments, SWISS WorldCargo wants to consolidate relationships, satisfying them through simple but effective contractual conditions, providing guaranteed space (allotments), spot on, priority and promotional contract forms.

Main costs resulted from freighter charter ad-hoc requests, operational costs from cargo transported in passenger aircraft (suffering from joint product cost structure), costs from road feeder services, administrative and agency costs and charges from ground handling procedures. Relatively to costs, the management board has the objective of cost reduction on operations with higher weight on the cargo structure, delegating services to other entities and expanding partnerships.

In 2012, the company had an overall cargo revenues of 464 million euros, representing 11% of total SWISS Group’s revenue share. With a cargo load factor of 80%, general cargo transportation accounted for 70% of total capacity sold in European and North American flows, usually under spot on contracts defined within a short time frame. RFS’s also boosted up revenues, road transportation in Europe and North America accounted for 15% of total freight volumes. Prorate and block space partner agreements also contributed for final revenue values.

Table 3.8 - SWISS WorldCargo business model

			SWISS WorldCargo
Key Partners	Airlines	Cargo alliance	Lufthansa Cargo Group: Lufthansa Cargo, SWISS WorldCargo, Brussels Airlines Cargo and Aerologic
		Other airlines	LAN Cargo, Air China Cargo and Edelweiss Air
	Airports		Genève International Airport and Zurich Airport
	Customers		5 International freight forwarders
	Handling	Main hub	Swissport (Genève) and Cargologic (Zurich)
		Other airports	Outsourcing model
	RFS		Europe and North America
	Other		Jettainer and Envirotainer (Container specialists)
Key Activities	Product portfolio	Normal	General Cargo
		Special	X-Presso, X-Presso XL, X-Presso "One hour option", Valuables, Argus, Mail and ºCelsius Active & Passive
		Charter	Subcontracted (Chapman Freeborn Airchartering)
	Marketing capabilities	Pax. aircraft	SWISS
		Cargo aircraft	-
		RFS	Own and subcontracted
	Logistic management		Logistics service provider, concentrating on marketing hold capacity on SWISS aircraft and on truck transportation between two or more points
Key Resources	Fleet	Passenger	87 Aircraft
		Freighter	-
	Hub	Main	Zurich Airport
		Secondary	Genève Airport
	IT cargo software		SWISS Worx(Mercator)
	Physical resources besides aircraft		-
Value Propositions	Differentiation from competitors	Main attributes	Network, innovative concept and service adapted to market conditions
		Complementary attributes	Quality of the service and reliability
	Cargo markets	Geographic specificity	European and North American markets
		Served regions	Europe, Africa, Americas, Middle East and Asia (120 destination in over 80 countries)
	Complementary propositions		Focus on high added value products and intensive care solutions
			Air freight supplemented by a finely meshed truck network
Customer Relationships	Contracts	Types	Guaranteed space (allotments), spot on, priority, promotional
		Most common	Spot on contracts within a short time frame
	Customer interaction		Consolidated relationship with main freight forwarders, satisfying them through simple but effective contractual conditions
Channels	Category		Personal assistance and automated services (e-booking)
	Contact methods		Direct, telephone and E-mail
	Performed actions		Direct contact and campaigns among freight forwarders
	Agencies	Branch offices	8 Countries
		GSAs	43 Countries
Customer Segments	Main customers		5 International freight forwarders with regular air freight requirements
			Regional and less representative freight forwarders
	Secondary customers		Integrators
			Logistic companies requiring care intensive shipments
Cost Structure	Economic type		Economies of scope (more destinations than capacity)
	Cost allocation in Pax. aircraft		Joint product cost structure
	Main costs		Operational, Administrative and agency costs
			Costs from handling procedures and road feeder services
Revenue Streams	Overall cargo revenues (€)		424 000 000
	Customers	Pricing mechanisms	Negotiation
		Pricing time frame	Prices defined seasonally (except for promotional rates)
		Higher yield markets	Europe and North America
		Most lucrative actions	General cargo accounts around 70% of capacity sold
	Airlines	Considered as	Partners
		Agreement type	Prorate agreements and block space agreements
	Other		Trucks account for 15% of total freight volumes

3.4.7. Finnair Cargo

Finnair's cargo department emphasis on airport to airport cargo transportation, focusing its business in 38 countries and 6 regions with 80 weekly flights between Asia, Europe and North America, accomplishing an overall cargo network of 60 destinations.

Taking advantage of the potential traffic between Asia and Europe, the company wants to solidify connections among the northern hemisphere of these continents. Finnair Cargo vision consists on exploring these two regions, being the most desired option in traffic between Asia and Europe, and controlling the Nordic European freight traffic.

Previous strategic measures promoted a profitable growth, improving overall transportation time and adding new Asian destinations. Finnair's fleet is constituted by 70 passenger aircraft and 4 freighter aircraft from the affiliated charter air company, Nordic Global Airlines. Dedicated freighter service is available on scheduled and non-scheduled flights to Hong Kong, Seoul, Mumbai, New York, Frankfurt, Brussels and Helsinki.

Cargo sector is under subsidiary model structure, wherein network is defined according to cargo business, without passengers network overlay. Promoting a sustainable competitive advantage due to its operated geographical specificity, the company still requires an extensive network of partners. At the moment, Finnair Cargo has the cargo sector from Rossiya Airlines, Belavia Airlines, Aeroflot, Air China, Bangkok Airways, CSA, Icelandair, IAG and TAP as partners. Cargo transportation with these entities is usually stipulated under prorate agreements.

Finnair Cargo provides flexible logistic solutions to its customers, specialized in Asian, European and North American markets. Finnair's main hub is located in Helsinki, where warehouses and own handling services (Finnair Cargo Terminal Operations) are provided. Company also has a secondary hub in Brussels Airport, where cargo operations are under outsourcing models (warehouse and handling). Enhancing air transportation, road feeder services are also available, reaching offline points in Europe, North America, India, China, South Korea and Japan. In less representative regions, this service is also provided under subcontracted agreements. Either in air and road transportation, cargo is controlled by CHAMP Cargospot IT cargo software.

Offering the fastest connections between Asia and Europe, Finnair also wants to improve their customer's experience on the delivering of its product portfolio. Normal cargo products are segmented into two propositions according to general cargo priority (First and Business). Special cargo transportation is differentiated according to products usual transportation requirements, these could be dangerous goods, live animals, perishable goods, valuable products, vulnerable and pharma. The air carrier also offers charter cargo services through its affiliated charter company.

Company's main customers consist in international and regional freight forwarders, allocating to second plan integrators, other cargo agents and producing companies. Having a consolidated relationship with main customers, Finnair Cargo delegated domestic airfreight sales, bookings and shipments to Jetpack, a regional freight forwarder.

International and domestic customers can be offered guaranteed space contracts (allotments), spot on contracts, priority contracts and promotional contracts attained through direct contact or campaign among them.

Providing personal assistance, the cargo department can offer their customers Finnair's Cargo network, geographic specificity within a service adapted to market conditions. These could be reached through the company's 8 branch offices or 30 general sales agents located in Europe, Asia and North America.

Adopting structural changes and cost reduction programs in order to attain cost competitiveness in cargo business the company had to adjust operational costs according to the prevailing market conditions. Main cargo costs resulted from operational features of freighter services, cargo transported in passenger aircraft (suffering from joint product cost structure under the supervision of Finnair Group), costs from road feeder services, administrative and agency costs and charges from handling procedures.

Having a good financing position, the company has to carefully implement measures in order to accomplish their strategic goal of double revenues from Asian traffic by 2020 (compared to 2010).

In 2012, Finnair Cargo transported 148 132 tons of cargo and mail, accomplishing a cargo sector revenue of 343 million euros. This value, representing 14% of total group's revenue, was mainly attained to high-tech, intermediary and perishable products transportation between Asian and European markets under spot on contracts defined in a short time frame. Operational profits from partner airlines and working with Nordic Global Cargo also improved overall revenues.

Table 3.9 - Finnair Cargo business model

			Finnair Cargo
Key Partners	Airlines	Cargo alliance	-
		Other airlines	Aeroflot Cargo, Air China Cargo, Bangkok Airways Cargo, CSA Cargo, Icelandair Cargo, IAG Cargo and TAP Cargo
	Airports		Helsinki Airport and Brussels Airport
	Customers		Domestic freight forwarders (Jetpack)
	Handling	Main hub	Finnair Cargo Terminal Operations (Helsinki)
		Other airports	Outsourcing model
	RFS		Europe, North America, India, China, South Korea and Japan
	Other		-
Key Activities	Product portfolio	Normal	BUSINESS (general air cargo) and FIRST (priority air cargo)
		Special	Dangerous Goods, Live Animals, Perishables, Valuable, Vulnerable and Pharma
		Charter	Nordic Global Airlines
	Marketing capabilities	Pax. aircraft	Finnair
		Cargo aircraft	Nordic Global Airlines
		RFS	Own and subcontracted
	Logistic management		Logistic services specialized in Asian and European and Northern American markets
Key Resources	Fleet	Passenger	70 Aircraft
		Freighter	4 Aircraft
	Hub	Main	Helsinki Airport
		Secondary	Brussels Airport
	IT cargo software		CHAMP Cargospot (CHAMP Cargosystems)
	Physical resources besides aircraft		Cargo terminals and warehouses
Value Propositions	Differentiation from competitors	Main attributes	Network, geographic specificity and service adapted to market requirements
		Complementary attributes	Quality of the provided services
	Cargo markets	Geographic specificity	North European to North Asian markets
		Served regions	Europe, Asia and North America (60 destinations)
	Complementary propositions		Sustainable competitive advantage due to its geographical location
			Excellent operational quality and efficiency
Customer Relationships	Contracts	Types	Guaranteed space (allotments), spot on, priority, promotional
		Most Common	Spot on contracts within a short time frame
	Customer interaction		Consolidated relationship with important freight forwarders
Channels	Category		Personal assistance and automated services (e-booking)
	Contact methods		Direct, telephone and E-mail
	Performed actions		Direct contact and campaigns among freight forwarders
	Agencies	Branch offices	8 Countries
		GSAs	30 Countries
Customer Segments	Main customers		International freight forwarders
			Regional freight forwarders (Jetpack)
	Secondary customers		Integrators
			Producing companies (final clients)
Cost Structure	Economic type		Compromise between economies of scale (capacity) and economies of scope (destinations)
	Cost allocation in Pax. aircraft		Joint product cost structure
	Main costs		Performing the freighter service
			Operational, administrative and agency costs
			Costs from handling procedures and road feeder services
Revenue Streams	Overall cargo revenues (€)		107 500 000
	Customers	Pricing mechanisms	Negotiation
		Pricing time frame	Prices defined seasonally (except for promotional rates)
		Higher yield markets	Asia and Europe
		Most lucrative actions	Special products transportation
	Airlines	Considered as	Partners
		Agreement type	Prorate agreements
	Other		-

3.4.8. TAP Cargo

Maintaining a strong connection with Portugal, TAP Cargo strategic priorities consist on customers' satisfaction and loyalty. This strategic view is accomplished through the company's main value propositions of network and operated geographic specificity.

TAP Cargo is present in Portugal, through its cargo headquarters. Composed by cargo management teams, these provide personal assistance through direct contacts and campaigns among customers. In Angola, Brazil and few European countries contacts are made through general sales agents.

Customers are offered TAP Cargo's product portfolio, segmented in general air cargo, priority cargo, courier and airmail, valuable cargo, temperature sensitive cargo, out of format cargo, live animals, dangerous goods and human remains. All of these products are offered to customers in form of guaranteed space contracts (allotments), spot on contracts, priority contracts and promotional contracts.

One of TAP's Group strategic point is to promote a sustainable philosophy on overall operations, improving every market segment where the company's strategic position excels. Focusing on its geographic specificity, TAP's valuable assets involve passenger transportation to Portugal and Portuguese ex-colonies such as Brazil, Angola and Mozambique. To maximize management results, freight services are attached to the passenger sector through cargo management teams, controlling logistics and cargo distribution networks.

Cargo sector is characterized for being a unit business, where the 46 cargo destinations are established according to the passenger business. These connect European markets to Africa, North America and South America through a segmentation strategy, consolidating the excellent Portuguese transatlantic positioning. Brazilian and Angolan markets allow for a rotary platform in Lisbon that is enhanced by the European road feeder service. RFS operations are also provided in Brazil and USA.

Passengers and cargo (mainly perishable goods, pharmaceuticals and high-tech products) transported in TAP's 55 passengers' aircraft allow the company to achieve the leadership status of European air carrier to the Brazilian market. Once accomplished this goal, strategic objectives were developed to maintain it for the following years.

Despite the lower customer involvement on network definition and cargo operations, transportation has been performed in appropriate service times, customer focused and at competitive market prices with the assistance of CHAMP Cargospot software, allowing the necessary adaptations to markets requirements.

As a relatively small air carrier, network growth and expansion opportunities should not be neglected. In order to expand business, TAP Cargo provides a series of prorate agreements with several airlines such as Etihad Cargo, Turkish Cargo and Finnair Cargo achieving a compromise between capacity (economies of scale) and destinations (economies of scope).

With a fragile financial structure on overall operations aggravated by previous debts, unit costs awareness and cost reductions have been fundamental aspects in business performance improvements. A cargo sector revenue share of 4.73% reveals to be a weak source of income to cover all the operational costs. Most of them, such as aircraft operational costs, are allocated into the group's structure, particularly in the passenger sector.

Cargo costs are marginally priced, obtained through by-product methods. These have to support administration and agency cargo costs, costs from handling procedures and road feeder services.

In terms of revenues, cargo sector has performed relatively well taken into consideration the dimension of operations, attaining revenues of 126.9 million euros in 2012. This value was reached mainly through freight forwarders and other airlines participation.

Spot on contracts within a short time frame from freight forwarders accounted for most of the revenues, where Angolan and Brazilian routes exhibit higher yields in perishables products transportation. Prices were defined through negotiation processes over a certain period (usually two times a year, except for promotional rates). Other airlines also contributed to overall revenues, besides being considered as partners, cargo sector benefited in working with them through the established prorate agreements.

