



Economie
Ontcijferd



Universiteit Antwerpen
| Faculteit Bedrijfswetenschappen
en Economie

Vlieg niet voor je vleugels hebt

Prof. Dr. Wouter Dewulf

Presentation's content

The Strategy of Air Cargo Operators. About Carpet Sellers and Cargo Stars.

1. **Setting the Research Framework**
2. **Research Gaps and Structure**
3. **The Air Cargo Industry**
4. **Organizational Purpose and Dimensions of Strategy**
5. **Indicators**
6. **Research Methodology**
7. **Typology of Strategy Models**
8. **Successful Strategy Models**
9. **Key Success Factors**
10. **Conclusions**



1. Research Framework

- Air Cargo was traditionally seen as a **by-product** of passenger transport. The last decade this vision has changed considerably.
- Global air cargo industry is nowadays a 62 billion USD (direct revenues) **mature industry!**
- **Strategy** is being drafted far beyond the basic entrepreneurial framework in which an emerging industry operates. However, **different strategy models** are observed in the market...
- **Objective: Investigate the strategy models of air cargo carriers.**
 - Gain a better understanding of the **strategy** of air cargo carriers
 - Gain a deeper insight in the **drivers** of the strategic framework
 - Assist airlines in gaining insight in their **strategic positioning**

Research questions

1. What are the main influencing drivers which play a role in the background behind the strategy development for air cargo operators? I.e. what is the **strategy context** in which they operate?
2. What are the main components of a business level strategy for air cargo operators? I.e. what is the **strategy content** of air cargo carriers?
3. Are there **different types of business level strategy models**, and if so, where do these models differentiate?
4. Are there any **key success factors** behind a 'winning strategy' and what are the dynamics behind it?

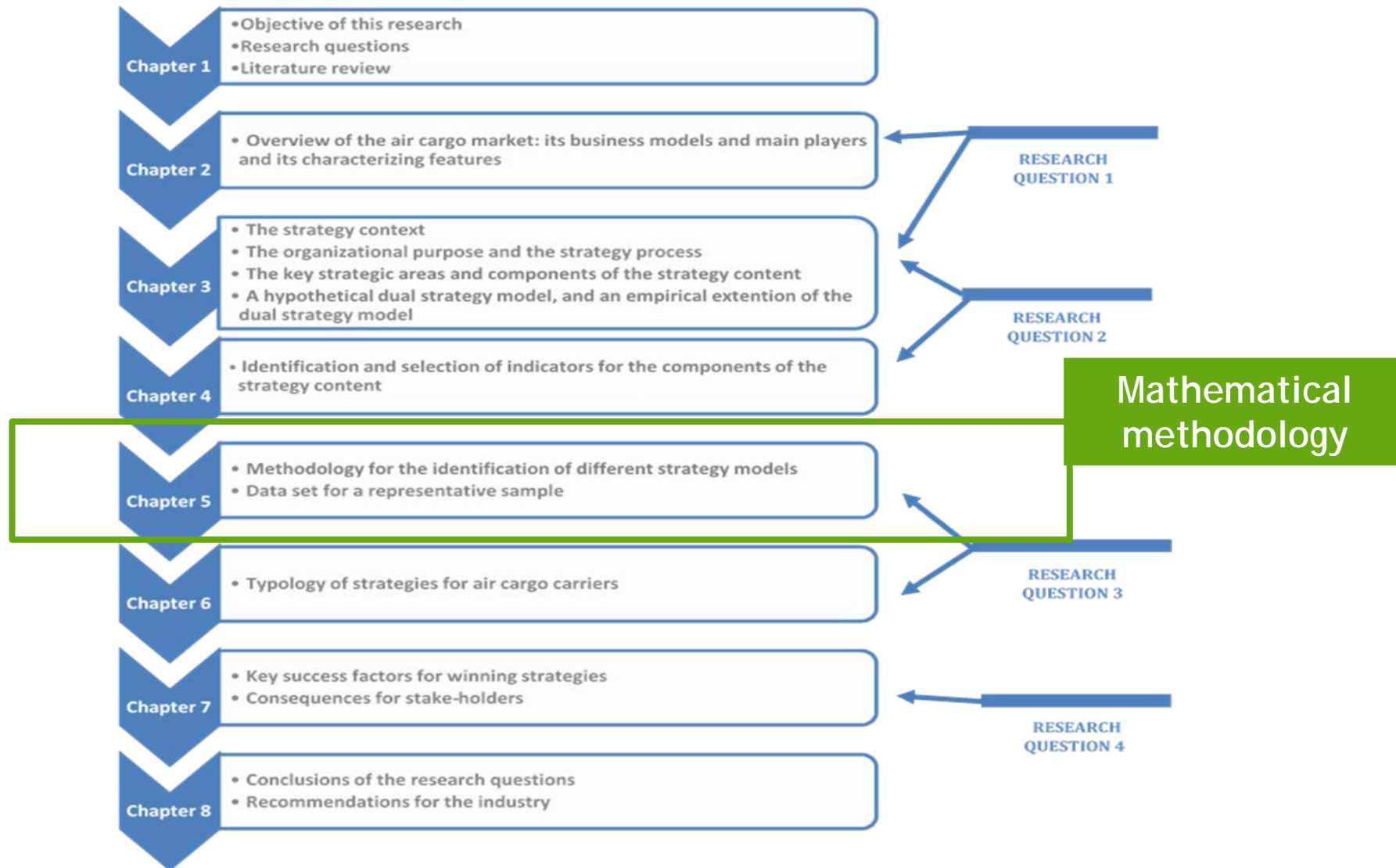
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2. Research structure



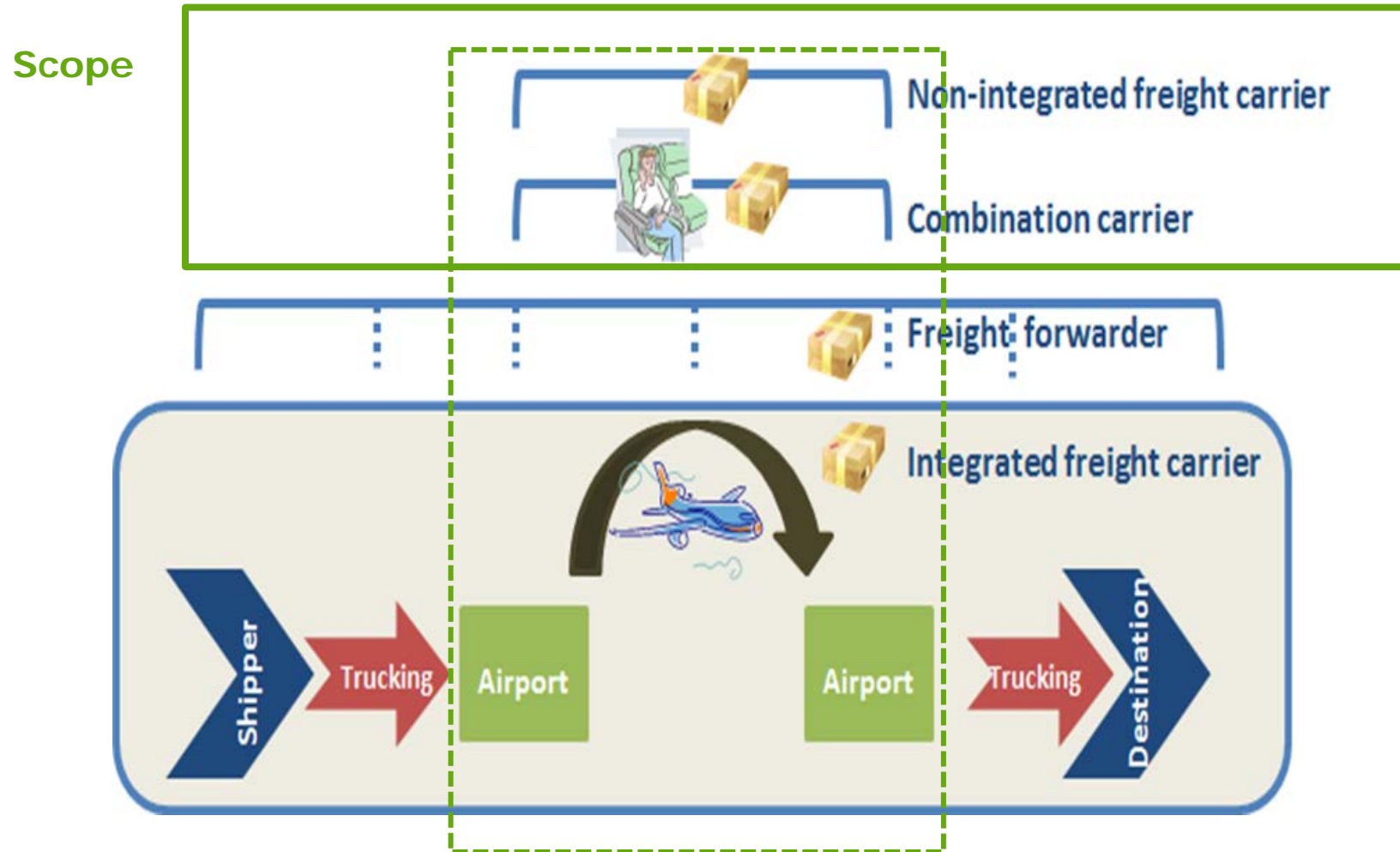
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3. Business Models in the Air Cargo Industry



3. Business Models in the Air Cargo Industry



3. Business Models in the Air Cargo Industry



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3. Business Models in the Air Cargo Industry



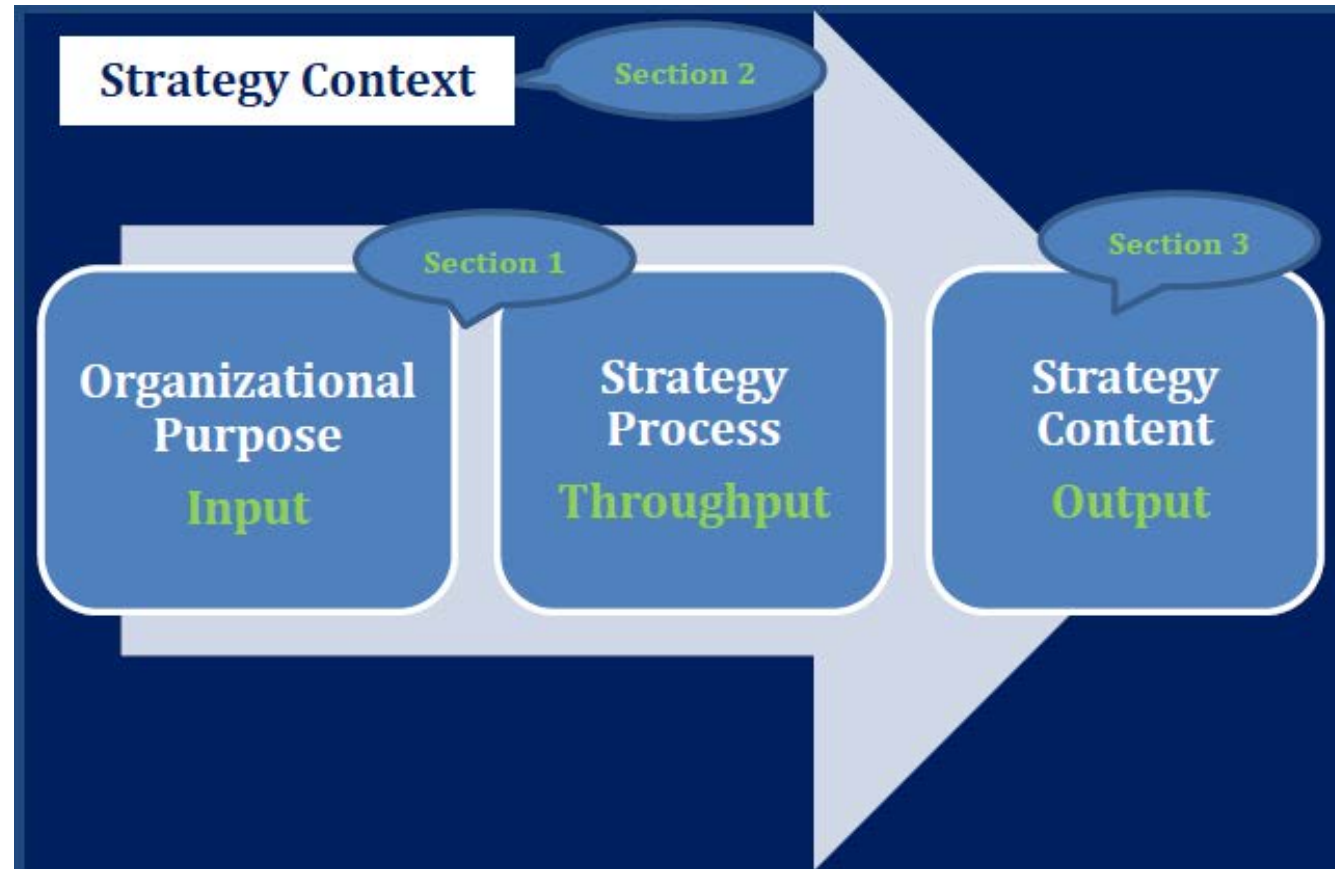
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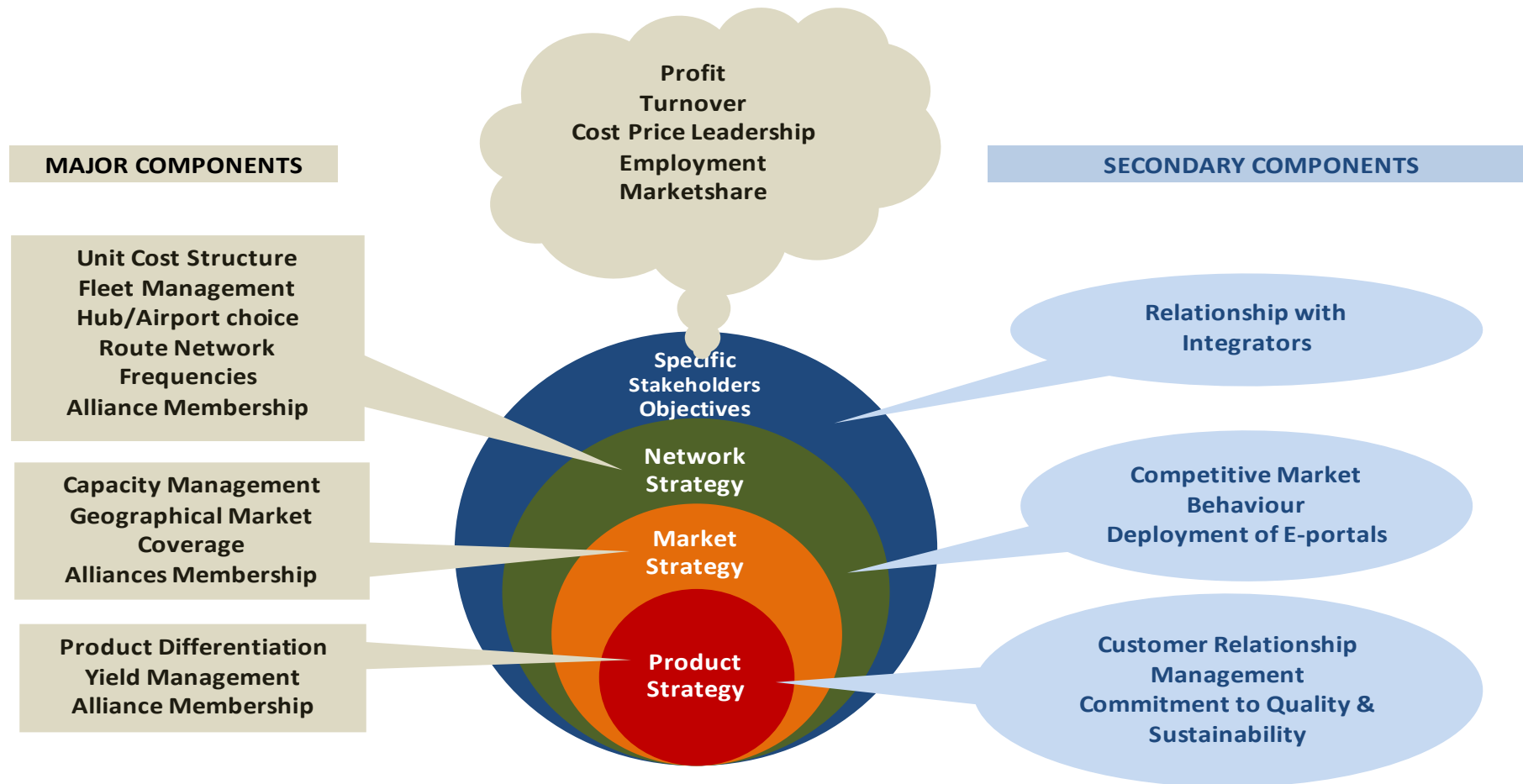
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4. Organizational Purpose and Dimensions of Strategy



Strategy content



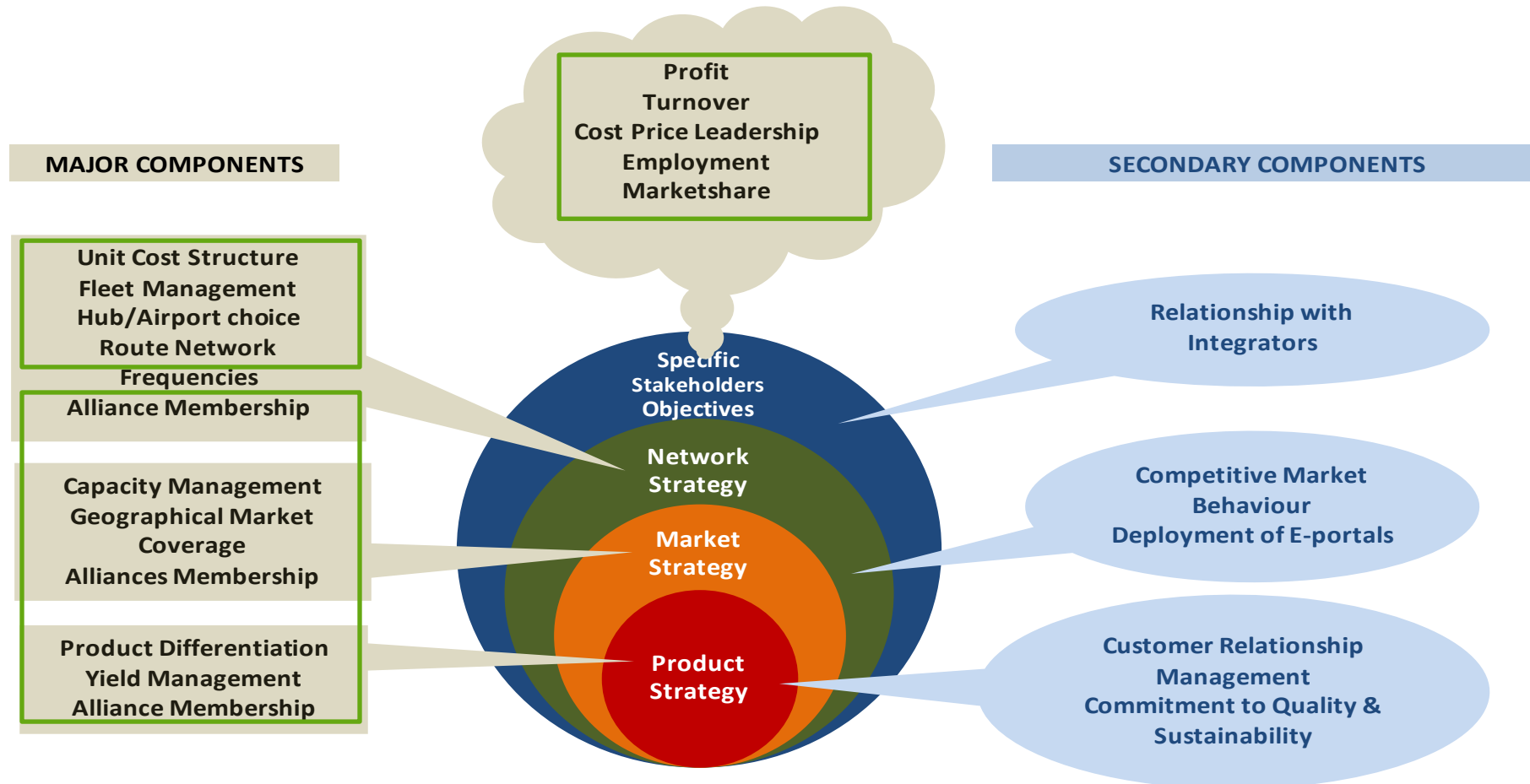
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Components to be measured by a numeric Indicator