Table 3.10 - TAP Cargo business model

			TAP Cargo
Key Partners	Airlines	Cargo alliance	-
		Other airlines	SATA Cargo, Etihad Cargo, Finnair Cargo, S7 Cargo, United Cargo, Gollog, Air China Cargo, Avianca Cargo, Turkish Cargo and LOT Cargo
	Airports		Lisbon Airport and Porto Airport
	Customers		Regional freight forwarders (Abreu Carga)
	Handling	Main hub	Groundforce (affiliated company)
		Other airports	Outsourcing model
	RFS		Intra-Europe, Brazil and USA
	Other		Envirotainer (Container specialist)
Key Activities	Product portfolio	Normal	General Air Cargo
		Special	Priority Cargo, Courier and Airmail, Valuable Cargo, Temperature Sensitive Cargo, Out of Format Cargo, Live Animals, Dangerous Goods and Human Remains
		Charter	-
	Marketing capabilities	Pax. aircraft	TAP Portugal
		Cargo aircraft	-
		RFS	Own and subcontracted
	Logistic Management		Logistics and distribution network cargo management team
Key Resources	Fleet	Passenger	55 Aircraft
		Freighter	-
	Hub	Main	Lisbon Airport
		Secondary	Porto Airport and Faro Airport
	IT cargo software		CHAMP Cargospot (CHAMP Cargosystems)
	Physical resources besides aircraft		-
Value Propositions	Differentiation from competitors	Main attributes	Network and geographic specificity
		Complementary attributes	Service quality, provided assistance and post sales services
	Cargo markets	Geographic specificity	Connections between Portugal, Angola and Brazil
		Served regions	Europe, Africa and South America (46 destinations)
	Complementary propositions		Consolidation of TAP's excellent transatlantic positioning
			Rotary platform in Lisbon, with higher relevance to Brazilian and Angolan markets
Customer Relationships	Contracts	Types	Guaranteed space (Allotments), spot on, priority, promotional
		Most common	Spot on contracts within a short time frame
	Customer interaction		Lower customer involvement on network definition and cargo operations
Channels	Category		Personal assistance
	Contact methods		Direct, telephone and E-mail
	Performed actions		Direct contact and campaigns among freight forwarders
	Agencies	Branch offices	Portugal and Angola
		GSAs	Brazil, Mozambique and European countries
Customer Segments	Main customers		Regional and domestic freight forwarders (Abreu Carga)
			International freight forwarders
	Secondary customers		Integrators and logistic companies
			Producing companies (final clients)
Cost Structure	Economic type		Compromise between economies of scale (capacity) and economies of scope (destinations)
	Cost allocation in Pax. aircraft		By-product cost structure
	Main costs		Operational, administrative and agency costs
			Costs from handling procedures and road feeder services
Revenue Streams	Overall cargo revenues (€)		126 895 000
	Customers	Pricing mechanisms	Negotiation
		Pricing time frame	Prices defined seasonally (except for promotional rates)
		Higher yield markets	Angola and Brazil
		Most lucrative actions	Transportation of perishable products from Brazil to Europe
	Airlines	Considered as	Partners
		Agreement type	Prorate and code-share agreements
	Other		-

3.4.9. Brussels Airlines Cargo

Brussels Airlines Cargo is the airfreight department of Brussels airlines, focusing on airport to airport air cargo business. Following a unit business model structure with a network established according to passenger business sector, the cargo sector serves more than 60 European and 13 African destinations.

Africa and Europe are the company's geographical focus, however the North American market is also served. All the cargo transportation is performed in Brussels Airlines passenger aircrafts wherein main hub is located in Brussels Airport. Handling operations in all the operated airports are performed following an outsourcing philosophy.

Relying on Brussels hub, Europe can become a transfer point from African and North American markets. In order to comply with those objectives, flight frequency to African countries, especially to Angola, Kenya and Senegal must be increased. European network should be enhanced through special prorate agreements and codeshare agreements with other airlines.

At the moment, Brussels Airlines Cargo is a member of the Lufthansa Cargo Group (Lufthansa Cargo, SWISS WorldCargo and Aerologic). Outside the cargo group, it also provides special prorate agreements with American Airlines Cargo, Jet Airways Cargo, Bulgaria Air Cargo, airBaltic Cargo, Continental Airlines Cargo, Kenya Airways Cargo, United Airlines Cargo and Etihad Cargo.

Brussels Airlines Cargo does not own any trucks, but provides road feeder services across Europe, Africa and North America through subcontracted road transport companies.

Brussels Airlines also has operational strategic goals defined by shareholder's requirements. Those insist in load factors improvement in passenger and freight business under strict budgetary control in order to consolidate operational results. SN Airholding SA/NV and Lufthansa Group are the only company shareholders, having an equity stake of 55% and 45%, respectively. Being affiliated to Lufthansa Group implies to be under the company's SCORE (Synergies, Costs, Organization, Revenue, Execution) program.

All passenger destinations are at cargo sector disposal, achieving a compromise between economies of scale (capacity) and economies of scope (destinations). Customers are offered Brussels Airlines Cargo's geographic specificity, appropriateness to market requirements, product and customer oriented services.

Product portfolio available to customers consists in general air freight, "Fresh to Shelf", courier goods, live animals, valuable cargo and perishable goods. Products' transportation could be contractually agreed through guaranteed space contracts (allotments), spot on contracts, priority contracts and

promotional contracts. Providing personal assistance, with direct contact and campaigns among freight forwarders enables Brussels Airlines Cargo to establish the necessary contractual bonds with customers.

Cooperating with Adelantex, a Belgian freight forwarder, allowed Brussels Airlines Cargo to specialize its channels in the transportation of perishable products with its “Fresh to Shelf” proposition. This special relationship enables the products’ timely delivery right to the major markets and distribution centers. This freight forwarder, besides being considered as a customer is also a partner.

Brussels Airlines Cargo provides its branch offices in 8 relevant African countries, such as Cameroun, Guinea, Ivory Coast, Kenya, Liberia, Senegal, Uganda and Angola. Its presence on these countries corroborates the geographic specificity exhibited by the company, betting in African markets.

Routes from Europe to USA, Africa and intra-Europe flows are managed by a major general sales agent, ECS Globe Air Cargo. On ten Africa to Europe routes, cargo sales are performed by GSA’s, located in Morocco, Mali, Gambia, Benin, Sierra Leone, Togo , Burkina Faso and the Belgian ex-colonies of Democratic Republic of the Congo, Burundi and Rwanda.

Brussels airlines also adopted a strategy of continuous adaptation to new market’s requirements, taking the necessary measures to reduce further costs. Company’s board assign cargo costs through by-product’s methods, being marginally priced. Main cargo costs are generated by handling services, subcontracted road feeder services and general sales agent’s agreements.

In 2012, Brussels Airlines Cargo transported 178.5 million freight tonne-kilometres. This result derived mainly by working with specialized freight forwarders on perishable products (Adelantex), international and regional freight forwards, integrators and producing companies.

Primary products transported with these agents were perishable goods, courier goods and live animals, mainly from Africa to Europe routes defined through spot on contracts within a short time frame under negotiation pricing mechanisms. In some routes, cargo sector performed so well that the passenger sector was cross financed from freight operations. Partner airlines, inside and outside Lufthansa Cargo Group, also boosted up revenues through special prorate agreements and codeshare agreements.

Table 3.11 - Brussels Airlines Cargo business model

			Brussels Airlines Cargo
Key Partners	Airlines	Cargo alliance	Lufthansa Cargo Group: Lufthansa Cargo, SWISS WorldCargo, Brussels Airlines Cargo and Aerologic
		Other airlines	American Airlines Cargo, Continental Airlines Cargo, Kenya Airways Cargo, United Airlines Cargo and Etihad Cargo
	Airports		Brussels Airport
	Customers		Regional freight forwarders (Adelantex)
	Handling	Main hub	Outsourcing model
		Other airports	Outsourcing model
	RFS		Europe, Africa and North America
	Other		-
Key Activities	Product portfolio	Normal	General Air Freight
		Special	Fresh to Shelf, Courier, Live Animals, Valuable Cargo and Perishables
		Charter	-
	Marketing capabilities	Pax. aircraft	Brussels Airlines
		Cargo aircraft	-
		RFS	Subcontracted
	Logistic management		Logistic air freight management in European, Northern America and African routes
Key Resources	Fleet	Passenger	44 Aircraft
		Freighter	-
	Hub	Main	Brussels Airport
		Secondary	-
	IT cargo software		CHAMP Cargospot (CHAMP Cargosystems)
	Physical resources besides aircraft		-
Value Propositions	Differentiation from competitors	Main attributes	Geographic specificity and service adapted to market conditions
		Complementary attributes	Product and customer oriented services
	Cargo markets	Geographic specificity	Connecting Europe to Africa
		Served regions	Africa, Europe and North America
	Complementary propositions		Specialized in perishable products with its "Fresh to Shelf" proposition
			A major GSA (ECS Globe Air Cargo) controls European and North American flows
Customer Relationships	Contracts	Types	Guaranteed space (allotments), spot on, priority, promotional
		Most common	Spot on contracts within a short time frame
	Customer interaction		Special relations with freight forwarders specialized on perishable products
Channels	Category		Personal assistance
	Contact methods		Direct, telephone and E-mail
	Performed actions		Direct contact and campaigns among freight forwarders
	Agencies	Branch offices	Belgium and in 8 African countries
		GSAs	10 African countries and ECS Globe Air Cargo agents
Customer Segments	Main customers		Regional freight forwarders
			International freight forwarders
	Secondary customers		Integrators and logistic companies
			Producing companies (final clients)
Cost Structure	Economic type		Compromise between economies of scale (capacity) and economies of scope (destinations)
	Cost allocation in Pax. aircraft		By-product cost structure
	Main costs		Administrative and agency costs
			Costs from handling procedures and road feeder services
Revenue Streams	Overall cargo revenues (€)		-
	Customers	Pricing mechanisms	Negotiation
		Pricing time frame	Prices defined seasonally (except for promotional rates)
		Higher yield markets	Africa
		Most lucrative actions	Perishable products transportation
	Airlines	Considered as	Partners
		Agreement type	Prorate agreements
	Other		-

3.4.10. SATA Cargo

Azorean air carrier operational activities are separated into two categories. The first category consists on exploring the Azorean domestic network, acting as a regional carrier with SATA Air Açores proposition. This regional service has the strategic goals of efficiency gains on fleet and crew operations, optimizing costs in passenger and cargo sectors. Freight transportation in regional services are quite reduced, only suited for priority and courier goods with reduced dimensions due to aircraft belly capacity restrictions.

The second proposition, SATA International provides European and North American regular air transportation services. Azores is a Portuguese autonomous region, in which the company's focus on connecting this region and Portugal mainland. The North American service is sustained by the passenger sector in order to serve Azorean emigrants.

Taking advantage of this geographic location, company intends to strengthen its international competitiveness. The Portuguese airports reveal to be important assets in the operational activity of SATA Cargo, where Ponta Delgada and Lisbon airports clearly stand out. In Azores, SATA has the exclusive domestic air route control, having their own airport resources, such as warehouses, terminals and handling company (SATA Handling). This close connection with airport entities, allows cargo sector to have more control and proximity on overall operations.

Cargo products transported in SATA's International 8 passenger aircraft fall into the categories of general air cargo, express cargo, airmail and courier, temperature sensitive cargo and live animals. These are managed through CHAMP Cargospot IT cargo software solution by CHAMP Cargosystems.

SATA Cargo network consists in 22 destinations (domestic, Europe and North America), some of them operated by partner airlines, such as TAP Cargo, WestJet Cargo and US Airways Cargo through prorate and codeshare agreements. Besides providing weekly connections from Portugal to Central and Northern Europe, in 2012 was registered slightly more international passenger service to North America than Europe.

The low demand of Portuguese air traffic leaded to a strategic posture of reinforcement passenger and cargo transportation supply at international markets. Betting in the transatlantic expansion by opening new routes to North and South America, in resemblance of TAP's strategy.

The favourable geography for connecting traffic across the North Atlantic enables the company to strengthen its passenger venture in solid market economies and less exposed to financial crisis effects (such as Germany, Canada and USA) in which airfreight could follow up.

Despite the lower customer involvement on cargo operations, SATA's freight department still wants to assure customers' satisfaction. Those are offered a specific geographic network with a service at market prices, complemented with product oriented services adapted to markets requirements.

Main customers consist on regional and domestic freight forwarders and integrators while secondary customers correspond to international freight forwarders and producing companies. These access SATA's Cargo services through its personal assistance, GSAs representatives, and automated services in other to establish guaranteed space contracts (allotments), spot on contracts and priority contracts. Spot on contracts within a short time frame is the most common type of contracts established in which could be pre-reserved via e-booking channels.

The 32 tonnes available for cargo transportation in 8 aircraft, reveals that cargo sector offers more destinations than capacity (economy of scope). The lack of cargo capacity on SATA's passenger aircraft and the relatively low level of commitment to cargo activities evidences the absence of promotional fare contracts. In order to mitigate the low demand in air cargo transportation, cargo operations are considered a complementary service to the passenger sector. Cargo operations assume a structure of unit business model which is established according to passenger business destinations on an airport to airport basis without any road feeder services. Azores, Portugal mainland and USA are the currently served regions. In some USA destinations, cargo volumes are relatively low due to aircraft operational restrictions, mainly on passenger and fuel payload issues.

Adopting cost control measures in order to improve unit costs and load factors, lead SATA Cargo to only have one branch office, controlling air cargo logistic services from Azores to United States and Europe. Remaining cargo flows are managed by general sales agents. In both cases, cargo costs are marginally priced, obtained through by-product methods under the supervision of SATA Group. Main cargo costs derived from general sales agents' services and handling procedures outside the Azorean region, since main group absorbs aircraft operational costs.

In 2012, cargo sector share represented 4.3% of overall group's revenue, corresponding of 6 637 ton of cargo and mail transported, revealing a profit of 6.75 million euros. Partner airlines contributed for the overall cargo profit, mainly in codeshare agreements with TAP Cargo. Although, most of the profits came from own activities, carrying courier goods, perishable products and pharmaceuticals negotiated with domestic freight forwarders in connections between Ponta Delgada and Lisbon. Courier goods can be justified by the lack of presence of integrators in this region. Azores region is a highly active fishing region wherein the transportation of this perishable product (in fresh condition) to outside markets is only viable with air transport.