Selected key indicators

Strategy Component		Indicator/KPI	Output
Product Strategy	Product Differentiation	Operational Revenues/RTK and /ATK	USD
		Operational Profit (Loss)/RTK and ATK	USD
	Yield Management	Operational Revenues/RTK en /ATK	USD
		Sold Produced Passenger Kilometers (RPK)	number
		Sold Produced Ton Kilometers - Total (RTK) and - Freight (FTK)	number
Alliance Membership	Member of Sky Team, Star Alliance, One world, preparatory phase or no membership	SKY/STAR/ONE/PREP/NONE	
Market Strategy	Capacity Management	Available Produced Ton Kilometers (ATK)	number
		Available Produced Passenger Kilometers (ASK)	number
		Load-factor (weight) for passenger aircraft and freighters	%
		Load-factor (seats) for passenger aircraft	%
	Geographical Market Coverage	Stage Length Passenger aircraft (km flown/number of flights)	km
		Stage Length Freighters (km flown/number of flights)	km
		Average Distance Flown 1 ton on Passenger Aircraft (FTK/tons)	km
Average Distance Flown 1 ton on Freighter Aircraft (FTK/tons)		km	
Alliance Membership	Member of Sky Team, Star Alliance, One world, preparatory phase or no membership	SKY/STAR/ONE/PREP/NONE	
Network Strategy	Unit Cost Structure	Total Operational Costs	USD
		Operational Costs/ATK	USD
		ATK/employee and FTK/employee	number
	Fleet Management	Number of Passenger aircraft in fleet	number
		Number of Freighter aircraft in fleet	number
		Kilometers flown with Freighter aircraft	km
		Flights with Freighter aircraft	number
		Flight Hours with Freighter aircraft	hours
		Tons transported by Freighter aircraft	tons
		Available produced Ton Kilometers with Freighter aircraft (ATK)	number
		Sold Produced Ton Kilometers - Freight with Freighter aircraft	number
		Sold Produced Ton Kilometers - Mail with Freighter aircraft	number
		Sold Produced Ton Kilometers - Total (FTK) with Freighter aircraft	number
	% tonnage transported by Freighter aircraft	%	
	Hub/Airport Choice	Tons treated in hub	tons
		Rank of hub (tons) worldwide	rank
	Route Network	Flown Fleet Kilometers	km
		Flown Fleet Hours	hours
		Flown Fleet Flights	number
		Flown average distance of 1 ton freight on Passenger and Freighter aircraft (FTK/tons)	km
Average Stage Length for Passenger and Freighter aircraft (Flown km/Flown flights)		km	
Alliances	Member of Sky Team, Star Alliance, One world, Preparatory phase or No membership	SKY/STAR/ONE/PREP/NONE	
Spec. Stakeholders' Obj.	Profit	Total Operational Profit (Loss)	USD
		Operational Profit (Loss) /ATK and /FTK	USD
	Turnover	Total Operational Revenues	USD
	Cost Price Leadership	Operational Costs/ATK and /FTK	USD
	Market-share	Total number of transported Passengers	number
		Total tonnage of transported Freight	tons
		Worldwide Marketshare (in % worldwide produced FTK's)	%
	Employment	Number of Employees (FTE)	number

Selected sample of 47 airlines represents 74,69% of scheduled worldwide FTK's (2010)

Airline	IATA	Airline	IATA	Airline	IATA	Airline	IATA
Aeroflot	SU	CAL Cargo Airlines	5C	EVA Air	BR	Nippon Cargo Airlines	KZ
Air Canada	AC	Cargolux	CV	Garuda Indonesia	GA	Philippine Airlines	PR
Air China	CA	Cathay Pacific Airways	CX	Gol airlines	GO	Qantas Airways	QF
Air France	AF	China Airlines	CI	Gulf Air	GU	Qatar Airways	QR
All Nippon Airlines	NH	China Eastern Airlines	MU	Iberia	IB	SAS	SK
American Airlines	AA	China Southern A/L	CZ	JAL	JL	Saudi Arabian A/L	SV
Asiana Airlines	OZ	Continental Airlines	CO	Jet Airways	9W	Singapore Airlines	SQ
Atlas Air	5Y	Delta Airlines	DL	KLM	KL	South African Airways	SA
Avianca	AV	El Al Israel Airlines	LY	Korean Air	KE	SWISS	LX
bmi	BD	Emirates	EK	LAN Airlines	LA	Thai Airways	TG
British Airways	BA	Ethiopian Airlines	ET	Lufthansa	LH	Turkish Airlines	TK
Brussels Airlines	SN	Etihad Airways	EY	Malaysian Airlines	MH		

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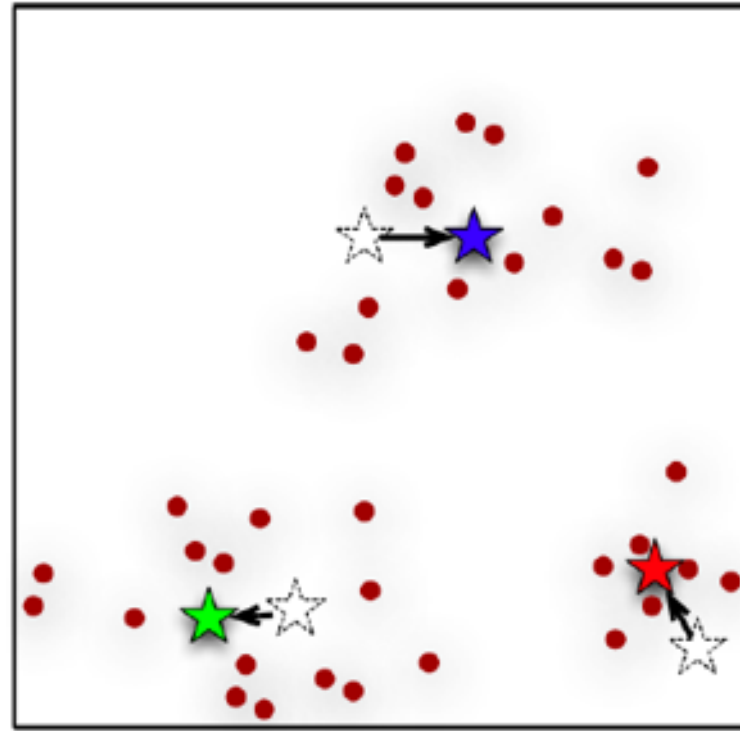
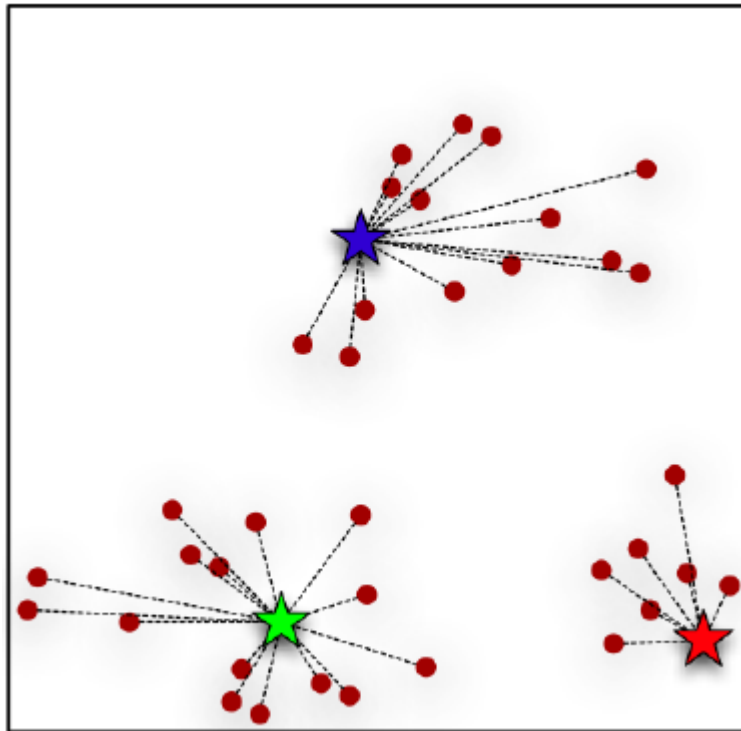
Classification Methods

- **Classification** is an important component of virtually all scientific research.
- Statistical techniques for classification are essentially of two types:
 - **Cluster Analysis**: aims to uncover groups of observations from initially unclassified data
 - **Discriminant Function Analysis**: works with data that is already classified into groups to derive rules for classifying new unclassified individuals on basis of these rules
- Cluster Analysis is typically used for **exploratory purposes**, an empirically based classification of cases, but also for **confirmatory purposes**, e.g. compare a proposed typology with the typology derived from the Cluster Analysis

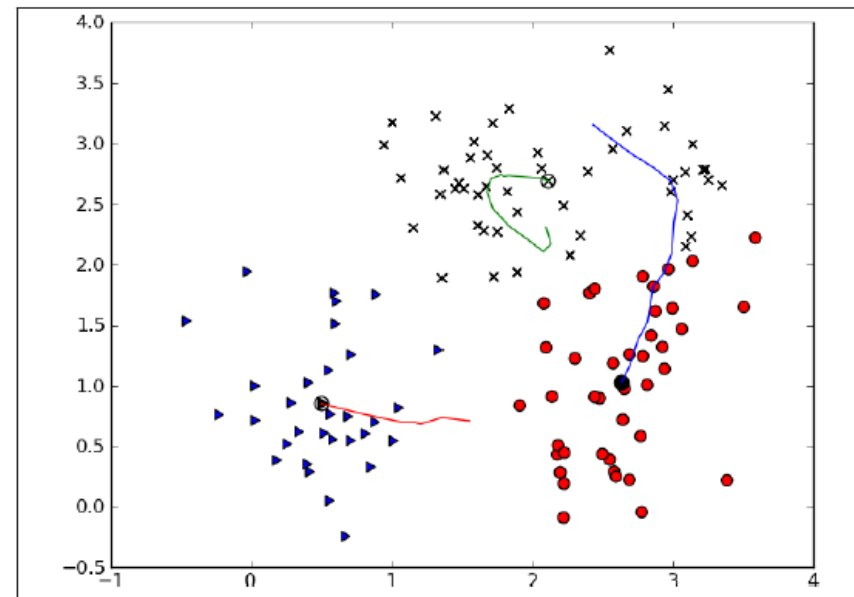
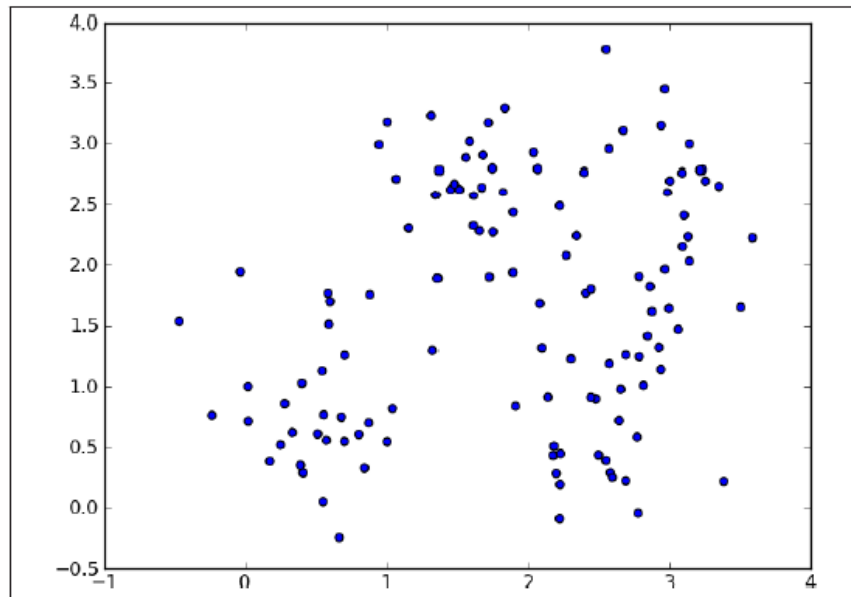
Cluster Analysis

- Classifies the concerned airlines 'cases' into cluster groups by **minimizing the differences in variables among the cluster members, but maximizing the differences between the cluster groups** -> 3rd Research Question
- Caveat:
 - **Sample size** must be large enough to provide sufficient representation of small groups within the sample
 - **Number of clusters** to be determined beforehand (K-means Cluster Analysis) or to be calculated (Hierarchical Cluster Analysis)
- **K-means Cluster Analysis:** starting from an initial set of 'K' clusters, cases could be assigned to an initial cluster based on the closest Euclidean distance to the respective cluster means

Cluster Analysis



Cluster Analysis

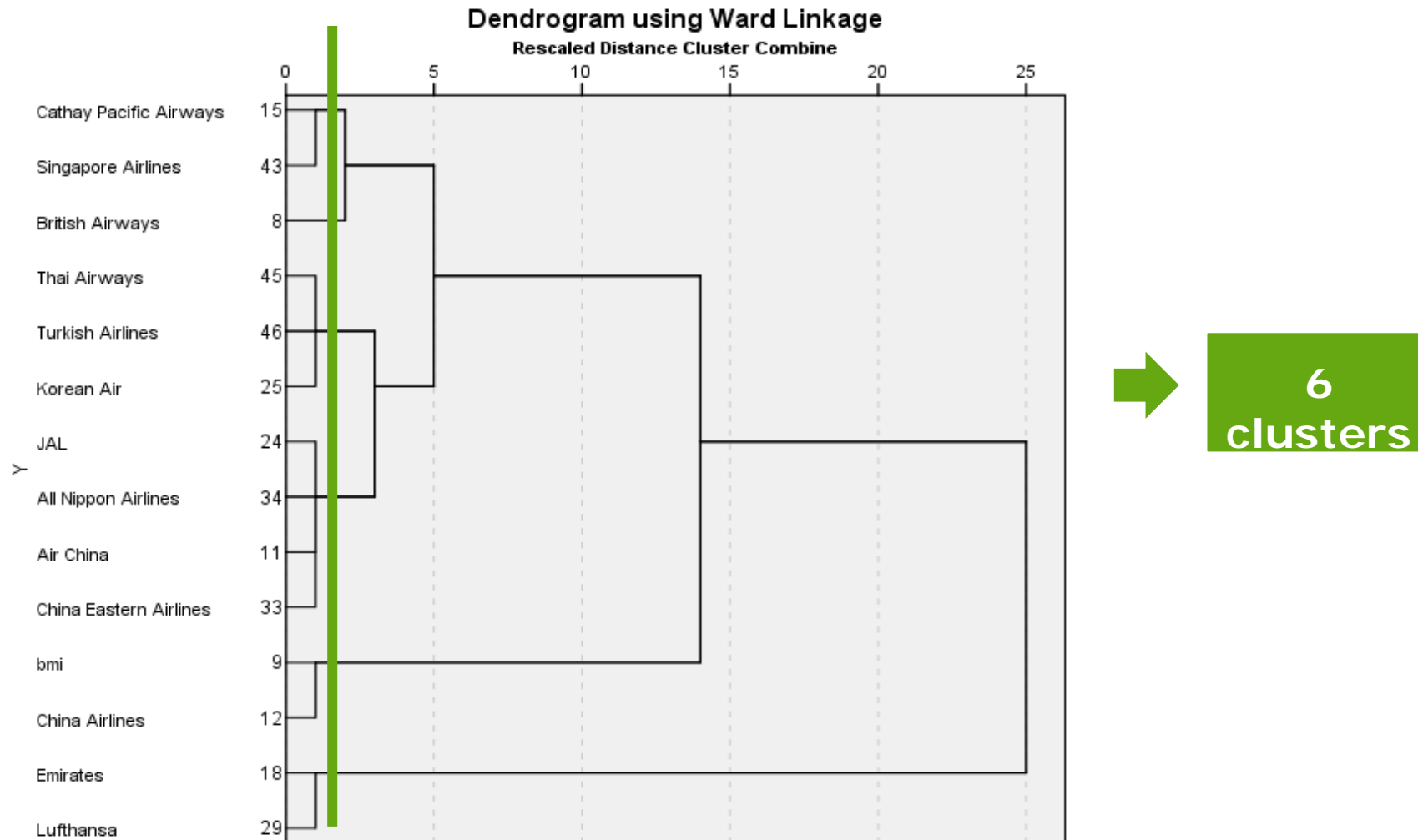


K-means Cluster Analysis

- $d_{ij} = \sqrt{\sum_{f=1}^n (x_{if} - x_{jf})^2}$, where d_{ij} is the Euclidean distance between two cases i and j , each measured on n variables x_{if} and x_{jf} , $f=1, 2, \dots, n$
- Cluster centers are recalculated after the first iteration by reassigning cases to Clusters.
- After each reclassification, the cluster means are recalculated, using the values of the cases that are now member of the cluster group.
- This process is iterated until convergence has been achieved due to little or no change in the newly calculated Cluster centers. This happens when all cases in the Cluster are closer to their own Cluster mean than to that of any other Cluster.

Hierarchical Cluster Analysis

- To identify the optimal number of Clusters.