Table 3.12 - SATA Cargo business model

			SATA Cargo
Key Partners	Airlines	Cargo alliance	-
		Other airlines	TAP Cargo, WestJet Cargo and US Airways Cargo
	Airports		Azorean airports
	Customers		Regional freight forwarders (Abreu Carga)
	Handling	Main hub	SATA Handling
		Other airports	Outsourcing model
	RFS		-
	Other		-
Key Activities	Product portfolio	Normal	General Air Cargo
		Special	Express Cargo, Airmail, Temperature Sensitive Cargo and Live Animals
		Charter	-
	Marketing capabilities	Pax. aircraft	SATA International and SATA Air Açores
		Cargo aircraft	-
		RFS	-
	Logistic management		Air cargo logistics services from Azores to United States and Europe
Key Resources	Fleet	Passenger	8 Aircraft
		Freighter	-
	Hub	Main	Ponta Delgada Airport
		Secondary	Lisbon Airport
	IT cargo software		CHAMP Cargospot (CHAMP Cargosystems)
	Physical resources besides aircraft		Warehouses
Value Propositions	Differentiation from competitors	Main attributes	Geographic specificity and market prices
		Complementary attributes	Product oriented services and adapted to market requirements
	Cargo Markets	Geographic specificity	Connections between Azores and Portugal mainland
		Served regions	Europe and North America
	Complementary propositions		Favourable geography for connecting traffic across the Atlantic
			Market control in intra-Azores routes
Customer Relationships	Contracts	Types	Guaranteed space (Allotments), spot On, priority
		Most common	Spot on contracts within a short time frame
	Customer interaction		Lower customer involvement on network definition and cargo operations
Channels	Category		Personal assistance and automated services (e-booking)
	Contact methods		Direct, telephone and E-mail
	Performed actions		Direct contact and campaigns among freight forwarders
	Agencies	Branch offices	Azores
		GSAs	Portugal mainland and USA
Customer Segments	Main customers		Regional freight forwarders
			Integrators
	Secondary customers		International freight forwarders
			Producing companies (final clients)
Cost Structure	Economic type		Economies of scope (more destinations than capacity)
	Cost allocation in Pax. aircraft		By-product cost structure
	Main costs		Operational, administrative and agency costs
			Costs from handling procedures and road feeder services
Revenue Streams	Overall cargo revenues (€)		6 752 712
	Customers	Pricing mechanisms	Negotiation
		Pricing time frame	Prices defined seasonally (except for promotional rates)
		Higher yield markets	Connections between Ponta Delgada and Lisbon
		Most lucrative actions	General cargo transportation
	Airlines	Considered as	Partners
		Agreement type	Code-share agreements with TAP Portugal
	Other		-

4. Air cargo business analysis

4.1. Clustering Airlines

This study analyses cargo's modes of operation from ten passenger airlines, for better information interpretation, these suffered an arrangement according to previous strategic studies, maintaining the coherence of previously adopted methodologies.

Wouter Dewulf in his work *"The strategy of Air Cargo Operators About Carpet Sellers and Cargo Stars"*, had the objective of investigate the business strategic levels from air cargo carriers. Dewulf selected 47 airlines with different dimensions and range operations, including all over the world passenger airlines and all-cargo carriers, achieving a final clusters classification that hardly resembles with selected airlines from this project.

An empirical classification was also provided by the author, and was adopted by this project avoiding clustering noise effects and disruptions from the selected variables. Dewulf segmented airlines into five categories corresponding to Basic Service Freighter, Basic Service Combination Carrier, Full Service Combination Carrier, Separate Profit and Loss Full Service Combination Carrier and Full Service Freighter Operator.

From the mentioned categories, basic and full service freighter operator segments were not selected, since these do not represent air passenger carriers, thus fall outside the scope of this dissertation. This dissertation adopted Dewulf's clusters empirical observations, clarifying posterior comparative evaluations, categorizing and grouping information according to predominant product, market and network strategic factors. Thus, passenger airlines can adopt the following clusters: Basic Service Combination Carrier (BSCC), Full Service Combination Carrier (FSCC and Separate Profit & Loss Full Service Combination Carrier (SFSCC), also present in Table 4.1.

Table 4.1 - Airlines clusters according to strategy

		Basic Service Combination Carrier (BSCC)	Full Service Combination Carrier (FSCC)	Separate Profit and Loss Full Service Combination Carrier (SFSCC)
Airlines		TAP Cargo, Brussels Airlines Cargo, SATA Cargo	Turkish Cargo, SWISS WorldCargo, Finnair Cargo	AF-KLM Cargo, Emirates SkyCargo, Lufthansa Cargo, IAG Cargo
Product Strategy	Product Differentiation	Basic Product	Medium range	Broad Range
	Yield	Low	Medium	High
	CRM	Small Sales Team / GSA	Professional Sales Team	Professional Sales Team
	Alliances	Only for PAX transport	Only for PAX transport	Vertical Integration / Separate Alliance
Market Strategy	Capacity Management	Hardly Present	Basic	Complex
	Competitive Behaviour	Market Breaker	Follower	Market Maker
Network Strategy	Unit Cost	Marginal Cost	Low	Medium to High
	Route Network	Follows PAX Network	Follows Mainly PAX Network	Very Large
	Hub	PAX Hub	Mainly PAX Hub	Mainly PAX Hub
	Airport	Major Airports	Major Airports	Mainly Major Airports
	Fleet	Only Belly Space	Belly Space and ad-hoc Freighters	Belly Space and Freighters

Adapted from *"The strategy of Air Cargo Operators About Carpet Sellers and Cargo Stars"* by Wouter Dewulf

4.1.1. Basic Service Combination Carrier

Considered by Dewulf as "*Air cargo is a by-product of passenger services"*, this category represents the lowest level of commitment to cargo procedures. Providing a basic range of products sold by a small sales teams and generating relatively low yields. In terms of partnerships with other airlines, these could be established, but their focus is mainly driven by the passenger sector.

In terms of capacity management procedures, these are hardly present, making the transported cargo marginally priced (by-product) in passenger defined routes.

All actions are driven by the passenger sector, cargo is transported in the belly-hold capacity provided by passenger aircraft between main passenger hubs. Cargo operations are merely considered as a complementary service in order to enhance overall group's revenue performance.

Considering the researched airlines, the ones that reveal the lowest level of commitment to cargo operations and complying with the majority of parameters are TAP Cargo, Brussels Airlines Cargo and SATA Cargo.

4.1.2. Full Service Combination Carrier

Climbing up the ladder of passenger airlines cargo operations' commitment, arises full service combination carrier category. Characterized by Dewulf as *"Air cargo is important and contributes to bottom line"*, this segment provides a medium range product differentiation which are sold by a professional sales team and a broader range of general sales agents.

Airlines fitted in this category tend to follow procedures defined by air carriers in separate profit and loss full service combination carrier group, marginally or joint product pricing cargo transportation in their passenger network. Cargo independent routes could be defined, but are not common in this segment.

Using mainly passenger hubs located at major airports, these transport their products in passenger aircraft belly space, reduced freighter fleet or ad-hoc chartered freighters. Partnerships are increased, but also highly dependent of the passenger sector.

In this segment, which provides a broader range of cargo operations but still focusing in the passenger sector, could be fitted Turkish Cargo, SWISS WorldCargo and Finnair Cargo.

4.1.3. Separate Profit and Loss Full Service Combination Carrier

This last category encompasses air passenger carriers that reveal the highest level of commitment with cargo operations. Defined by Dewulf as having a *"management focus on air cargo through a separate profit and loss sector"*, these provide a wider range of services and operations which are mainly managed and sold by own cargo representatives.

A complex capacity management is performed in freight transportation. Using belly-hold capacity from passenger aircraft and own freighters originates medium to high unit costs. Providing all of these resources in cargo operations enables a large route network. These use mainly passenger hubs on major regions airports and full freighter operations to specific cargo hubs.

Airlines from this type of full service combination carrier are considered as market makers, betting in less cargo explored regions but ensuring overall operational profit derived from the passenger sector.

In this segment, from the selected passenger airlines, the ones that dominate air cargo transportation on a global basis are AF-KLM Cargo, Emirates SkyCargo, Lufthansa Cargo and IAG Cargo.

4.2. Business Models Block Comparison

With the created business model according to cargo operations in passenger airlines, attributes between clustered airlines and business models blocks are discussed. This comparison intends to reveal essential attributes, so final cargo business models can be defined. For better information assessment, Annex 4 was created, clarifying cluster's business models block comparison.

4.2.1. Key Partners

Several forms of partnerships compose air cargo business. These could be with other airlines (under alliances or individual cooperation modes), airports, handling companies, road feeder services providers, IT software companies and customers.

Cooperation with other airlines for cargo purposes are usually established under special or normal prorate agreements, complemented by block space or codeshare agreements, usually inside the same alliance group. Independently of air companies dimension and cluster positioning, partnerships are present. There is no direct relation although, in some cases, alliances in the passenger sector can transpose to the cargo sector, being the case of SkyTeam and Lufthansa. Another interesting fact, all alliances have at least one cargo only airline. Alliances also have the favourable effect of providing the evolution and development of full service combination carriers (FSCC).

In the sample analysed, every passenger airline had cargo partnerships with other airlines granting the viability of cargo business. Although a pattern emerged revealing if an airline has too many partnerships, could be an indicator of lack of alliance presence. SFSCC generally have fewer partnerships, according to their philosophy in preferring to do cargo operations guaranteeing markets share thus dominating them. FSCC registered the highest number of partnerships, improving markets' share these airlines relies on partners' contribution to improve their service levels. The last group, BSCC are hugely dependent on partner airlines' cooperation on outside geographic specificity markets.

Airports have a preponderant role in airfreight transportation and could also be important partners. Most of cargo operations are performed in high passenger traffic hubs. European passenger airlines are usually associated to a specific country (former flag carriers), thus easily associated to major national hubs' airports. Airlines from SFSCC besides having their national hubs as a referral point and partner, these have also airports' partnership outside national territory, enhancing worldwide coverage.

Handling procedures can adopt two forms, according to airports relevance in airlines' cargo structure. Procedures are generally equal across the three clusters, wherein main hubs' operations are performed by own or affiliated handling companies. In other airports, ground services follow the outsourcing model.

Road feeder services can be distinguished between own and subcontracted forms of this service. All of the analysed airlines present own RFSs across Europe, except SATA International. SFSCC and FSCC besides the European service also offer their own service in two more continents while BSCC, if the service is provided, only serve their own continent. In all clusters, subcontracted RFSs are available in regions where cargo volumes are less representatives or in regions that own service forms are unviable.

Customers with higher yields in the cargo structure can also be considered as partners. This industry is highly dependent on the participation of freight forwarders. SFSCC and FSCC main customers are usually a combination of international and regional freight forwarders, in which could be associated as partners. Instead BSCC, acting in a regional basis, thus main customers are usually regional freight forwarders.

With the growing of IT cargo software capabilities, airlines associated themselves with IT companies improving management aspects of cargo transportation. According to the dimension of operations, different levels of IT services could be offered. Airlines from SFSCC have a huge participation and assistance from these service providers, adjusting operations and technicalities according to markets and resources requirements. BSCC have only basic standard forms of these services and FSCC have intermediary forms of these services.

Other partnerships could be achieved, complementing airfreight services. Being associated with an alliance can deliver extra privileges on services besides pure air transportation, such as ULD companies' partnerships. In SFSCC, due to its operational dimension, becomes appealing to other entities cooperation in ancillary procedures, such as e-freight, freight forwarders networks and courier services.

4.2.2. Key Activities

Air cargo operations are highly related to commitment given in logistic management procedures, where the three considered clusters can differentiate from each other. Separate profit and loss full service combination carriers provide worldwide airfreight logistic services supplemented by a vast RFS network, controlled by this entity.

In the intermediary segment, logistic operations are focused on higher yield markets and in some less relevant markets. Significant road feeder services are also controlled by these teams.

Basic service combination carriers have a minor range of operations, specializing on logistical services to geographic specificity markets. Reflecting in road feeder services, these are usually stipulated under subcontracts, thus having a reduced logistical control from the airline agents.

In terms of market capabilities, being passenger airlines, all provide cargo transportation in the belly-hold of passenger aircraft as well as road feeder services. Freighter aircraft marketing capability is only provided in SFSCC and FSCC, in the last case, with reduced scope of operations, comparatively to SFSCC.

Product portfolio wise, services provided easily fall into three categories: normal, special and charter services. In SFSCC, normal services comprise in general and express air cargo transportation, instead BSCC only considers as standard services the transportation of general air cargo, relegating express transportation to special services. FSCC cluster exhibit lack of consistency in normal services designation. An outliner in this field is the IAG Group, presenting as normal services geographic specificity products, such as pharmaceuticals and perishable products transportation.

Markets and procedures convergence lead to special services uniformity, in which common airlines' extra services are: temperature sensitive, perishable products, out of format, live animals, pharmaceuticals, valuable, vulnerable and airmail transportation.

Charter services are provided by SFSCC so FSCC could use it. This provider/user relation enables the SFSCC to generate extra revenues while FSCC responds to peak market demands. BSCC can establish user charter agreements but usually does not practice this service.

4.2.3. Key Resources

Passenger airlines cargo resources comprise mainly in fleet, hubs, IT software and ground physical assets. Fleet resources can be distinguished into passenger and freighter aircraft. SFSCC have at its disposal more than 300 passenger and a maximum of 20 freighter aircraft. FSCC and BSCC have less than 100 passenger aircraft, except for Turkish Airlines that has 224 passenger aircraft. In relation to freighter aircraft, FSCC have a reduced fleet of freighter aircraft, resorting to market search for ad-hoc freighter charter services.

Main hubs are defined in principal airports from company's country of foundation (former flag carriers). Secondary hubs for SFSCC are strategically located providing worldwide coverage. Instead for FSCC and BSCC only consist in secondary national airports.

Ground operations are also essential for airfreight business. In SFSCC and FSCC ground assets, such as cargo terminals and warehouses are owned or controlled by affiliated handling companies. In other spectrum, BSCC concede these operations to subcontracted or affiliated ground handling companies, not owning any of these resources.

Nowadays operational efficiency is deeply associated to IT systems. IT cargo software diverge across the three clusters. SFSCC have a highly developed cargo software, specifically design according to company's requirements and range of actions. These are conceived through affiliated IT company's or subcontracted specifically for each company. Full service combination carriers search in the market for leader IT systems, derived from SFSCC IT service providers. The last cluster has a low end IT services provided by simple subcontracted forms of this service. Champ Cargospot IT software is present across the three clusters with different stages of development.

4.2.4. Value Propositions

With astonishment, answers from cargo executives to what differentiates their services from opponents followed a similar pattern. Revealing operated network, geographic specificity, product and customer oriented services according to market conditions as same attributes. These were complemented by reputation and quality of the provided services.

The similarity of responses implied a further study in this matter, examining the performing cargo markets through the companies' geographic specificity and served regions.

All three clusters revealed focus on European cargo flows (importing and exporting) as a geographic specificity. SFSCC revealed a geographic specificity from three to six continents, in order to maximize worldwide coverage. FSCC and BSCC provide a geographic specificity inferior to three continents. While FSCC act in specific regions with high revenue markets BSCC prefer to act in nearby continents, particularly in countries with geopolitical interests.

In terms of airlines' served regions, SFSCC act in 6 continents granting worldwide coverage, FSCC serves around 3 continents usually with high service levels and BSCC serve 3 to 1 continents in specific regions.

Value propositions are not only driven by cargo markets other relevant propositions arise. SFSCC offers its customers extensive global connections alongside their involvement in cargo operations, responding to customers specific requirements. This group also has developed IT capabilities and a vast RFS network. FSCC complementary propositions indicate an airfreight supplemented by RFS and ad-hoc full freighter charters, offering specific solutions to customers. Finally, BSCC considers air cargo as an ancillary service, complementing the passenger venture having Europe as initial or final transportation point. Both FSCC and BSCC can attain sustainable competitive advantage due to main hub's location and geographic specificity markets.

4.2.5. Customer Relationships

This block analyses contracts formulation and how the cargo department allows customer interaction in cargo activities.

Air companies across the three clusters show uniformity of procedures on contract types (guaranteed space contracts, spot on contracts, priority contracts and promotional contracts), even in most common contracts, spot on contracts within a short time frame (under six months).

Relatively to customer interaction, SFSCC allows the highest level, providing unique relationships with main customers complemented by a worldwide customs understanding service. FSCC offer to its customer's medium to low interaction levels, consolidating relations with primary customers. BSCC customer cargo operations interaction is usually non-existent, although some airlines can provide low customer communication, only to main customers in special regular transportation cases.

4.2.6. Channels

This block reveals again another remarkable uniformity of procedures in air cargo operations differentiating only in operational scale. Sales channels are mainly provided through personal assistance and automated services (e-booking) established through direct personal contact, telephone and e-mail means. Performed actions by cargo entities, including GSA, consist in direct contact and campaigns among customers, mainly freight forwarders. Dedicated personal assistance can also be provided to main customers in air companies from SFSCC.

Customers are reached through the companies' branch offices or general sales agents. SFSCC can have up to 50 branch offices and more than 40 GSAs agreements, satisfying clients and enhancing their global network. FSCC typically have 8 to 12 branch offices located in the company's home country, geographic specificity and higher yield countries. BSCC usually have less than 8 branch offices, also located in company's home and geographic specificity countries. In both clusters, GSAs agreements are established in regions served by passenger sector.

4.2.7. Customer Segments

Customers can be categorized according their relevance in revenue structure. Main customers correspond to the ones that generate a substantial portion of company's revenue. In separate profit and loss and full service combination carriers, main customers correspond to international and regional freight forwarders. In basic service combination carriers, regional freight forwarders represent more revenues than international freight forwarders.

In both clusters, secondary customers consist in integrators and other cargo agents following by producing companies or final clients.

4.2.8. Cost Structure

The economic type predominant in the cargo sector from airlines across the three clusters consist in a compromise between economies of scale and scope, wherein scale consists in available capacity and scope offered destinations. In some companies from FSCC cluster revealed an economy of scope, offering more destinations than the available capacity.

Cargo transportation in passenger aircraft has two different types of cost structure. SFSCC and FSCC adopt a joint product cost structure controlled by cargo revenue management systems, attaining price optimization. Instead, BSCC considers cargo transportation as a by-product, thus being marginally priced.

Overall airlines' principal costs comprise if they perform freighter services or not. SFSCC usually have a considerable fleet of freighter aircraft, thus having a higher cost structure. FSCC typically have freighter aircraft or ad-hoc charter services rising cargo's department cost structure.

Costs from road feeder service, administrative, representative agents, handling and documentation procedures also have a significant weight on cargo's structure.

4.2.9. Revenue Streams

Main revenue flows derive from working with customers and cooperation with partner airlines. In terms of overall cargo revenue, SFSCC achieve a cargo sector revenue of more than one billion euros, while companies from FSCC realise 300 to 600 million euros, approximately half of the first cluster. BSCC only generate up to 300 million euros in cargos revenue.

Most of companies' cargo revenues are generated from customers. Prices are defined seasonally (except for promotional rates) being established with freight forwarders on negotiation basis. Most lucrative actions consist in working with main customers on general and special products transportation on higher yield markets, usually dependent on airlines' geographic specificity.

Extra revenues can be attained in working with partner airlines, under special or normal prorate agreements. Airlines with an extended freighter aircraft fleet and providing charter services can also boost their revenues on supplying this service, usually to FSCC.

4.2.10. Common attributes across clusters

After analysing the business models blocks, these revealed similarities among the selected variables. Across business models, similar features can be found in seven blocks: key partners, key activities, value propositions, customer relationships, channels, customer segments, cost structure and revenue streams.

Across models, every single airline have some sort of cargo partnership with other airlines, belonging or not to an alliance. Main hubs are also considered by the majority of airlines relevant partners, these are usually main national airports with high passenger traffic. Handling procedures reveal also similarities, being the majority of times operated by affiliated companies in main national hubs, embracing the outsourcing model in other airports, independently of their business relevance. Road feeder services basis is also identical only differentiating on operational dimension. In this block, should also be mentioned that main customers are also considered as key partners.

In key activities, all air carriers transport freight in belly-hold capacity from passenger aircraft, according to the companies' product portfolio. Normal products classification can differ, although in special products classification refers to the same products' category of temperature sensitive, perishable, out of format, live animals, pharmaceutical, valuable, vulnerable and airmail.

Value propositions block should be where airlines differentiates from each other, nevertheless cargo sectors reveal another similar pattern. Network, geographic specificity, product and customer oriented according to market conditions complemented by quality and reputation form provided services were mainly chosen attributes from the contacted agents. These attributes have different operational scales according to airline's business. However in geographic specificity attribute, all focus on Europe to other continents cargo flows according to airlines' specific acting region.

Customer relationships and channels segments reveal the most identical attributes of all the blocks. These are defined by contract types (guaranteed space, spot on, priority and promotional contracts), provided assistance (personal assistance and automated channels) and contact methods (direct contact and campaign among freight forwarders) clearly reveal the uniformity of procedures in this industry.

Customer segments can distinguish main customers according airlines cargo department dimension, however secondary customers consist in the same agents.

In terms of cost structure, economic type practically resides in a compromise between economies of scale and scope. Relatively to effective costs, airlines have the same main costs in operating RFS, administration, agency, handling and documentation procedures, varying the dimension of these.

Revenues streams block also resembles in some aspects. Prices are usually defined according negotiation among customers and airline cargo agents, where prices are defined seasonally, except for promotional rates that could be weekly. According to airlines geographic specificity region, they work with main customers on general and special product transportation. Other airlines, with whom cargo department works, can generate extra revenues under special and normal prorate agreements.

4.3. Passenger airlines cargo models

Analysing variables from passenger airlines concerning cargo businesses, cargo structure is clearly a parameter that distinguishes airlines. Complementing previous researches by Doganis and adopting the nomenclature established by Zondag, airlines can follow a subsidiary model or a unit business model according to the level of commitment given to cargo operations.

In this research, seven of the studied carriers are structured under a subsidiary model, although with dissimilar business models. Another distinction is needed, accessing the registered differences. Thus, are proposed two types of subsidiary model, corresponding to high and low end forms of this model. The remaining studied airlines are structured according a unit business model. The foundation of this model remained the same, upgraded by new features according to business model parameters evaluated.

Not only assessing business models, overall business characteristics and strategies were associated to each model definition. Summarizing the information assessed, Table 4.2 was created providing a framework for other passenger airlines' cargo sector evaluation.

Table 4.2 - Passenger airlines' cargo business models

Business Model	Concept Proposed		**High-end Subsidiary model**	**Low-end Subsidiary model**	**Unit business model**
	Blocks	Key Partners	Few airline partners	Many airline partners	Limited airline partners
		Key Activities	Specialized logistic management teams offering worldwide services	Specialized logistic management teams acting in specific regions	
		Key Resources	Freighter aircraft Passenger aircraft	Ad-hoc charters Passenger aircraft	Passenger aircraft
		Value Propositions	Worldwide services	Geographic specificity regions (higher yield markets)	Geographic specificity regions (lower yield markets)
		Customer Relationships	Special relationships with major customers	Consolidated relationship with important freight forwarders	Lower customer interaction
		Channels	Direct contact and campaigns among freight forwarders		
		Customer Segments	International and regional freight forwarders		Regional freight forwarders
		Cost Structure	Heavy cost structure	Medium cost structure	Reduced cost structure
		Revenue Streams	Up to 15% of total airlines revenues		Less than 5% of total airlines revenues
Strategy			Separate Profit and Loss Full Service Combination Carrier (SFSCC)	Full Service Combination Carrier (FSCC)	Basic Service Combination Carrier (BSCC)
Business Characteristics		Cargo Transported	More than 500 thousand tons	Up to 500 thousand tons	Inferior than 100 thousand tons
		Sold FTK	Up to 10 billions	Under 5 billion	Under 1 billion
		Cargo Load Factor	Superior to 50%		Inferior to 50%

4.3.1. Subsidiary model

Airlines adopting a subsidiary model to cargo operations recognises freight transportation as one autonomous business division. This division could be composed by several business units working on behalf cargo transportation, under the control of overall group's management.

Maintaining an independent structural arrangement, allows cargo divisions achieving high sector revenues, from hundreds of thousand euros to billion euros, representing up to a quarter of total groups revenues. This is only possible on adopting a philosophy of supplementing belly-hold passenger aircraft transportation with freighter contribution, possessing or chartering this aircraft.

Despite having a heavier cost structure, higher capacity levels are offered, making it possible to transport more cargo and mail, from hundreds of thousand tons to million tons, thus achieving an improved sold freight tonne-kilometre, usually under dozen billion tonne-km.

In terms of resources, besides freighters services these airlines are characterized by having an extensive passenger aircraft fleet connecting relevant passenger and cargo hubs in their wide-ranging network. Despite this high level of resources, the subsidiary model can also surpass de 50% barrier in cargo load factor, revealing an advantageous indicator on resource utilisation.

As an independent unit, route network is established according to cargo business, with no passenger network overlay, besides using this service. Cargo network can be distinguished according aircraft type, while freighter network focus on major cargo hubs connections, passenger network helps providing a profitable worldwide range of cargo services. Using the service from other's group subsidiary segment, cargo transported in passenger aircraft is under revenue management measures, suffering from joint product cost structure.

On technical and operational aspects, logistic management features are performed by specialized teams according to product and market requirements. With improved IT services, cargo sectors not only controls airfreight transportation but also manage a vast RFS network, providing this service in more than two continents with own resources. In ground operations, subsidiary airlines can provide cargo terminals and warehouses in main hubs. Operations are performed by own or affiliated groups' handling companies.

Focusing in attaining customers all over the world, customers can reach airlines cargo products through its wider range of agencies branch offices and GSA agreements. Cargo departments allow main customers integration on cargo defining procedures, especially on international and regional freight forwarders with regular transportation requirements.

Analysing airlines' business models from the subsidiary group, it was possible to identify two extra subgroups, designated by high-end and low-end subsidiary models. Reasons for this distinction resided

mainly in key activities, key resources, cost structure, key partners, customer relationships and value propositions business models blocks.

4.3.1.1. High-end subsidiary model

This subsidiary model variant refers to passenger airlines considered as industry global players, corresponding to Dewulf's empirical cluster of Separate Profit and Loss Full Service Combination Carrier (SFSCC). Cargo sector markets belly-hold passenger capacity supplemented by own freighters on an extensive region coverage. With few airlines partnerships, these prefer to dominate world cargo transportation, responding to markets requirements and needs instead of being a simple spectator.

Its specialized logistics management teams allow for an improved worldwide services augmented by more hub points. These are strategically located, corresponding to their route network objectives. Enhancing these objectives, an IT cargo management software solution is offered, made specifically for that airline by a dedicated software company.

Route network is not only used by passenger aircraft but also by a couple dozens of freighter aircraft. Some of these freighters, when not in use, could be chartered to other airlines for cargo purposes. This model is also characterized by having an extended RFS, where the company controls most of the flows.

Serving six continents and providing a geographic specificity in several regions, cargo subsidiaries contact their widespread range of customers through agencies (branch offices and general sales agents) located at a global basis. Customer satisfaction is also an important factor, allowing them a higher level of interaction on cargo procedures.

Relatively to operational costs, this model distinguishes from others by having a heavier cost structure due to its extensive freighter services, but at the same time, can provide higher levels of capacity to more regions achieving further revenues.

Besides revenues from being a charter service provider, this account for a fraction of overall income. The majority of revenues come from serving customers.

In terms of figures, this model is characterized by having the variable of transported cargo and mail among hundreds of thousand tons and millions of thousand tons, corresponding to a sold freight tonne-kilometre up to ten billions.

Captivating more clients, especially from other air cargo operators, administrators understand and wish to improve customer interaction. Adjust to market requirements are also an important cornerstone for these companies.

4.3.1.2. Low-end subsidiary model

This subsidiary model comprises airlines from Full Service Combination Carrier (FSCC) cluster. These markets passenger aircraft belly-hold capacity, complementing it with own freighters or ad-hoc charter services.

Service to geographic specificity areas resulted from previous passenger business ventures. Customers are reached through the company's agencies with lower level of interaction in cargo operations. Partnership with other airlines, on alliance or not basis, allow for improved cargo network developing traffic figures outside geographic specificity regions.

Logistic management teams act on national countries and geographic specificity markets, achieving a competitive advantage in relation to other agents. IT services are also provided improving cargo transportation management levels.

These airlines can have a reduced freighter aircraft fleet, but in the majority of the cases, they resort to full freighter chartered ad-hoc services. Complementing air transportation, road feeder services are also provided. Cargo department only controls RFS flows on higher yield markets, delegating other regions to road transport companies.

Cargo general costs are relatively lower than the high-end model. These airlines detain less cargo related resources, searching on the market when demand justifies. Revenue wise, most incomes come from cargo transportation services on geographic specificity regions.

In terms of figures, this model is characterized by having a sold freight tonne-kilometre under five billion, corresponding to a couple hundreds of thousand tons in cargo and mail transported.

Difficulty on achieving high-end status due to industry competition, such as the participation of passenger airlines with high end subsidiary models and integrators make it difficult in new markets entrance.

4.3.2. Unit business model

Business units reunite various sectors, when operating together, compose a company. Divided into different departments these became responsible for a specific corporate activity. In air cargo industry, this model was considered a traditional way of operating this business sector.

Comparatively to the subsidiary model, unit business model reveals a lower level of commitment to cargo operations, lacking from structural independence thus hampering business results. Cargo department revenues usually do not surpass couple hundred thousand euros, representing most of the cases less than 5% of total group's revenues. This reduced financial performance is also justified by the

adopted cargo philosophy, only marketing the belly-hold capacity from passenger aircraft without any freighter aircraft involvement. Strategy wise, this business model is commonly adopted by passenger airlines from Basic Service Combination Carrier (BSCC) cluster.

Offering lower capacity levels, reduced due to aircraft and payload issues, airlines can transport up to hundred thousand tons, achieving a sold freight tonne-kilometre inferior to one billion. Focusing in the passenger sector also promotes cargo transportation at lower prices.

Cargo transportation is usually performed in passenger aircraft under relevant passenger hubs route network. This passenger sector focused system also reflects in cargo load factor indicator, not surpassing the 50% barrier.

Attached to a major company's business unit, route network is influenced by this fact. Established according passenger business destinations, most passenger airlines act in a specific region due to geopolitical and operational interests, wherein cargo sector complementary attributes excels.