Research Methodology

- **Data set** of key indicators and key performance indicators for 47 air cargo carriers, excluding integrators, representing 74,69% of worldwide performed FTK's
- **Source:** IATA World Air Traffic Report 2010 and research at annual reports/data from respective airlines
- **Aim:** Make a typology of air cargo carriers' strategies
- **Methodology:** k-means Cluster-analysis with iterations, using PASW Statistics 19 and 20 (SPSS)
- **Results:** Cluster analysis runs with k= 5, 6, 7 and 8

Cluster analysis with 5 clusters

Cluster 1 is diverse

Cluster 4 is very diverse

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Air France	Avianca	American Airlines	Air Canada	Jet Airways
British Airways	bmi	Delta Airlines	Air China	China Airlines
Continental Airlines	EVA Airways		Cathay Pacific	Gol
China Southern Airlines	Ethiopian Airlines		JAL	Iberia
Emirates	Etihad Airways		Korean Air	LAN
Lufthansa	Gulfair		KLM	Swiss
Qantas	El Al Israel Airlines		China Eastern	Malaysia Airlines
	Philippine Airlines		ANA	Asiana
	South African Airways		Singapore Airlines	Qatar Airways
	Brussels Airlines		Thai Airways	SAS
	CAL Cargo Airlines			Saudi
	Atlas Air			Turkish Airlines
	Nippon Cargo Airlines			Cargolux
	Polar Air Cargo			
	Volga Dnepr Airlines			

Cluster analysis with 5 clusters

Cluster 1 is still diverse

Cluster 4 has been split

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
Air France	Avianca	American Airlines	Air Canada	Jet Airways	Air China
British Airways	bmi	Delta Airlines	Cathay Pacific	EVA Airways	JAL
Continental Airlines	Ethiopian Airlines		Korean Air	China Airlines	China Eastern
China Southern Airlines	Etihad Airways		KLM	Gol	ANA
Emirates	Gulfair		Qatar Airways	Iberia	
Lufthansa	El Al Israel Airlines		Singapore Airlines	LAN	
Qantas	Philippine Airlines		Thai Airways	Swiss	
	Brussels Airlines			Malaysia Airlines	
	CAL Cargo Airlines			Asiana	
	Atlas Air			South African Airways	
	Nippon Cargo Airlines			SAS	
	Polar Air Cargo			Saudi	
	Volga Dnepr Airlines			Turkish Airlines	
				Cargolux	

Cluster analysis with 5 clusters

Cluster 1 has been split

Strategy Typology will be based here-on

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7
Air France Emirates Lufthansa	British Airways Continental Airlines China Southern Airlines Qantas	Avianca bmi Ethiopian Airlines Etihad Airways Gulfair El Al Israel Airlines Philippine Airlines Brussels Airlines CAL Cargo Airlines Atlas Air Nippon Cargo Airlines Polar Air Cargo Volga Dnepr Airlines	Air Canada Cathay Pacific KLM Singapore Airlines Air China JAL China Eastern	Jet Airways China Airlines Gol EVA Airways LAN Swiss Malaysia Airlines Asiana South African Airways SAS Saudi Cargolux	Iberia Korean Air Qatar Airways Thai Airways Turkish Airlines ANA	American Airlines Delta Airlines

Formed a separate cluster before

Final Cluster results

	Cluster						
	1	2	3	4	5	6	7
OPREVENUE	\$22,553,287	\$11,100,218	\$1,534,167	\$12,951,144	\$3,991,004	\$8,912,586	\$26,962,500
OPCOST	\$21,483,229	\$10,510,341	\$1,292,607	\$11,855,880	\$3,636,116	\$8,338,975	\$25,700,000
OPPROFITLOSS	\$1,070,058	\$589,877	\$36,301	\$1,102,407	\$233,228	\$512,175	\$1,262,500
OPPROFITATK	0.037100000	0.030350000	0.001938462	0.067100000	0.026145455	0.036483333	0.029450000
OPPROFITRTK	0.141633333	0.249075000	-0.223730769	0.289185714	0.039781818	0.179700000	0.411950000
OPREVENUERTK	1.149970787	0.791455378	1.076589920	1.164826988	0.885321132	1.147577299	1.100594650
OPREVENUEATK	0.853752937	0.579354366	0.638285654	0.815068547	0.598585746	0.689848996	0.676487682
OPCOSTATK	0.816675848	0.548993231	0.488826178	0.748475771	0.574347421	0.649065601	0.647081474
OPCOSTRTK	1.099214279	0.748831778	0.840972302	1.068074428	0.820001810	1.082458141	1.053170281
KKMFLWNSCH	720425	718307	71904	461014	191231	323087	1488909
ACDEPSCH	424357	400983	62638	233325	127815	174846	760844
HRFLOWNSCH	1115897	1094974	126102	693239	298471	508636	2283925
PAXSCH	44856814	48136770	4808634	30864157	15124854	24034807	98643890
FRTONSCH	1165468	579369	121964	936070	500988	765502	476764
KRPKSCH	132834964	111038028	7933606	78176991	28690568	53630997	234435293
KASKSCH	165710427	138053570	10594879	97717588	37947333	71885490	284069216
PAXLFSCH	,80	,80	,74	,80	,76	,75	,83
KPTKSCH	12671171	11008657	783438	7213989	2616847	4836016	21302503
KFTKSCH	6693061	2880958	834179	4584615	2518273	3344722	2852519
KMTKSCH	195714	149448	7397	148572	26731	75203	182560
TOTALKTKSCH	19559946	14039063	1423341	11947176	4937098	8255941	24337581
KATKSCH	26783385	19225357	2205484	16663143	6976703	12928283	39465242
WEIGHTLFSCH	,73	,74	,65	,71	,70	,64	,62
KKMFLWNFREIGHTER	36644	14787	11132	33519	41529	24503	0
ACDEPFREIGHTER	8119	3100	2422	7902	9606	8153	0
HRFLOWNFREIGHTER	48930	19750	13857	43948	55063	51840	0
FRTONSFREIGHTER	341855	111502	130180	469541	511134	313582	0
KFTKFREIGHTER	2373207	1044672	853671	2521027	2909075	1629043	0
KMAILTKFREIGHTER	19732	1704	805	11791	9597	5765	0
TOTALKTKFREIGHTER	2392938	1045808	854387	2532819	2914560	1634807	0
KATKFREIGHTER	3361282	1516830	1181709	3393903	3916216	2059997	0
WEIGHTLFFREIGHTER	,70	,68	,63	,74	,70	,75	,00
PAXAC	310	291	29	183	82	124	670
FREIGHTERS	9	2	6	7	8	8	0
PROCUSEFREIGHTER	31,33	12,00	48,08	27,43	36,58	26,38	,00
EMPLOYEES	67675	30864	3706	21752	11503	17693	72496
ATKPEREMPLOYEE	550	816	1604	902	1088	795	545
FTKPEREMPLOYEE	136	126	909	250	533	199	40
METRICTONSHUB2010	2314890	785685	989386	2137679	815722	1304272	654857
RANKHUB2010	7	71	60	14	53	25	31
FTKFTCPAXAC	5845	5113	2069	4297	3736	4200	5981
FTKFTCFREIGHTER	6928	8170	3488	4282	2951	3949	0
AVGSTGLGTHPAXAC	2311	1956	954	2515	1503	2125	1968
AVGSTGLGTHFREIGHTER	4574	4199	2916	3602	4302	2082	0
TOTALMKTSHR	3,8333	1,6475	,6946	2,6343	1,4767	1,9117	1,6300

ANOVA – table

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
OPREVENUE	3,617E+14	6	1,316E+13	36	27,475	,000
OPCOST	3,112E+14	6	1,288E+13	33	24,152	,000
OPPROFITLOSS	1,377E+12	6	2,281E+11	39	6,038	,000
OPPROFITATK	,003	6	,003	39	1,324	,270
OPPROFITRTK	,319	6	,351	39	,910	,498
OPREVENUERTK	,125	6	,384	36	,326	,919
OPREVENUEATK	,059	6	,133	36	,444	,844
OPCOSTATK	,070	6	,082	33	,846	,544
OPCOSTRTK	,116	6	,230	33	,501	,803
KKMFLAWSCH	8,245E+11	6	7378030680	40	111,749	,000
ACDEPSCH	2,102E+11	6	14178546138	40	14,823	,000
HRFLOWNSCH	1,901E+12	6	33300896422	40	57,090	,000
PAXSCH	3,396E+15	6	1,112E+14	38	30,539	,000
FRTONSCH	8,135E+11	6	1,415E+11	40	5,751	,000
KRPKSCH	2,213E+16	6	1,062E+14	38	208,456	,000
KASKSCH	3,272E+16	6	1,433E+14	38	228,386	,000
PAXLFSCH	,005	6	,002	34	2,216	,065
KPTKSCH	1,927E+14	6	1,133E+12	38	170,065	,000
KFTKSCH	2,012E+13	6	4,105E+12	40	4,902	,001
KMTKSCH	33705575716	6	2854221040	36	11,809	,000
TOTALKTKSCH	3,108E+14	6	5,775E+12	40	53,819	,000
KATKSCH	6,785E+14	6	8,873E+12	40	76,464	,000
WEIGHTLFSCH	,011	6	,007	40	1,444	,222
KKMFLWFREIGHTER	949007003,7	5	634013790,5	28	1,497	,223
ACDEPFREIGHTER	57553274,53	5	29195973,69	28	1,971	,114
HRFLWFREIGHTER	2000620744	5	1290290238	28	1,551	,206
FRTONSFREIGHTER	1,645E+11	5	90107528716	27	1,825	,141
KFTKFREIGHTER	4,509E+12	5	4,185E+12	28	1,077	,394
KMAILTKFREIGHTER	203998868,6	5	210802225,4	23	,968	,458
TOTALKTKFREIGHTER	4,549E+12	5	4,223E+12	28	1,077	,394
KATKFREIGHTER	8,151E+12	5	7,017E+12	28	1,162	,352
WEIGHTLFFREIGHTER	,013	5	,022	27	,606	,696
PAXAC	159109,231	6	3944,786	40	40,334	,000
FREIGHTERS	39,805	6	61,320	40	,649	,690
PROCUSEFREIGHTER	1256,477	6	1271,146	40	,988	,446
EMPLOYEES	2860221255	6	138639178,7	40	20,631	,000
ATKPEREMPLOYEE	995726,408	6	1483100,987	40	,671	,673
FTKPEREMPLOYEE	751086,992	6	714409,083	40	1,051	,407
METRICTONSHUB2010	2,254E+12	6	8,329E+11	39	2,706	,027
RANKHUB2010	3347,814	6	2644,051	40	1,266	,295
FTKFTCPAXAC	11766642,05	6	3803092,284	40	3,094	,014
FTKFTCFREIGHTER	24077238,60	6	11885649,10	40	2,026	,085
AVGSTGLGTHPAXAC	2492215,294	6	1171444,970	40	2,127	,071
AVGSTGLGTHFREIGHTER	8721940,752	6	10832995,11	39	,805	,572
TOTALMKTSHR	5,619	6	1,435	40	3,916	,004

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Limitations of the Methodology

- **Subjective nature** in selecting the optimal cluster solution:
 - Take great care in validating and ensuring practical significance of the final cluster solution
 - Cross Validation Test!