Services outside geographic specificity regions can also be provided, exhibiting lower incomes. Independently of operated region cargo transportation costs are marginally priced, being considered as a passenger by-product.

Cargo logistic management teams have reduced range of action, focusing on serving geographic specificity regions. With lower IT management capabilities, these controls the majority of airfreight delegating RFS logistical control to subcontracted truck companies, except on major national country flows. Handling operations are usually subcontracted or performed by affiliated companies, possessing all cargo related infrastructures.

With a structured system for customers to use, airlines provide reduced cargo customer interaction. Main customers are typically countries' regional freight forwarders. All customers are reached by companies' branch offices, in home airline's country and higher yield markets and GSAs agreements in fewer representatives regions.

Cargo departments are under strict budgetary control from board's directors. Despite that, they still want to improve sector's profitability, betting in geographic specificity regions actions thus improving main hubs' cargo transportation share.

5. Conclusion

Traditionally air cargo was considered a passengers business by-product. Nowadays, this business sector is more important than ever. Many passenger airlines already recognized air cargo advantageous propositions, merging it with passenger services. Management boards give a certain level of commitment to cargo operations, regarding their management objectives.

This is where business model comes in, analysing and describing the rationale behind creating, delivering and capturing value, offering an added value proposition to their customer segments. Appropriately adjusted to air cargo business from passenger airlines and coupled with strategy, allows the analysis and definition of cargo business intentions form a passenger airline.

This dissertation was motivated in perceiving how a passenger air carrier manages their cargo business. Nowadays, there are several passenger airlines that execute cargo procedures, with different levels of commitment by management boards. This dissertation analyses a group of ten passenger airlines from Europe, or acting on this continent, with different cargo structures, revealing important attributes from each operated cargo business.

Doganis and Zondag previously studied air cargo business models in passenger airlines, characterizing this industry in three models: outsourced model, unit business model and subsidiary model. Although, they generically described business models from passenger airlines cargo sectors. Adopting Osterwalder's business model proposition, this dissertation intended to give a new perspective, culminating in new business models definition for this air cargo sector.

Accomplishing that was followed four main topics: evaluation of present airlines business models and strategies, cargo business analysis in passenger airlines, adaptations from the collected information to Osterwalder's business model proposition, concluding in the interpretation of results.

First topic was achieved through academic and business related information research. Being the starting point of this dissertation, the collected information allowed for an introduction in this specific subject.

From the available business models framework, choice ended up in Osterwalder's model. A recently new business model framework, author presented his model with a nine business model canvas, explaining and describing major areas of activity from a company, exploiting synergies and avoiding conflicts among agents and operational activity fields. Nine block business model canvas analyses the company's attributes regarding value propositions, channels, customer relationships, key partners, key resources, key activities, customer segments, revenue streams and cost structure.

In terms of strategy, Wouter Dewulf studied this subject relatively to air cargo carriers. The author segmented strategy in three major blocks: product strategy, market strategy and network strategy. Not

being the core, this dissertation took advantage of this previous study assisting in the business models definition.

Accomplished the first topic, market perspective was considered in order to evaluate passenger airlines cargo business models. Hence, this analysis was conducted in inquiry forms to cargo executives from selected passenger airlines. Inquiry adopted two types, online surveys and personal interviews, in favour of gathering the necessary information for the following steps. Personal interviews were conducted in passenger airlines with cargo branch offices in Portugal. Online survey reached another five European airlines, accomplishing a sample of ten passenger airlines.

With the collected information from first and second topics, the Osterwalder's business model proposal was them adapted to air cargo business. This adaptation was crucial in further developments, since it allows a better blocks' comparison and subsequently business models refinement. Procedures adopted consisted in subcategorizing certain patterns inside each of the nine blocks. The diversity of subjects examined in market analysis chapter allowed the organization of collected information in each business model block.

Reunited the necessary information from ten passenger airlines regarding cargo operations, airlines were clustered into three groups according to Dewulf empirical observations of strategies from air cargo carriers.

Considering business models blocks data, business characteristics and adopted strategies it is concluded that Doganis proposition in air cargo business models is currently inadequate. Due to the diversity and distinctive attributes encountered inside the subsidiary model, this had to be separated into high and low levels of cargo performance. Hence, the creation of high-end and low-end subsidiary models. Unit business model remains essentially the same, although now is defined by more characteristics not only dependent of cargo structure.

Another conclusion, the proposed business model concept coincides with the strategy studies from Dewulf, revealing an interrelation among the subjects. A cargo sector following a high-end subsidiary model is likely to follow the strategies defined in a separate profit and loss full service combination carrier (SFSCC). The same occurs to the low-end subsidiary model and unit business model, following strategies from a full service combination carrier (FSCC) and basic service combination carrier (BSCC), respectively.

Also, the proposed final framework offers guidance to management boards who wish to change their cargo business model, increasing or not airlines' commitment levels on this area.

Other conclusions to be drawn from this dissertation are:

- All airlines see the cargo sector as a complementary or supplementary business in order to promote overall operational profits and performance gains;
- Cargo business is driven by commitment levels provided by management boards, influenced by structure given and allocated resources;
- Subsidiary model has the highest commitment level, recognizing the cargo business as one business component, independent from passenger business;
- High-end subsidiary model provides worldwide cargo services focusing in numerous regions, competing among air cargo industry leaders;
- Low-end subsidiary model is mainly driven by cargo transportation to geographic specificity regions, an evolution provided from passenger business. These regions can be characterized for being higher yield air cargo markets;
- Unit business model is still limited and dependent from passenger business, where their range of cargo operations is confined to geographic specificity markets;
- Combination of cargo and passenger business can guarantee the sustainability of an airline in future ventures.

In terms of limitations, this dissertation is mainly restricted by survey aspects, analysed in chapter 3. With limited available information from passenger airlines cargo business, this dissertation was complemented by a series of questionnaires to cargo executives.

First limitation refers to the number of airlines analysed, only ten European passenger airlines with cargo sectors were analysed. This may be a small sample in relation to all agents acting in this industry. Personal interviews were only conducted in Portugal, considered as a small market in the air cargo industry. Besides revealing attributes from this particular market, European market aspects were also discussed.

Inquiries also had some restrictions. Online and interview pre-conceived surveys were limited to 29 questions focusing in generic company's cargo operations. Other subjects were discussed, whenever possible, nevertheless the available information was filtered not revealing business confidences.

Has a business deeply dependent on passenger operations, passenger related variables were not considered in this project. Focus remained exclusively on cargo operations.

Business models are usually formulated and discussed by people inside the organization in analysis. The project's information treatment was executed by the author, without any relation to an airline organization.

Analysing the encountered limitations in this project, future research consists in complementary studies, overcoming and improving cargo business models formulation in passenger airlines. Future research consists mainly in the following topics:

- Enlarge scope of research, including more passenger airlines in order to corroborate the study performed;
- Analyse outsourced cargo business models in passenger airlines, revealing how this model evolved;
- Business model formulated by an entity fully integrated in airlines business structure, accessing more information and completing business models blocks;
- This dissertation clustered airlines according Dewulf strategic studies in three groups, perform other studies with different airline segmentation;
- Use other business model frameworks, and evaluate the one that resembles the most with air cargo industry;
- As an industry highly dependent of passenger business, evaluate parameters of this business sector associating them to cargo business;
- Use other cargo agents in order to access satisfaction levels in cargo transportation, inquiring general sales agents, freight forwards and other involved agents.

6. Bibliography

Abdelghany, A.; Abdelghany, K. (2010) – “Modelling Applications in the Airlines Industry”, Ashgate Publishing, Surrey (England), ISBN: 9780754678748, pp. 1-5.

Afuah, A. (2004) – “Business models: A strategic management approach”, McGraw-Hill Irwin, New York (USA).

Allaz, C. (2004) – “History of Air Cargo and Airmail from the 18th Century”, Christopher Foyle Publishing, London (England), ISBN: 1902579828, pp. 301-380.

Ansoff, H. (2007) – “Strategic Management”, Palgrave Macmillan Publishing, Los Angeles (USA), ISBN: 9780230525481, pp. 9-13.

Applegate, L. (2001) – “E-business Models: Making sense of the Internet business landscape” Information Technology and the Future Enterprise.

Belobaba, P.; Odoni, A.; Barnhart, C. (2009) – “The Global Airline Industry”, John Wiley & Sons, Inc., United Kingdom, ISBN: 9780470740774, pp. 23-54.

Boeing (1977) – “Evaluation of Passenger and Cargo Profits in a Combi Operation”, Sales and Marketing Department, Boeing Airplane Company.

Boeing (2012) – “World Air Cargo Forecast 2012-2013”, Boeing Commercial Airplanes, Seattle (USA).

Clancy, B.; Hoppin, D. (2004) - “After the storm”, Air Cargo World, May 2004.

Conway P. (2004) – “Diverging Paths”, Airline Business, November 2004.

Dewulf, W. (2014) – “The strategy of Air Cargo Operators – About Carpet Sellers and Cargo Stars”, Universiteit Antwerpen, Antwerp (Belgium), ISBN: 9789089940940.

Dewulf, W.; Van de Voorde, E.; Vanelslander, T. (2011) – “Key Factors Contributing to Management Strategy Development at Air Cargo Carriers”, Aerlines Magazine, May 2011.

Doganis, R. (2006) – “The Airline Business”, Second Edition, Routledge, New York (USA), ISBN: 0203596803, pp. 280-291.

Efstathiou, E.; Anderson, N. (2000) – “The Swedish Air Freight Industry”, Master Thesis, Goteborg University Graduate School, Sweden. Pp.2-9.

Euro Carex (2011) – “Project of high-speed: European rail freight service connected to airports and logistic areas”, Euro Carex AISBL, Paris (France).

Grasl, O. (2009) – “Business Model Analysis – Method and Case Studies”, PhD Thesis, University of St. Gallen, St. Gallen (Switzerland), pp. 82-100.

Hellermann, R. (2002) – “Lufthansa Cargo AG: Capacity and Dynamic Pricing. Case study reference no. 602-029-1”, WHU Otto Beisheim School of Management.

ICAO-WCO (2013) – “Moving Air Cargo Globally – Air Cargo and Mail Secure Supply Chain and Facilitation Guidelines”, International Civil Aviation Organization, First Edition.

Kupfer, F.; Meersman, H.; Onghena, E.; Van de Voorde, E. (2009) – “Air Cargo: The difference between success and failure?”, European Transport Conference 2009, Noordwijkerhout (Netherland).

Linder, J.; S. Cantrell (2010) – “Changing Business Models: Surveying the Landscape”, Accenture, Institute for Strategic Chance.

Macário, R.; Reis, V.; Viegas, J.; Magalhães, L. (2010) – “HERMES WP2 – Cross Modal Transport Models (Prototypes)”, Instituto Superior Técnico, Lisboa (Portugal), pp. 54-110.

Magretta, J. (2002) – “Why Business Models Matter”, Havard Business Review 80 (5), pp. 86-92.

MergeGlobal Value Creation Initiative (2008) – “End of an era? – Why the ‘super spike’ in fuel prices may signal the end of ‘super growth’ in air freight”, American Shipper, 50 (8), August 2008, pp. 32-47.

Mckeown, M. (2011) – “The Strategy Book”, Financial Times Publishing, ISBN: 9780273757092, PP. 9-25.

Mintzberg, H. (1987) – “Five Ps for Strategy”, General Strategic Theory, California Management Review, pp. 11-21.

Morrell, P. (2011) – “Moving Boxes by Air – The Economics of International Air Cargo”, Ashgate Publishing, Surrey (England), ISBN: 9781409402527.

Morris, M.; Schindehutte, M.; Allen, J. (2003) – “The entrepreneur’s business model: toward a unified perspective”, Journal of Business Research.

Osterwalder, A. (2004) – “The Business Model Ontology – A Proposition in a Design Science Approach”, PhD thesis, Université de Lausanne, Lausanne (Switzerland), pp. 11-102.

Osterwalder, A. (2010) – “Business Model Generation”, John Wiley & Sons, Inc., New Jersey (USA), ISBN: 9780470876411.

Osterwalder, A.; Pigneur, Y.; Tucci, C. (2005) – “Clarifying Business Models: Origins, Present, and Future of the Concept”, Communication of the Association for Information Systems 16, pp. 1-40.

Petrovic, O.; Kittl, C; Teksten, R. (2001) – “Developing Business Models for Ebusiness”, evolaris eBusiness Competence Center, Graz (Austria).

Popescu, A.; Keskinocak, P.; Mutawaly, I. (2010), - “The Air Cargo Industry”, Eno Transportation Foundation, Intermodal Transportation: Moving freight in a Global Economy, pp. 208-237.

Porter, M. (2008) – “The Five Competitive Forces That Shape Strategy”, Havard Business Review, Havard Business School Publishing Corporation, pp. 24-41.

Reis, V. (2009) – “Development of Cargo Business in Combination Airlines: Strategy and Instrument”, PhD Thesis, Instituto Superior Técnico, Lisbon (Portugal), pp. 2-36.

Seabury Cargo Advisory (2009) – “International Air Freight 2008-2013: Turbulence Ahead”, Seabury Group, American Shipper.

Serpen, E.; Mirza, A. (2009) – “The World Economy and Air Cargo Business”, 7th Annual Cargo Aircraft & Operations Conference.

Stähler, P. (2002) – “Business Models as an Unit of Analysis for Strategizing”, International Workshop on Business Models, Lausanne (Switzerland).

Teece, D. (2010) – “Business Models, Business Strategy and Innovation”, Long Range Planning 43, Elsevier, pp. 172-194.

Teichert, T.; Shehu, E.; Wartburg, I. (2008) – “Customer segmentation revisited: the case of airline industry”, Transportation research Part A, Vol. 42, pp 227-242.

Timmers, P. (1998) – “Business Models for Electronic Markets”, Electronic Markets 8(2), pp.3-8.

Vasigh, B.; Fleming K.; Tacker, T. (2008) – “Introduction to Air Transport Economics”, Ashgate Publishing, Surrey (England), pp. 44-62.

Weill, P.; Vitale, M. (2001) – “Place to space: Migrating to eBusiness Models”, Boston (USA), Harvard Business School Press.

Zondag, W. (2006) - “Competing for Air Cargo. A Qualitative Analysis of Competitive Rivalry in the Air Cargo Industry”, PhD Thesis, Free University Amsterdam, Amsterdam (Netherlands), pp. 17-69.

Interviews and Online Surveys

Aires, B. (2014), General Manager at TAP Cargo, Interview on 20th March of 2014, Lisbon (Portugal).

Ferreira, M. (2014), Country Manager Portugal at Lufthansa Cargo, Interview on 30th March of 2014, Porto (Portugal).

Gomes, F. (2014), Cargo Manager at Emirates SkyCargo in Portugal, Interview on 18th March of 2014, Lisbon (Portugal).