- **Multi-collinearity!**
 - Is a form of implicit weighing
 - Reduce the number of variables?
 - no logical cluster output
 - Factor Reduction?
 - variables that truly discriminate among the underlying groups are not well represented in most factor solutions

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Typology of air cargo carriers


Cargo Stars	Large PAX wide-body Operators	Carpet Sellers	Premium Cargo Operators	Strong Regionals	Basic Cargo Operators	Huge Americans
Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7
Air France Emirates Lufthansa	British Airways Continental Airlines China Southern Airlines Qantas	Avianca bmi Ethiopian Airlines Etihad Airways Gulfair El Al Israel Airlines Philippine Airlines Brussels Airlines CAL Cargo Airlines Atlas Air Nippon Cargo Airlines Polar Air Cargo Volga Dnepr Airlines	Air Canada Cathay Pacific KLM Singapore Airlines Air China JAL China Eastern	Jet Airways China Airlines Gol EVA Airways LAN Swiss Malaysia Airlines Asiana South African Airways SAS Saudi Cargolux	Iberia Korean Air Qatar Airways Thai Airways Turkish Airlines ANA	American Airlines Delta Airlines

Formed a separate cluster before

Typology of air cargo carriers


Typology		Cluster 3	Cluster 6	Cluster 5	Cluster 7	Cluster 2	Cluster 4	Cluster 1
Component		Carpet Sellers	Basic Cargo Operators	Strong Regionals	Huge Americans	Large PAX WB Operators	Premium Cargo Operators	Cargo Stars
Product Strategy	Yield	Average	High	Low	Average	Low	High	High
	<i>Operational revenues/RTK (1)</i>	\$1.0766	\$1.1476	\$0.8853	\$1.1006	\$0.7915	\$1.1648	\$1.1500
	<i>Operational revenues/ATK (2)</i>	\$0.6383	\$0.6898	\$0.5986	\$0.6765	\$0.5794	\$0.8151	\$0.8538
	Product differentiation <i>PCD-index (1)x(2)x100</i>	Low/average 68.72	Average 79.16	Low 52.99	Average 74.45	Low 45.85	Broad 94.94	Broad 98.18
Market Strategy	Load factor (weight)	65%	64%	70%	62%	74%	71%	73%
	Capacity management	Low	Low	Average	Low	High	Average	High
	Size of central cargo hub	Small	Strong regional	Small	Small	Varying	Avg/Large	Large
	Stage length (km) passenger a/c	954	2125	1503	1968	1956	2515	2311
	Stage length (km) freighters	2916	2082	4302	0	4199	3602	4574
Network Strategy	Unit cost	Low/average	Average	Low	Average	Low	High	Highest
	<i>Operational costs/ATK</i>	\$0,6381	\$0,6491	\$0,5743	\$0,6471	\$0,5490	\$0,7485	\$0,8167
	Fleet (pass/freighters)	29/6	124/8	82/8	670/0	291/2	183/7	310/9
	Utilisation of freighters (ATK)	0%/100%	26.38%	36.58%	0.00%	12.00%	27.43%	31.33%
	Flown distance freighters (MIO km)	11132	24503	41529	0	14787	33519	36644
	Avg distance 1 ton in pass. aircraft	2069	4200	3736	5981	5113	4297	5845
	Avg distance 1 ton in freighter	0/3488	3,949	2,951	0	8,170	4,282	6,928
Stakeholders' Objectives	Profit (Operat. profit USDcents/ATK)	\$0.1938	\$3.6483	\$2.6145	\$2.9450	\$3.0350	\$6.7100	\$3.7100
	Turnover (thousands)	\$1,534,167	\$8,912,586	\$3,991,004	\$26,962,500	\$11,100,218	\$12,951,144	\$22,553,287
	Cost price leadership (ATK)	Good	Fair	Very good	Fair	Very good	Bad	Worst
	Employment (FTE)	3706	17693	11503	72496	30864	21752	67675
	Market share (% worldwide FTK)	0.69%	1.91%	1.48%	1.63%	1.65%	2.63%	3.83%

Typology of air cargo carriers



		Typology	Cluster 6	Cluster 5	Cluster 7	Cluster 2	Cluster 4	Cluster 1
		Carpet Sellers	Basic Cargo Operators	Strong Regionals	Huge Americans	Large PAX WB Operators	Premium Cargo Operators	Cargo Stars
Component								
Product Strategy	Yield	Average	High	Low	Average	Low	High	High
	Operational revenues/RTK (1)	\$1.0766	\$1.1476	\$0.8853	\$1.1006	\$0.7915	\$1.1648	\$1.1500
	Operational revenues/ATK (2)	\$0.6383	\$0.6898	\$0.5986	\$0.6765	\$0.5794	\$0.8151	\$0.8538
Product Strategy	Product differentiation	Low/average	Average	Low	Average	Low	Broad	Broad
	PCD-index (1)x(2)x100	68.72	79.16	52.99	74.45	45.85	94.94	98.18
Market Strategy	Load factor (weight)	65%	64%	70%	62%	74%	71%	73%
	Capacity management	Low	Low	Average	Low	High	Average	High
	Size of central cargo hub	Small	Strong regional	Small	Small	Varying	Avg/Large	Large
	Stage length (km) passenger a/c	954	2125	1503	1968	1956	2515	2311
	Stage length (km) freighters	2916	2082	4302	0	4199	3602	4574
Network Strategy	Unit cost	Low/average	Average	Low	Average	Low	High	Highest
	Operational costs/ATK	\$0,6381	\$0,6491	\$0,5743	\$0,6471	\$0,5490	\$0,7485	\$0,8167
	Fleet (pass/freighters)	29/6	124/8	82/8	670/0	291/2	183/7	310/9
	Utilisation of freighters (ATK)	0%/100%	26.38%	36.58%	0.00%	12.00%	27.43%	31.33%
	Flown distance freighters (MIO km)	11132	24503	41529	0	14787	33519	36644
	Avg distance 1 ton in pass. aircraft	2069	4200	3736	5981	5113	4297	5845
Stakeholders' Objectives	Avg distance 1 ton in freighter	0/3488	3,949	2,951	0	8,170	4,282	6,928
	Profit (Operat. profit USDcents/ATK)	\$0.1938	\$3.6483	\$2.6145	\$2.9450	\$3.0350	\$6.7100	\$3.7100
	Turnover (thousands)	\$1,534,167	\$8,912,586	\$3,991,004	\$26,962,500	\$11,100,218	\$12,951,144	\$22,553,287
	Cost price leadership (ATK)	Good	Fair	Very good	Fair	Very good	Bad	Worst
	Employment (FTE)	3706	17693	11503	72496	30864	21752	67675
	Market share (% worldwide FTK)	0.69%	1.91%	1.48%	1.63%	1.65%	2.63%	3.83%

Typology of air cargo carriers



		Typology	Cluster 6	Cluster 5	Cluster 7	Cluster 2	Cluster 4	Cluster 1
		Carpet Sellers	Basic Cargo Operators	Strong Regionals	Huge Americans	Large PAX WB Operators	Premium Cargo Operators	Cargo Stars
Component								
Product Strategy	Yield	Average	High	Low	Average	Low	High	High
	Operational revenues/RTK (1)	\$1.0766	\$1.1476	\$0.8853	\$1.1006	\$0.7915	\$1.1648	\$1.1500
	Operational revenues/ATK (2)	\$0.6383	\$0.6898	\$0.5986	\$0.6765	\$0.5794	\$0.8151	\$0.8538
Product Strategy	Product differentiation	Low/average	Average	Low	Average	Low	Broad	Broad
	PCD-index (1)x(2)x100	68.72	79.16	52.99	74.45	45.85	94.94	98.18
Market Strategy	Load factor (weight)	65%	64%	70%	62%	74%	71%	73%
	Capacity management	Low	Low	Average	Low	High	Average	High
	Size of central cargo hub	Small	Strong regional	Small	Small	Varying	Avg/Large	Large
	Stage length (km) passenger a/c	954	2125	1503	1968	1956	2515	2311
	Stage length (km) freighters	2916	2082	4302	0	4199	3602	4574
Network Strategy	Unit cost	Low/average	Average	Low	Average	Low	High	Highest
	Operational costs/ATK	\$0,6381	\$0,6491	\$0,5743	\$0,6471	\$0,5490	\$0,7485	\$0,8167
	Fleet (pass/freighters)	29/6	124/8	82/8	670/0	291/2	183/7	310/9
	Utilisation of freighters (ATK)	0%/100%	26.38%	36.58%	0.00%	12.00%	27.43%	31.33%
	Flown distance freighters (MIO km)	11132	24503	41529	0	14787	33519	36644
	Avg distance 1 ton in pass. aircraft	2069	4200	3736	5981	5113	4297	5845
Stakeholders' Objectives	Avg distance 1 ton in freighter	0/3488	3,949	2,951	0	8,170	4,282	6,928
	Profit (Operat. profit USDcents/ATK)	\$0.1938	\$3.6483	\$2.6145	\$2.9450	\$3.0350	\$6.7100	\$3.7100
	Turnover (thousands)	\$1,534,167	\$8,912,586	\$3,991,004	\$26,962,500	\$11,100,218	\$12,951,144	\$22,553,287
	Cost price leadership (ATK)	Good	Fair	Very good	Fair	Very good	Bad	Worst
	Employment (FTE)	3706	17693	11503	72496	30864	21752	67675
	Market share (% worldwide FTK)	0.69%	1.91%	1.48%	1.63%	1.65%	2.63%	3.83%