Hoornaert, H. (2014), Head of Cargo Brussels Airlines, Online Survey on 16th April of 2014.

Horta, A. (2014), Account Manager at AF-KLM, Interview on 25th March of 2014, Porto (Portugal).

Mourão, T. (2014), Cargo Manager at Iberia Cargo in Portugal, Interview on 10th March of 2014, Lisbon (Portugal).

Odermatt, J. (2014), Cargo Agent at SWISS Worldcargo, Online Survey on 31st March of 2014.

Quelhas, P. (2014), Commercial Manager -Spain and Portugal at British Airways World Cargo, Interview on 14th March of 2014, Lisbon (Portugal).

Simsek, O. (2014), Cargo Agent Turkish Cargo, Online Survey on 8th April of 2014.

Sousa, A. (2014), Cargo Manager at SATA Cargo, Online Survey on 10th April of 2014.

Virtanen, L. (2014), Cargo Agent at Finnair Cargo, Online Survey on 29st April of 2014.

Annual Reports

Air France KLM, 2012 Annual Report, December 31, 2012.

Emirates SkyCargo, 2012 Annual Report, December 31, 2012.

Finnair, 2012 Annual Report, December 31, 2012.

International Airlines Group, 2012 Annual Report, December 31, 2012.

Lufthansa Cargo AG, 2012 Annual Report, December 31, 2012.

SATA, 2012 Annual Report, December 31, 2012.

SWISS, 2012 Annual Report, December 31, 2012.

TAP, 2012 Annual Report, December 31, 2012.

Turkish Airlines, 2012 Annual Report, December 31, 2012.

Web directories:

[W1] - http://www.digitalbusinessmodelguru.com/2013/02/difference-between-business-models-and.html (consulted in 14-12-2013).

[W2] - https://www.iagcargo.com/ (consulted in 09-03-2014).

[W3] - http://www.tapcargo.com/Portugal/pt/home (consulted in 14-03-2014).

[W4] - http://www.skycargo.com/english/index.aspx (consulted in 15-03-2014).

[W5] - http://www.af-klm.com/cargo/portalb2b/home (consulted in 22-03-2014).

[W6] - http://lufthansa-cargo.com/ (consulted in 25-03-2014).

[W7] - http://www.swissworldcargo.com/ (consulted in 02-04-2014).

[W8] - http://www.turkishcargo.com.tr/cargo/ (consulted in 10-04-2014).

[W9] - http://www.sata.pt/en/category/sections/other-services/cargo (consulted in 14-04-2014).

[W10] - http://www.brusselsairlines.com/en-be/b2b/info-and-services/cargo/default.aspx (consulted in 18-04-2014).

[W11] - http://www.finnaircargo.com/en/ (consulted in 30-04-2014).

Annex

Annex 1 – Air cargo market characteristics

There are several subjects that should be mentioned regarding air cargo industry. One of those subjects, are the types of commodities carried, representing the most profitable product's categories on behalf of air cargo transportation. In market environment, key factors regarding strengths and limitations for air cargo growth are revealed.

The issue of modal choice is also addressed with the mention of truck, rail and sea combinations complementing air cargo services, providing solutions to customer's requests. Actual panorama and air cargo forecasts are also mentioned, revealing an optimistic path for the next 20 years.

1. Commodities carried

Commodities carried may vary depending on production centres and markets needs in each region. According to MergeGlobal reports, breakdown of air trade commodities fills into the following categories: high-tech products (27%); capital equipment (19%); apparel, textiles and footwear (17%); consumer products (16%); intermediate products (12%) and refrigerated foods (5%). The referred percentages in Figure A.1.1 were measured in tonne-km by goods transported in 2008 (MergeGlobal, 2008).

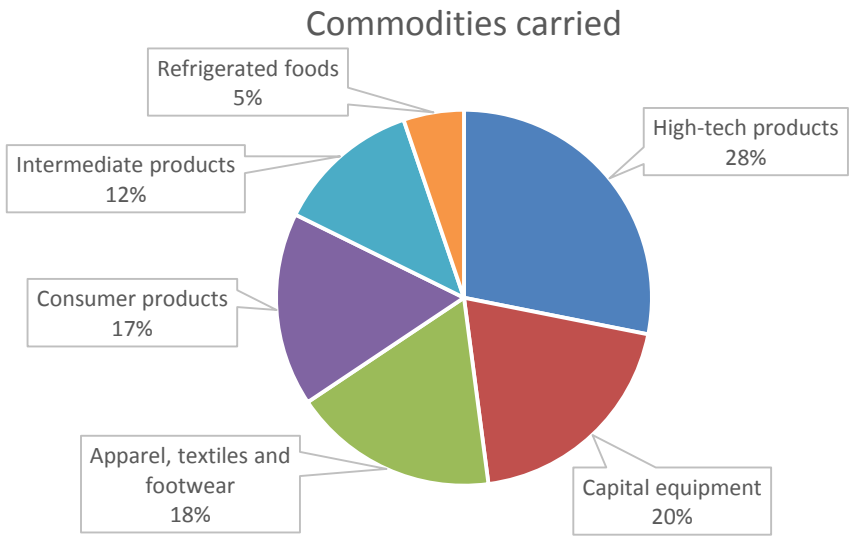


Figure A.1.1 – Commodities carried by air in 2008

Source: Mergeglobal, End of an era?, August 2008

Analysing markets, the connections between Asia to Europe and North America account for the most significance traffic in air cargo routes. Exportations from Asia to Europe and North America are mainly dominated by high tech products category also prevailing in the intra-Asian market (Morrell, 2011).

High tech products, capital equipment and apparel, textiles and footwear are the three main commodities categories carried between Asia to North America, accounting up to 69% of all the air cargo traffic registered in this link. Asia to Europe link consists mainly in apparel, textiles and footwear goods and miscellaneous manufactured products. Conversely, main commodities in the inverse link consist in capital equipment (WACF, 2012).

The North American air market is dominated by the exportation to Europe and Asia of high tech product's and capital equipment's, such as machinery and electrical equipment's. These commodities categories also prevail in exports to Latin America. Instead imports from this region reside in refrigerated goods, mainly perishable products. Europe to North America cargo flow is characterized by the movement of capital equipment and express shipments (Kupfer, 2009). Figure A.1.2 shows the share of commodities categories, in percentage, on major airfreight markets related to 2007.

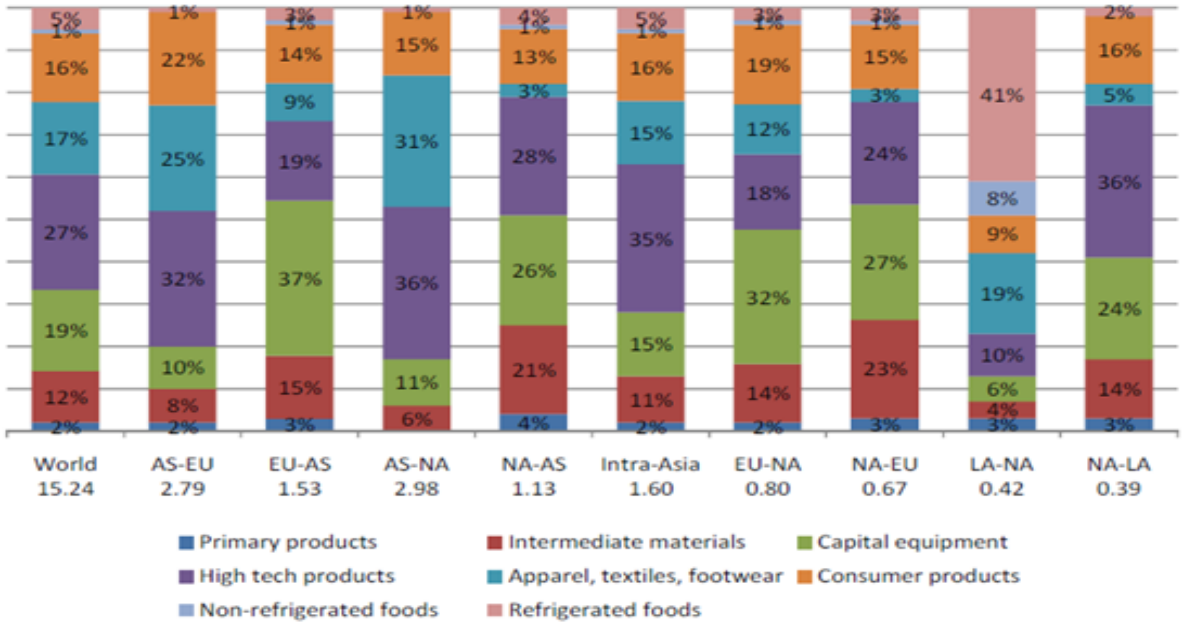


Figure A.1.2 - Commodity share of air freight markets in 2007

Source: MergeGlobal World air freight supply and demand model, 2008, pp 36

2. Market environment

The main factor affecting air cargo transport is the world's economic activity. World demand for freight transport is closely related to Gross Domestic Product (GDP) from each region where the cargo movements occur. The international trade results from the push of the exporter to a pull of the importer, usually in different countries (WACF, 2012).

Despite GDP importance, other aspects need to be taken into consideration. These factors could be categorized as dependent of air companies or non-dependent of them. In the inherent factors to airliners, depend mainly on their operation fleet and service provided. An air company with a larger fleet and better services lead to favourable effects, not only on the regions operated but also in the company's revenues (WACF, 2012).

In the adjacent factors for air companies (Figure A.1.3), these play significant roles in the air cargo growth. These could be inventory management techniques, modal competition, environmental regulations, globalization, market liberalization, national development programs and the introduction of new air eligible commodities (WACF, 2012, pp 10).

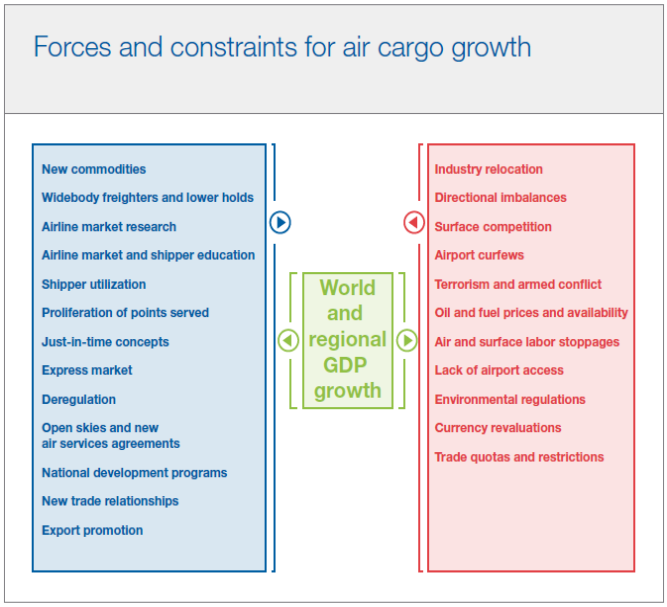


Figure A.1.3 - Forces and constraints for air cargo growth

Source: World Air Cargo Forecast, Boeing, 2012-2013, pp 10

After the economic downturn in 2008-2009, authors made several studies addressing the problematic of new cargo indicators besides GDP. Kupfer found out that merchandise exports from each country relates better to world air freight than the GDP after the economic crisis (Kupfer, 2009). Still, GDP is accepted by the majority of authors, prevailing the reference indicator on forecast estimations.

3. Modal choice

With the persistence jet fuel price growth, air cargo market became less desirable for freight transportation. Jet fuel prices practically triplicated in the time frame of 2004 to 2012 (WACF, 2013).Freight forwards, integrators and other transport related agents have diverged a considerable amount of airfreight to other modes of transport providing a more efficient solution to their customers.

Air cargo market is heading up to a premium market covering commodities with high value. These products tend to be valued more than $16 per kilogram (WACF, 2013). Air cargo terminals location are usually constrained, so road transport is the mode of transport that better complements the air service between customer's location and airport facilities.

There are also Airport/Rail and Airport/Sea links with cargo connection agreements. Airport/Sea cargo links are quite unusual mainly due to products' characteristics and customers' requirements incompatibilities among air and sea freight transportation.

Air/Sea connections are not common in the air cargo industry. Nerveless, there are some strategic points where these types of connections can occur. That is the case of Sharjah and Dubai, having frequent sea and air connections with fast connection times between each infrastructure, accomplishing transfers up to six hours (Morrell, 2011).

European connections to and from the Middle East are made via aerial mode. Instead connections linking Middle East to North East Asia are provided through sea mode. In 2010, Air/Sea service was around 35% cheaper and took ten more days than the direct air service, without considering boat transhipments (Morrell, 2011).

Connections between airports and rail are more and more studied for express cargo and perishable goods transportation. One of the projects being developed in this area, is the Carex Project. The main goal of this project is to use the European high speed rail network to transport air cargo over distances between 300 km to 800 km (EuroCarex, 2011).

For that, Carex takes into consideration modal shift from short-range and mid-range flights to high speed trains, whenever appropriated. Airport with rail terminals are connected to high speed links and a tailored service appropriated to integrators logistic chains and transport solutions are also considered (EuroCarex, 2011).

Several entities united themselves in favour of Carex project. At this moment, there are several studies on Airport/Rail interfaces on the following locations: Lyon-Saint-Exupéry Airport, Paris-Charles de Gaulle Airport, Liège Airport, Amsterdam-Schiphol Airport, London, Cologne-Bonn Airport and Frankfurt (EuroCarex, 2011).

4. Actual Panorama

According to Boeing's World Air Cargo Forecast, from 1981 to 2004 world air cargo traffic, measured in revenues per tonnes (RTK), expanded at a rate of 6.7% per year. This growth was sustained by the liberalization of international air freight market in which allowed the growth of the world trade.

Technological progress, further value/weight ratio on transported cargo and decreased the pressure on air cargo yields also contributed for air cargo traffic growth, as described on Figure A.1.4.

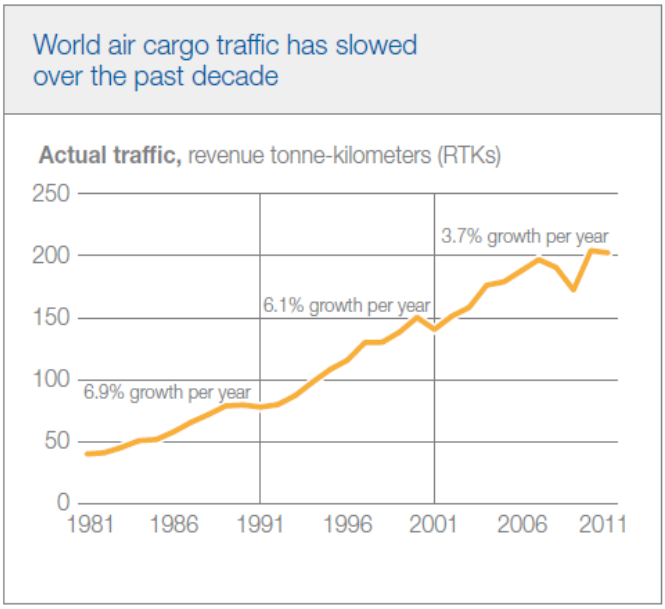


Figure A.1.4 - World air cargo traffic

Source: World Air Cargo Forecast, Boeing, 2012-2013, pp 1

The economic downturn of 2008 and 2009 hauled all the modes of transport, specially the air cargo industry. Air cargo traffic fell 12.5% between the middle of 2008 and the end of 2009, being the worst decline in the jet transported age (WACF, 2012). In the middle of 2009, air cargo traffic began to recover from its massive fell. This recovery had mainly to do with the growth of the worldwide industrial production.

By the first quarter of 2011, air traffic registered a growth of 4.5% relatively to the same period of the previous year. Although by the end of 2011, with consecutive increases of jet fuel prices, the Tohoku earthquake in Japan and the flooding's in Thailand lead to another air traffic cargo decreasing. The natural causes that affected Japan and Thailand had a huge impact on the production of automobile components and information technologies, which are key products in the air cargo industry (WACF, 2012).

To conclude, air cargo industry will always be influenced by jet fuel price. With the incessant rise of fuel prices, implying the good's diversion to other modes of transport less fuel price sensitive, affecting world air cargo traffic directly.

5. Forecast

According to Boeing's World Air Cargo Forecast, despite the slowdown registered in the last decade, air cargo traffic will more than double over the next 20 year, comparatively to 2011. Forecasting methods are closely related to economic activity, in which are measured by the regions GDP. It is predicted that world economic growth average 3.2% over the next 20 years. GDP growth and the forecast of stable fuel prices will provide air cargo traffic to grow (WACF, 2012).

All over the next 20 years, it is expected that world air cargo traffic grow 5.2% per year, increasing from 202.4 billion RTKs (Revenue Tonne-km) in 2011 to 558.3 billion RTKs in 2031 (WACF, 2012), as revealed in Figure A.1.5.

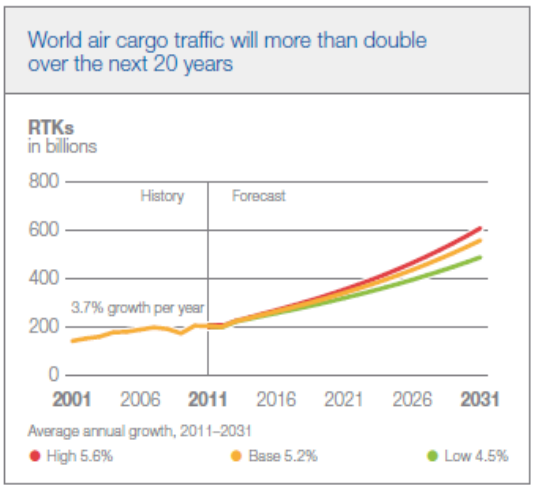


Figure A.1.5 - Forecast of air cargo traffic over the next 20 years

Figure A.1.6 - Expected annual growth over the next 20 years on major markets

Source: World Air Cargo Forecast, Boeing, 2012-2013,

In this time frame, air cargo markets linking Asia will lead the growth of the air cargo world traffic, with the intra-Asia market averaging 6.9% per year. North America and European routes will also expand at an average rates of 5.8% and 5.7%, respectively. In Domestic China, will be the fastest growing market in the world, averaging 8.0% per year. In mature markets, such as North America and intra-Europe, are expected to be registered the slowest growths, achieving 2.3% and 2.4% growth rates per year, respectively (Figure A.1.6).

Annex 2 – Survey adopted in interviews to Portuguese cargo agents

Modelo de Negócio em geral

1. Qual dos seguintes modelos melhor se ajusta ao negócio de carga?

   Sem serviço ☐

   Não realiza serviços de carga

   Modelo de *outsourcing* ☐

   Terceirização dos serviços de carga

   Modelo de unidade de negócios ☐

   Secção de carga incluída e controlada pela própria companhia aérea de passageiros

   Modelo subsidiário ☐

   Secção de carga independente da companhia aérea de passageiros, com o seu próprio modelo de negócio

   Outro

   ☐_____

2. A rede de carga aérea é:

   Determinada em função dos destinos do negócio dos passageiros ☐

   Determinada em função negócio da carga, mesmo que não exista racional pelo negócio dos passageiros (transporte de carga é feito em aviões de passageiros) ☐

   Determinada em função do negócio da carga, não havendo obrigatoriedade de sobreposição com a rede de passageiros (transporte de carga em cargueiros ou aviões de passageiros) ☐

3. Todos os destinos de passageiros têm serviço de carga?

   Sim ☐

   Não ☐

4. Qual a distribuição, em percentagem, do volume de negócio de carga para os seguintes destinos?

Europa ☐

África ☐

Ásia ☐

América do Sul ☐

América do Norte ☐

Oceânia ☐

Atividades-Chave

As ações mais importantes que uma empresa deve fazer para que crie e ofereça Propostas de valor.

1. Que tipo de serviços fornecem:

Standard ☐

Serviço de transporte entre aeroportos para mercadorias sem requisitos especiais

Tempo de entrega / Urgente ☐

Serviço de transporte entre aeroportos com prioridade e garantias de embarque e desembarque

Dependente do produto ☐

Serviço de transporte entre aeroportos para produtos com requisitos especiais

Serviços de acrescentado valor ☐

Serviço de transporte porta a porta através de soluções personalizadas

Correio ☐

Serviço de transporte de pequenos volumes com alta prioridade no embarque e desembarque

Outro ☐

_____

2. Qual a distribuição, em percentagem, dos produtos transportados?

Produtos tecnológicos ☐

Equipamentos de alto custo (*Capital equipment*) ☐

Vestuário, têxteis e calçado ☐

Farmacêuticos ☐

Produtos expresso ☐

Peças auto ☐

Produtos intermediários ☐

Bens perecíveis ☐

Produtos de cariz especial ☐

(ex. Perigosos, animais vivos, frágil, etc..)

Outros ☐

_____

Segmentos de Clientes

Que clientes a servir, segmentando-os conforme os seus atributos, necessidades e comportamentos.

1. Distribua, em forma de percentagem, a importância dos seguintes clientes no seu modelo de negócios?

   Transitários ☐

   Outros agentes de carga ☐

   Empresas produtoras / Cliente final ☐

   Outro ☐

   _____

2. Em geral, como são consideradas outras companhias aéreas com quem trabalham?

   Parceiros ☐

   Clientes ☐

Canais

A forma como a empresa se conecta com os seus Segmentos de Clientes.

1. Como adquirem clientes? Descrever:

   Passos necessários

   _____

   Tempo de aquisição

   _____

   Valor típico do negócio

   _____

Intervenientes (stakeholders)

_____

2. Quais os canais de venda utilizados?

Assistência pessoal ☐

Assistência pessoal dedicada somente a um cliente ☐

Serviços automáticos (e-freight) ☐

Outro ☐

_____

3. Quais os principais métodos de contacto com os clientes?

Contacto direto ☐

Contacto telefónico ☐

E-mail ☐

Aplicações mobile ☐

Rede sociais ☐

Outro ☐

_____

Proposta de Valor

Produtos ou serviços que criam valor para um determinado Segmento de Clientes.

1. O que distingue o seu serviço de carga dos demais competidores?

Rede ☐

Especificidade geográfica ☐

Preço ☐

Serviços porta a porta ☐

Especialização num certo tipo de produto ☐

Qual?_____

Especialização em Segmentos de Clientes ☐

Qual?_____

Serviço adaptado às condições de mercado ☐

Conceito inovador ☐

Outro ☐

_____

Relações com os Clientes

Tipo de relacionamento a empresa tem com os seus Segmentos de Clientes.

1. Qual o tipo de contrato habitualmente estabelecido com os clientes?

Acordo de capacidade garantida (Allotments) ☐

Garante uma capacidade nos vários voos operados com pré-acordo de preço.

Agentes de carga têm a possibilidade de devolver a capacidade à companhia aérea.

Acordos normais (Capacity Purchasing Agreement) ☐

Compra fixa de capacidade por parte dos agentes de carga num particular dia

e rota, a preços atrativos mas sem possibilidade de retorno de capacidade.

Acordos prioritários ☐

Acordos promocionais ☐

Outro ☐

_____

2. Qual a duração dos contratos acima mencionados?

Longo prazo (superior a 12 meses) ☐

Médio prazo (de 6 meses a 12 meses) ☐

Curto prazo (inferior a 6 meses) ☐

3. Permitem o envolvimento, por parte dos clientes, na definição de rotas e operações de carga? Em que medidas?

_____

_____

_____

Parcerias-Chave

Rede de fornecedores e parceiros que fazem o modelo de negócio funcionar.

1. Que tipo de acordos normalmente a empresa pratica, com outras companhias aéreas?

   Pro rata (distribuição proporcional) ☐

   Partilha de códigos (code-share) ☐

   Troca de capacidade (capacity swap) ☐

   Acordo reserva de capacidade (block space) ☐

   Outro ☐

   _____

2. Como executa o transporte rodoviário (Road Feeder Service)?

   Não fornece ☐

   Frota própria ☐

   Subcontrato com Transitário / Integradores ☐

   Subcontrato com empresas de transporte rodoviário ☐

   Outro ☐

   _____

3. Como é que a empresa lida com operações de *handling*?

   Soluções dentro da própria empresa ☐

   Empresas filiadas ☐

   Outsourcing ☐

   Outro ☐

   _____

4. Pratica outras parcerias que sejam relevantes no seu modelo de negócio?

   _____

   _____

   _____

Recursos-Chave

Os recursos necessários para que o modelo de negócios funcione na sua plenitude.

1. Que tipo de aeronaves próprias a sua empresa tem ao dispor para serviços de carga? Qual a sua tipologia? Quantos?

Aviões de carga (Freighter)

_____

Aviões de passageiros

_____

Outro

_____

2. Neste momento, a sua empresa pratica alguma acordo Charter/ACMI de carga?

Companhia aérea

_____

Tipo de aeronave

_____

Quantos

_____

3. A sua empresa detém outro tipo de recursos físicos para além de aeronaves?

Armazéns ☐

Edifício de escritórios ☐

Equipamentos de ground operations ☐

Outro ☐

_____

4. São recursos e garantias financeiras considerados elementos essenciais no seu modelo de negócio?

_____

_____

_____

5. Qual a distribuição de aviões de passageiros para o sector de cargo?

_____

_____

_____

Fluxos de Rendimento

Representa a receita que a empresa gera em oferecer Propostas de Valor a cada Segmento de Clientes.

1. Que tipo de mecanismo de preços é normalmente estabelecido com os clientes?

Preços fixos

- Tabelado (TACT) ☐
- Dependente do produto ☐
- Dependente do Segmento de Cliente ☐
- Dependente do volume ☐

Preços dinâmicos

- Negociação ☐
- Gestão de rendimentos (yield management) ☐

Combinação de ambos ☐

Quais os mecanismos de preços usados?

_____

_____

2. Quais dos seguintes agentes conseguem gerar mais fluxo de rendimentos?

- Clientes ☐
- Companhias aéreas parceiras ☐

Estrutura de Custos

Descreve os custos mais importantes em operar um modelo de negócios

1. Que tipo de economia melhor se ajusta ao modelo de negócios?

- Economia de escala (mais capacidade) ☐
- Economia de âmbito (mais destinos) ☐

2. Em que base a empresa aloca os custos relativos a carga?

Sem alocação de custos ☐

Método by-product (custos marginais) ☐

Método joint product (custos totais) ☐

Outro ☐

_____

3. Da seguinte lista, distribua a percentagem consoante a relevância dos seguintes elementos na estrutura de custos.

Operações de handling ☐

Operações relativas a aeronaves ☐

Armazenamento ☐

Sistemas informáticos ☐

Charters/ACMI ☐

Seguros ☐

Taxas em aeroportos ☐

Combustível (Payload) ☐

Transporte rodoviário ☐

Alfandega ☐

Documentos ☐

Outro ☐

_____

4. Existe alguma rota em que exista financiamento cruzado da carga para os passageiros?

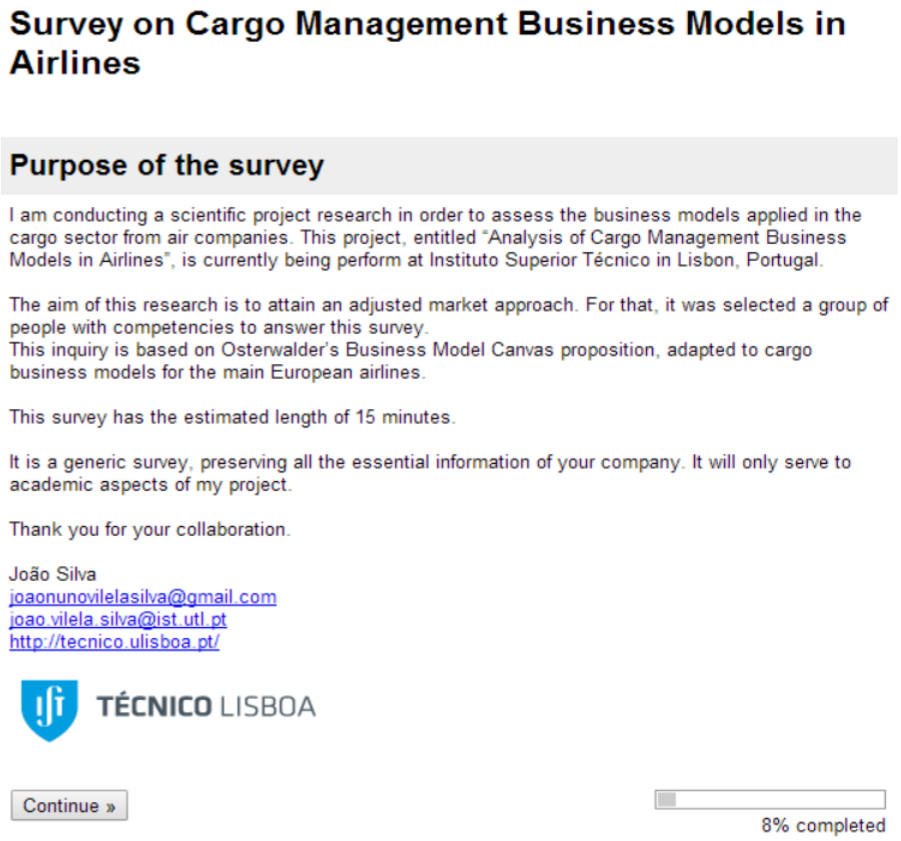
_____

_____

_____

Annex 3 – Online survey made available to European passenger airlines cargo agents

Online surveys to European cargo agents were based on Google Forms platform. This annex reveals the final format of the survey



Survey on Cargo Management Business Models in Airlines

Purpose of the survey

I am conducting a scientific project research in order to assess the business models applied in the cargo sector from air companies. This project, entitled "Analysis of Cargo Management Business Models in Airlines", is currently being perform at Instituto Superior Técnico in Lisbon, Portugal.