Typology of air cargo carriers

		Cluster 5	Cluster 7	Cluster 2	Cluster 4	Cluster 1		
Typology		Carpet	Basic Cargo	Strong	Huge	Large PAX	Premium Cargo	Cargo
Component		Sellers	Operators	Regionals	Americans	WB Operators	Operators	Stars
Product Strategy	Yield	Average	High	Low	Average	Low	High	High
	Operational revenues/RTK (1)	\$1.0766	\$1.1476	\$0.8853	\$1.1006	\$0.7915	\$1.1648	\$1.1500
	Operational revenues/ATK (2)	\$0.6383	\$0.6898	\$0.5986	\$0.6765	\$0.5794	\$0.8151	\$0.8538
Market Strategy	Product differentiation	Low/average	Average	Low	Average	Low	Broad	Broad
	PCD-index (1)x(2)x100	68.72	79.16	52.99	74.45	45.85	94.94	98.18
	Load factor (weight)	65%	64%	70%	62%	74%	71%	73%
Network Strategy	Capacity management	Low	Low	Average	Low	High	Average	High
	Size of central cargo hub	Small	Strong regional	Small	Small	Varying	Avg/Large	Large
	Stage length (km) passenger a/c	954	2125	1503	1968	1956	2515	2311
	Stage length (km) freighters	2916	2082	4302	0	4199	3602	4574
	Unit cost	Low/average	Average	Low	Average	Low	High	Highest
Stakeholders' Objectives	Operational costs/ATK	\$0,6381	\$0,6491	\$0,5743	\$0,6471	\$0,5490	\$0,7485	\$0,8167
	Fleet (pass/freighters)	29/6	124/8	82/8	670/0	291/2	183/7	310/9
	Utilisation of freighters (ATK)	0%/100%	26.38%	36.58%	0.00%	12.00%	27.43%	31.33%
	Flown distance freighters (MIO km)	11132	24503	41529	0	14787	33519	36644
	Avg distance 1 ton in pass. aircraft	2069	4200	3736	5981	5113	4297	5845
	Avg distance 1 ton in freighter	0/3488	3,949	2,951	0	8,170	4,282	6,928
Stakeholders' Objectives	Profit (Operat. profit USDcents/ATK)	\$0.1938	\$3.6483	\$2.6145	\$2.9450	\$3.0350	\$6.7100	\$3.7100
	Turnover (thousands)	\$1,534,167	\$8,912,586	\$3,991,004	\$26,962,500	\$11,100,218	\$12,951,144	\$22,553,287
	Cost price leadership (ATK)	Good	Fair	Very good	Fair	Very good	Bad	Worst
	Employment (FTE)	3706	17693	11503	72496	30864	21752	67675
	Market share (% worldwide FTK)	0.69%	1.91%	1.48%	1.63%	1.65%	2.63%	3.83%

Typology of air cargo carriers



Typology		Cluster 3	Cluster 6	Cluster 7	Cluster 2	Cluster 4	Cluster 1	
Component		Carpet Sellers	Basic Cargo Operators	Strong Regionals	Huge Americans	Large PAX WB Operators	Premium Cargo Operators	Cargo Stars
Product Strategy	Yield	Average	High	Low	Average	Low	High	High
	Operational revenues/RTK (1)	\$1.0766	\$1.1476	\$0.8853	\$1.1006	\$0.7915	\$1.1648	\$1.1500
	Operational revenues/ATK (2)	\$0.6383	\$0.6898	\$0.5986	\$0.6765	\$0.5794	\$0.8151	\$0.8538
Product Strategy	Product differentiation	Low/average	Average	Low	Average	Low	Broad	Broad
	PCD-index (1)x(2)x100	68.72	79.16	52.99	74.45	45.85	94.94	98.18
Market Strategy	Load factor (weight)	65%	64%	70%	62%	74%	71%	73%
	Capacity management	Low	Low	Average	Low	High	Average	High
	Size of central cargo hub	Small	Strong regional	Small	Small	Varying	Avg/Large	Large
	Stage length (km) passenger a/c	954	2125	1503	1968	1956	2515	2311
	Stage length (km) freighters	2916	2082	4302	0	4199	3602	4574
Network Strategy	Unit cost	Low/average	Average	Low	Average	Low	High	Highest
	Operational costs/ATK	\$0,6381	\$0,6491	\$0,5743	\$0,6471	\$0,5490	\$0,7485	\$0,8167
	Fleet (pass/freighters)	29/6	124/8	82/8	670/0	291/2	183/7	310/9
	Utilisation of freighters (ATK)	0%/100%	26.38%	36.58%	0.00%	12.00%	27.43%	31.33%
	Flown distance freighters (MIO km)	11132	24503	41529	0	14787	33519	36644
	Avg distance 1 ton in pass. aircraft	2069	4200	3736	5981	5113	4297	5845
Stakeholders' Objectives	Avg distance 1 ton in freighter	0/3488	3,949	2,951	0	8,170	4,282	6,928
	Profit (Operat. profit USDcents/ATK)	\$0.1938	\$3.6483	\$2.6145	\$2.9450	\$3.0350	\$6.7100	\$3.7100
	Turnover (thousands)	\$1,534,167	\$8,912,586	\$3,991,004	\$26,962,500	\$11,100,218	\$12,951,144	\$22,553,287
	Cost price leadership (ATK)	Good	Fair	Very good	Fair	Very good	Bad	Worst
	Employment (FTE)	3706	17693	11503	72496	30864	21752	67675
Market share (% worldwide FTK)	0.69%	1.91%	1.48%	1.63%	1.65%	2.63%	3.83%	

Typology of air cargo carriers



		Cluster 3	Cluster 6	Cluster 1	American Airlines	Cluster 2	Cluster 4	Cluster 1
Typology Component		Carpet Sellers	Basic Cargo Operators	Strong Regionals	Huge Americans	Large PAX WB Operators	Premium Cargo Operators	Cargo Stars
Product Strategy	Yield	Average	High	Low	Average	Low	High	High
	Operational revenues/RTK (1)	\$1.0766	\$1.1476	\$0.8853	\$1.1006	\$0.7915	\$1.1648	\$1.1500
	Operational revenues/ATK (2)	\$0.6383	\$0.6898	\$0.5986	\$0.6765	\$0.5794	\$0.8151	\$0.8538
	Product differentiation PCD-index (1)x(2)x100	Low/average 68.72	Average 79.16	Low 52.99	Average 74.45	Low 45.85	Broad 94.94	Broad 98.18
Market Strategy	Load factor (weight)	65%	64%	70%	62%	74%	71%	73%
	Capacity management	Low	Low	Average	Low	High	Average	High
	Size of central cargo hub	Small	Strong regional	Small	Small	Varying	Avg/Large	Large
	Stage length (km) passenger a/c	954	2125	1503	1968	1956	2515	2311
	Stage length (km) freighters	2916	2082	4302	0	4199	3602	4574
Network Strategy	Unit cost	Low/average	Average	Low	Average	Low	High	Highest
	Operational costs/ATK	\$0,6381	\$0,6491	\$0,5743	\$0.6471	\$0,5490	\$0,7485	\$0,8167
	Fleet (pass/freighters)	29/6	124/8	82/8	670/0	291/2	183/7	310/9
	Utilisation of freighters (ATK)	0%/100%	26.38%	36.58%	0.00%	12.00%	27.43%	31.33%
	Flown distance freighters (MIO km)	11132	24503	41529	0	14787	33519	36644
	Avg distance 1 ton in pass. aircraft	2069	4200	3736	5981	5113	4297	5845
Stakeholders' Objectives	Avg distance 1 ton in freighter	0/3488	3,949	2,951	0	8,170	4,282	6,928
	Profit (Operat. profit USDcents/ATK)	\$0.1938	\$3.6483	\$2.6145	\$2.9450	\$3.0350	\$6.7100	\$3.7100
	Turnover (thousands)	\$1,534,167	\$8,912,586	\$3,991,004	\$26,962,500	\$11,100,218	\$12,951,144	\$22,553,287
	Cost price leadership (ATK)	Good	Fair	Very good	Fair	Very good	Bad	Worst
	Employment (FTE)	3706	17693	11503	72496	30864	21752	67675
	Market share (% worldwide FTK)	0.69%	1.91%	1.48%	1.63%	1.65%	2.63%	3.83%

Typology of air cargo carriers


		Cluster 3	Cluster 6	Cluster 5	Cluster 1	Cluster 4	Cluster 1	
Typology		Carpet	Basic Cargo	Strong	Huge	Large PAX	Premium Cargo	Cargo
Component		Sellers	Operators	Regionals	Americans	WB Operators	Operators	Stars
Product Strategy	Yield	Average	High	Low	Average	Low	High	High
	Operational revenues/RTK (1)	\$1.0766	\$1.1476	\$0.8853	\$1.1006	\$0.7915	\$1.1648	\$1.1500
	Operational revenues/ATK (2)	\$0.6383	\$0.6898	\$0.5986	\$0.6765	\$0.5794	\$0.8151	\$0.8538
Product Strategy	Product differentiation	Low/average	Average	Low	Average	Low	Broad	Broad
	PCD-index (1)x(2)x100	68.72	79.16	52.99	74.45	45.85	94.94	98.18
Market Strategy	Load factor (weight)	65%	64%	70%	62%	74%	71%	73%
	Capacity management	Low	Low	Average	Low	High	Average	High
	Size of central cargo hub	Small	Strong regional	Small	Small	Varying	Avg/Large	Large
	Stage length (km) passenger a/c	954	2125	1503	1968	1956	2515	2311
	Stage length (km) freighters	2916	2082	4302	0	4199	3602	4574
Network Strategy	Unit cost	Low/average	Average	Low	Average	Low	High	Highest
	Operational costs/ATK	\$0,6381	\$0,6491	\$0,5743	\$0,6471	\$0,5490	\$0,7485	\$0,8167
	Fleet (pass/freighters)	29/6	124/8	82/8	670/0	291/2	183/7	310/9
	Utilisation of freighters (ATK)	0%/100%	26.38%	36.58%	0.00%	12.00%	27.43%	31.33%
	Flown distance freighters (MIO km)	11132	24503	41529	0	14787	33519	36644
	Avg distance 1 ton in pass. aircraft	2069	4200	3736	5981	5113	4297	5845
Stakeholders' Objectives	Avg distance 1 ton in freighter	0/3488	3,949	2,951	0	8,170	4,282	6,928
	Profit (Operat. profit USDcents/ATK)	\$0.1938	\$3.6483	\$2.6145	\$2.9450	\$3.0350	\$6.7100	\$3.7100
	Turnover (thousands)	\$1,534,167	\$8,912,586	\$3,991,004	\$26,962,500	\$11,100,218	\$12,951,144	\$22,553,287
	Cost price leadership (ATK)	Good	Fair	Very good	Fair	Very good	Bad	Worst
	Employment (FTE)	3706	17693	11503	72496	30864	21752	67675
Market share (% worldwide FTK)	0.69%	1.91%	1.48%	1.63%	1.65%	2.63%	3.83%	