The aim of this research is to attain an adjusted market approach. For that, it was selected a group of people with competencies to answer this survey.
This inquiry is based on Osterwalder's Business Model Canvas proposition, adapted to cargo business models for the main European airlines.

This survey has the estimated length of 15 minutes.

It is a generic survey, preserving all the essential information of your company. It will only serve to academic aspects of my project.

Thank you for your collaboration.

João Silva
joaonunovilelasilva@gmail.com
joao.vilela.silva@ist.utl.pt
http://tecnico.ulisboa.pt/

TÉCNICO LISBOA

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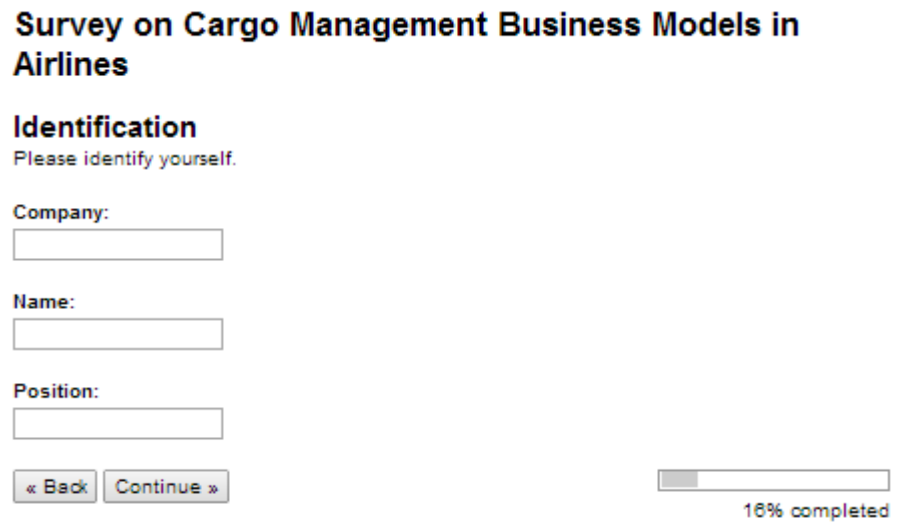

Survey on Cargo Management Business Models in Airlines

Identification

Please identify yourself.

Company:

Name:

Position:

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16% completed

Survey on Cargo Management Business Models in Airlines

Business Model in General

General aspects of the implemented business model.

Which the following models better suits your company's cargo business?

- ○ No service (does not operate any cargo services)
- ○ Outsourcing model (follows outsourcing philosophy to cargo services)
- ○ Unit business model (cargo sector directly controlled by the air passenger company)
- ○ Subsidiary model (cargo sector with its own and independent business model)
- ○ Other: [ ]

The cargo network is established:

- ○ In function of the passenger business destinations
- ○ In function of cargo business, even if there is no rational for passenger business (cargo transportation on passenger airplanes)
- ○ In function of cargo business, with no passenger's network overlay (cargo transportation on freighters and passenger airplanes)
- ○ Other: [ ]

Every passenger destinations have cargo services?

[▼]

Considering the company's cargo business volumes, how important are the following markets?

Classify 1 to 5, in which 1 corresponds for the most important and 5 the least important. If a region is not served, just check the No Service column

	1	2	3	4	5	No Service
Europe	○	○	○	○	○	○
Asia	○	○	○	○	○	○
North America	○	○	○	○	○	○
South America	○	○	○	○	○	○
Africa	○	○	○	○	○	○
Oceania	○	○	○	○	○	○

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25% completed

Survey on Cargo Management Business Models in Airlines

Key Activities

The most important actions a company must do to create and deliver value propositions.

What type of services are offered in the cargo sector?

- [ ] Standard (for general air cargo)
- [ ] Fast delivery / Urgent (for time-sensitive cargo)
- [ ] Product dependent (for products with special characteristics)
- [ ] Added value services (door-to-door services through personalized solutions)
- [ ] Airmail (for small volumes with high priority)
- [ ] Other:

How representative are the following product categories in volume transportation?

Classify 1 to 5, in which 1 corresponds for the most important and 5 the least important

	1	2	3	4	5
High-tech products	○	○	○	○	○
Capital equipment	○	○	○	○	○
Apparel, textiles and footwear	○	○	○	○	○
Pharmaceuticals	○	○	○	○	○
Courier goods	○	○	○	○	○
Automotive cargo	○	○	○	○	○
Intermediary products	○	○	○	○	○
Perishable goods	○	○	○	○	○
Special products (i.e. live animals, explosives)	○	○	○	○	○

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33% completed

Survey on Cargo Management Business Models in Airlines

Customer Segments

Which customers to serve, grouping them into distinct segments according to common needs, attributes and behaviours.

How relevant are the following customers on your company's business model?
Classify 1 to 5, in which 1 corresponds for the most important and 5 the least important

	1	2	3	4	5
Freight forwarders	○	○	○	○	○
Other cargo agents (Integrators, Logistic Companies)	○	○	○	○	○
Producing companies / Final clients	○	○	○	○	○
Other	○	○	○	○	○

How are usually considered other air companies with whom your company works?

▼

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41% completed

Survey on Cargo Management Business Models in Airlines

Channels

How the company reaches its customer segments.

Which sales channels are used?

- ☐ Personal assistance
- ☐ Dedicated personal assistance
- ☐ Automated services (e-booking)
- ☐ Other:

Which are the main contact methods?

- ☐ Direct contact
- ☐ Phone contact
- ☐ E-mail
- ☐ Other:

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50% completed

Survey on Cargo Management Business Models in Airlines

Value Propositions

Products or services that create value for a specific customer segment.

What distinguish your company's cargo services from competitors?

- [ ] Network
- [ ] Price
- [ ] Geographic specificity
- [ ] Product oriented
- [ ] Customer segment oriented
- [ ] Adapted to market requirements
- [ ] Innovating concept
- [ ] Other:

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58% completed

Survey on Cargo Management Business Models in Airlines

Customer Relationships

Type of relationship the company has with its customer segments.

What is the most common type of contracts established with customers?

- ○ Guaranteed space contracts (Allotments)
- ○ Spot on contracts (Capacity is bought at a negotiated price with no return policy)
- ○ Priority contracts (Capacity is bought for high priority shipments with a restricted time-frame of delivery)
- ○ Promotional Fares contracts (Capacity is bought at relatively low prices but without guarantees of immediate transportation)
- ○ Other:

What is the typical time-frame of the contract chosen above?

- ○ Long term (more than 12 moths)
- ○ Medium term (from 6 moths to 12 moths)
- ○ Short term (less than 6 moths)

Does your company allows customers' involvement in route definition and cargo operations?

If YES, please specify the main customers' requirements. If NO, ignore this question.

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66% completed

Survey on Cargo Management Business Models in Airlines

Key Partners

Network of suppliers and partners enhancing the business model

Which type of agreements your company usually practice with other air companies?

- ☐ Prorate agreement
- ☐ Code-share agreement
- ☐ Capacity swap agreement
- ☐ Block space agreement
- ☐ Other:

How does your company perform Road Feeder Services?

- ☐ Does not provide
- ☐ Own fleet
- ☐ Subcontract with road transport companies
- ☐ Subcontract with freight forwarders / integrators
- ☐ Other:

How does your company perform handling procedures?

- ☐ In house solutions
- ☐ Affiliated companies
- ☐ Outsourcing
- ☐ Other:

Does your company has other relevant partners?

If YES, please indicate the main partnerships. If NO, ignore this question.

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75% completed

Survey on Cargo Management Business Models in Airlines

Key Resources

The required assets enabling the business model to work

How is the business volume distribution according to the type of aircraft?

	1	2	3	4	5	
Passenger aircrafts	○	○	○	○	○	Freighters

How many freighters has the cargo business? What is the aircraft type?

If your company does not have any freighters ignore this question.

At the moment, does your company practice any Charter/ACMI cargo contract?

If YES, please identify the company, type of aircraft and number of aircraft chartered. If NO, ignore this question.

Does your company holds other physical resources besides aircraft?

- ☐ Warehouses
- ☐ Office buildings
- ☐ Ground operations equipment's
- ☐ Other:

Are financial resources a fundamental element in your company's business model?

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83% completed

Survey on Cargo Management Business Models in Airlines

Revenue Streams

Revenue generated in offering value propositions for each customer segment

From the following agents, who can generate more revenues streams?

	1	2	3	4	5	
Customers	○	○	○	○	○	Partner airlines

Which price mechanisms are usually established with customers?

- ☐ Negotiation
- ☐ Yield management
- ☐ List price (TACT)
- ☐ Product feature dependent
- ☐ Customer segment dependent
- ☐ Volume dependent
- ☐ Other:

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91% completed

Survey on Cargo Management Business Models in Airlines

Cost Structure

The most important costs incurred on performing a business model

Which economic type suits your company's business model?

	1	2	3	4	5	
Economies of scale (more capacity)	○	○	○	○	○	Economies of scope (more destinations)

In which basis, does your company assign cargo costs?

- ○ No cost allocation
- ○ By-product methods
- ○ Joint product method
- ○ Other: [ ]

How relevant are the following elements in your company's cost structure?

Classify 1 to 5, in which 1 corresponds for the most important and 5 the least important. If a service is not provided by the cargo sector or performed by other entity just check the Not Provided/Performed column.

	1	2	3	4	5	Not Provided/Performed
Handling operations	○	○	○	○	○	○
Aircraft operations	○	○	○	○	○	○
Warehousing	○	○	○	○	○	○
IT services	○	○	○	○	○	○
Charters / ACMI	○	○	○	○	○	○
Airport fees	○	○	○	○	○	○
Fuel Payload	○	○	○	○	○	○
Road Feeder Service	○	○	○	○	○	○
Customs clearance	○	○	○	○	○	○
Documentation	○	○	○	○	○	○

Is there any route, where the passenger sector is cross-financed by the cargo sector?

[▼]

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100%: You made it.

Annex 4 – Business models block comparison according to cluster airlines

			Separate Profit and Loss Full Service Combination Carrier	Full Service Combination Carrier	Basic Service Combination Carrier
			AF-KLM Cargo, Emirates SkyCargo, Lufthansa Cargo, IAG Cargo	Turkish Cargo, SWISS WorldCargo, Finnair Cargo	TAP Cargo, Brussels Airlines Cargo, SATA Cargo
Key Partners	Airlines	Cargo alliance	Synergies on cargo transportation	Promotes the growth of cargo sector	Address the lack of resources
		Other airlines	Fewer partnerships preference on performing cargo operations	Several partners improving their service levels	Partner dependent on outside geographic specificity markets
	Airports		National and international major airports	National and geographic specificity regions airports	National airports
	Customers		International freight forwarders	Combination between international and regional freight forwarders	Regional freight forwarders
	Handling	Main hub	Own or affiliated ground handling companies		
		Other airports	Outsourcing model		
	RFS		Provided in a worldwide basis	On intra-Europe routes and in geographic specificity markets	
Key Activities	Product portfolio	Normal	General air cargo and express cargo	Airline dependent	General air cargo
		Special	Same product's category: temperature sensitive, perishable products, out of format, live animals, pharmaceutical, valuable, vulnerable and airmail		
		Charter	Charter service provider	Charter service user	-
	Marketing capabilities	Pax. aircraft	Own and associated airlines belly-hold capacity	Cargo belly-hold capacity from passenger sector	
		Cargo aircraft	Own freighter aircraft	Reduced freighter fleet	-
		RFS	Own and subcontracted forms of this service		
	Logistic management		Worldwide airfreight logistic services supplemented by a vast RFS network	Operations focused in higher yield markets, controlling relevant RFS	Minor range of operations, only focusing on geographic specificity markets
Key Resources	Fleet	Passenger	More than 300 aircraft	Less than 100 aircraft	
		Freighter	Up to 20 aircraft	Less than 10 aircraft	-
	Hub	Main	National airports		
		Secondary	Strategically located, providing worldwide coverage	National secondary airports and geographic specificity regions airports	National secondary airports
	IT cargo software		Highly developed IT systems	Market search for leader IT cargo systems	Basic IT system
	Physical resources besides aircraft		Cargo terminals and warehouses		-
Value Propositions	Differentiation from competitors	Main attributes	Operated network, acting in geographic specificity regions, product and customer oriented services according to market conditions		
		Complementary attributes	Reputation and quality of the provided services		
	Cargo markets	Geographic specificity regions	Worldwide coverage	Higher yield markets	Specific regions with geopolitical interests
		Served continents	3 to 6	3	1 to 3
	Complementary propositions		Offer its customers extensive global connections	Sustainable competitive advantage due to main hub's location and geographic specificity markets action	
			Extensive freighter network	RFS supplement airfreight transport	Europe as an initial or final point
Customer Relationships	Contracts	Types	Guaranteed space (allotments), spot on, priority and promotional		
		Most common	Spot on contracts within a short time frame (less than 6 months)		
	Customer interaction		Unique relationships with main customers providing worldwide customs understanding	Consolidated relations with principal customers	Usually non-existent, only in special cases with major customers
Channels	Category		Personal assistance and automated services (e-booking)		
	Contact methods		Direct, telephone and E-mail		
	Performed actions		Direct contact and campaigns among freight forwarders		
	Agencies	Branch offices	Up to 50	8 to 12	Up to 8
		GSAs	More than 40	In less representative regions	Geographic specificity regions
Customer Segments	Main customers		International freight forwarders		Regional freight forwarders
			Regional freight forwarders		International freight forwarders
	Secondary customers		Integrators and other cargo agents		
			Producing companies		
Cost Structure	Economic type		Compromise between economies of scale (capacity) and economies of scope (destinations)		
	Cost allocation in Pax. aircraft		Joint product		By-product
	Main costs		Performing the freighter service	Freighter services and/or charter requests	-
			Operational, administrative and agency costs		
			Costs from handling procedures and road feeder services		
Revenue Streams	Overall cargo revenues		More than 1 billion euros	300 to 600 million euros	Less than 300 million euros
	Costumers	Pricing mechanisms	Negotiation		
		Pricing time frame	Prices defined seasonally except for promotional rates		
		Higher yield markets	Airlines geographic specificity regions' dependent		
		Most lucrative actions	Working with main customers on general and special products transportation in specific markets		
	Airlines	Considered as	Partners		
		Agreement type	Special or normal prorate agreements		
	Other		Revenues from providing charter services	-	