Typology of air cargo carriers

		Cluster 3	Cluster 6	Cluster 5	Cluster 7	Cluster 2	CATHAY PACIFIC	Cluster 1
Typology		Carpet	Basic Cargo	Strong	Huge	Large PAX	Premium Cargo	Cargo
Component		Sellers	Operators	Regionals	Americans	WB Operators	Operators	Stars
Product Strategy	Yield	Average	High	Low	Average	Low	High	High
	Operational revenues/RTK (1)	\$1.0766	\$1.1476	\$0.8853	\$1.1006	\$0.7915	\$1.1648	\$1.1500
	Operational revenues/ATK (2)	\$0.6383	\$0.6898	\$0.5986	\$0.6765	\$0.5794	\$0.8151	\$0.8538
Product Strategy	Product differentiation	Low/average	Average	Low	Average	Low	Broad	Broad
	PCD-index (1)x(2)x100	68.72	79.16	52.99	74.45	45.85	94.94	98.18
	Load factor (weight)	65%	64%	70%	62%	74%	71%	73%
Market Strategy	Capacity management	Low	Low	Average	Low	High	Average	High
	Size of central cargo hub	Small	Strong regional	Small	Small	Varying	Avg/Large	Large
	Stage length (km) passenger a/c	954	2125	1503	1968	1956	2515	2311
	Stage length (km) freighters	2916	2082	4302	0	4199	3602	4574
	Unit cost	Low/average	Average	Low	Average	Low	High	Highest
Network Strategy	Operational costs/ATK	\$0,6381	\$0,6491	\$0,5743	\$0,6471	\$0,5490	\$0,7485	\$0,8167
	Fleet (pass/freighters)	29/6	124/8	82/8	670/0	291/2	183/7	310/9
	Utilisation of freighters (ATK)	0%/100%	26.38%	36.58%	0.00%	12.00%	27.43%	31.33%
	Flown distance freighters (MIO km)	11132	24503	41529	0	14787	33519	36644
	Avg distance 1 ton in pass. aircraft	2069	4200	3736	5981	5113	4297	5845
	Avg distance 1 ton in freighter	0/3488	3,949	2,951	0	8,170	4,282	6,928
Stakeholders' Objectives	Profit (Operat. profit USDcents/ATK)	\$0.1938	\$3.6483	\$2.6145	\$2.9450	\$3.0350	\$6.7100	\$3.7100
	Turnover (thousands)	\$1,534,167	\$8,912,586	\$3,991,004	\$26,962,500	\$11,100,218	\$12,951,144	\$22,553,287
	Cost price leadership (ATK)	Good	Fair	Very good	Fair	Very good	Bad	Worst
	Employment (FTE)	3706	17693	11503	72496	30864	21752	67675
	Market share (% worldwide FTK)	0.69%	1.91%	1.48%	1.63%	1.65%	2.63%	3.83%

Typology of air cargo carriers

		Cluster 3	Cluster 6	Cluster 5	Cluster 7	Cluster 2	Cluster 1	 Lufthansa
Typology		Carpet	Basic Cargo	Strong	Huge	Large PAX	Premium Cargo	Cargo
Component		Sellers	Operators	Regionals	Americans	WB Operators	Operators	Stars
Product Strategy	Yield	Average	High	Low	Average	Low	High	High
	Operational revenues/RTK (1)	\$1.0766	\$1.1476	\$0.8853	\$1.1006	\$0.7915	\$1.1648	\$1.1500
	Operational revenues/ATK (2)	\$0.6383	\$0.6898	\$0.5986	\$0.6765	\$0.5794	\$0.8151	\$0.8538
	Product differentiation	Low/average	Average	Low	Average	Low	Broad	Broad
Market Strategy	PCD-index (1)x(2)x100	68.72	79.16	52.99	74.45	45.85	94.94	98.18
	Load factor (weight)	65%	64%	70%	62%	74%	71%	73%
	Capacity management	Low	Low	Average	Low	High	Average	High
	Size of central cargo hub	Small	Strong regional	Small	Small	Varying	Avg/Large	Large
	Stage length (km) passenger a/c	954	2125	1503	1968	1956	2515	2311
	Stage length (km) freighters	2916	2082	4302	0	4199	3602	4574
Network Strategy	Unit cost	Low/average	Average	Low	Average	Low	High	Highest
	Operational costs/ATK	\$0,6381	\$0,6491	\$0,5743	\$0,6471	\$0,5490	\$0,7485	\$0,8167
	Fleet (pass/freighters)	29/6	124/8	82/8	670/0	291/2	183/7	310/9
	Utilisation of freighters (ATK)	0%/100%	26.38%	36.58%	0.00%	12.00%	27.43%	31.33%
	Flown distance freighters (MIO km)	11132	24503	41529	0	14787	33519	36644
	Avg distance 1 ton in pass. aircraft	2069	4200	3736	5981	5113	4297	5845
Stakeholders' Objectives	Avg distance 1 ton in freighter	0/3488	3,949	2,951	0	8,170	4,282	6,928
	Profit (Operat. profit USDcents/ATK)	\$0.1938	\$3.6483	\$2.6145	\$2.9450	\$3.0350	\$6.7100	\$3.7100
	Turnover (thousands)	\$1,534,167	\$8,912,586	\$3,991,004	\$26,962,500	\$11,100,218	\$12,951,144	\$22,553,287
	Cost price leadership (ATK)	Good	Fair	Very good	Fair	Very good	Bad	Worst
	Employment (FTE)	3706	17693	11503	72496	30864	21752	67675
	Market share (% worldwide FTK)	0.69%	1.91%	1.48%	1.63%	1.65%	2.63%	3.83%

Carpet Sellers	Basic Cargo Operators	Strong Regionals	Low Cost Low Yielder	Large Pax WB Operators	Premium Cargo Operators	Cargo Stars
All Nippon Airways	Cargolux	Air Canada	Emirates	Etihad Airlines	American Airlines	British Airways
Asiana	Korean Air	Air China		AF-KLM	Cathay Pacific Airways	Delta Airlines
Avianca	Qantas Airways	China Southern Airlines		Singapore Airlines	Qatar Airways	Lufthansa
Brussels Airlines		Thai Airways			Turkish Airlines	United Airlines
China Airlines						
China Eastern Airlines						
El Al Israel Airlines						
Ethiopian Airlines						
EVA Air						
Garuda Indonesia						
Gulfair						
Iberia						
Japan Airlines						
Jet Airways						
LAN Airlines						
Malaysia Airlines						
Oman Air						
Philippine Airlines						
Saudi Arabian Airlines						
SAS						
South African Airways						
Swiss						
CAL Cargo Airlines						
Nippon Cargo Airlines						
Polar Air Cargo						
Volga Dnepr Airlines						



Two main strategic options remain: lowcost/high volume or product/margin driven cargo strategy

Presentation's content

The Strategy of Air Cargo Operators. About Carpet Sellers and Cargo Stars.

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2. Research Gaps and Structure
3. The Air Cargo Industry
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5. Indicators
6. Research Methodology
7. Typology of Strategy Models
8. **Successful Strategy Models**
9. Key Success Factors
10. Conclusions



Which cluster has a successful strategy model?

Profit & cash flow maximization

- Premium Cargo Operators
- Cargo Stars
- Basic Cargo Operators

Revenue maximization

- Huge Americans
- Cargo Stars

Cargo Market share maximization

- Cargo Stars
- Premium Cargo Operators
- Basic Cargo Operators

Employment maximization

- Huge Americans
- Cargo Stars
- Large Passenger Wide Body Operators

Unit cost level minimization

- Large Passenger Wide Body Operators
- Strong Regionals

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Key Success Factors within Strategy Models

1. A broad level of **Product Differentiation**
2. A professional **Capacity Management**
3. The **size of the Airline**
4. The **size of the cargo Hub**
5. A **balanced Fleet mix** between Passenger and Freighter aircraft
6. A **competitive Cost Level**

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Conclusions

- The business level **strategy** of an air cargo operator consists of a **number of components**.
- Using a k-means Cluster Analysis, key indicators and Key Performance Indicators can be used to draft a **typology** of air cargo operator strategy models
- The research generated a typology of **7 representative clusters of air cargo operators' strategy models**, each with their own characteristics.
- Our findings prove the clear **existence of different strategy models** and the differing degree of focus on air cargo strategy development and deployment among the air cargo carriers' population.
- Our findings prove the **existence of superior strategy models** which could be defined as 'winning strategies'. These '**winning strategies**' differ according to the **size** of the airline.

Thank you for your kind attention!

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