

## Aviation Economics & Finance

Professor David Gillen (University of British Columbia )&  
Professor Tuba Toru-Delibasi (Bahcesehir University)

## ADMINISTRATIVE MATTERS

- About the Instructors:
- David Gillen (UBC, Sauder School of Business)
  - YVR Professor of Transportation Policy & Management
  - Director: Center for Transportation Studies
  - Email: [david.gillen@sauder.ubc.ca](mailto:david.gillen@sauder.ubc.ca)
  - Access: through email and course web portal, before or after class
- Tuba Toru Delibasi (Bahcesehir University )
  - Professor of Economics, Transportation & Logistics
  - Email: [tuba.toru@eas.bahcesehir.edu.tr](mailto:tuba.toru@eas.bahcesehir.edu.tr)
  - Access: through email and course web portal, before or after class

## COURSE MATERIALS

- Required Materials-(Posted on the course website)
  - Syllabus (Posted on the course website)
  - Class slides, notes and other required readings
  - Course pack (cases, articles and other readings)
- Recommended Materials
  - There is no specific text but reference to any one of the texts on air transport economics available on the web is recommended if you are apprehensive about some topics.
  - If you wish to have recommendations, I am happy to provide them

# COURSE REQUIREMENT AND GRADING

<b>Case Study</b>	30%	
<b>In class Assignments</b>	20%	
<b>Final Exam</b>	40%	
<b>Participation</b>	10%	Criteria
<b>Working in teams</b>		5-6 people per team (people assigned to teams by the instructors)
<b><i>Ad hoc</i> Homework</b>		Important for applying concepts

## DAILY SCHEDULE

- 10:00-11:00 Morning Session 1
- 11:00-11:15 Break
- 11:15-12:15 Morning Session 2
- 12:15-12:30 Break
- 12:30-13:30 Morning Session 3
- 13:30-14:30 **Lunch-get some fresh air!**
- 14:30-15:30 Afternoon Session 1
- 15:30-15:45 Break
- 15:45-16:45 Afternoon Session 2
- 16:45-17:00 Break
- 17:00-18:00 Afternoon Session 3

## OVERVIEW OF COURSE

- Three sections
  - Microeconomics of aviation
    - Airlines
    - Airports
    - Components of the aviation Supply Chain
  - Macroeconomic relevant for global airlines
    - Develop a ‘macro-literacy’
    - Monetary policy,  $i$  rates, exchange rates, business cycles
  - Finance (you also see finance in Law and Commerce Course)

## OUTLINE

- A Slight Digression on Economic Principles
- The aviation value chain
- Aviation Supply chain versus Value Chain
- Emerging role of ancillary products/ services
- The role of aviation
- Performance in the aviation value chain
  - Investment
  - Rate of return
  - Credit rating
- Growth of Ancillary Revenues
- Role of Aviation
- Social Return from Aviation

## ECONOMICS

- Is a way of thinking not technology - **less is more**
- An approach not set of conclusions
- Is the study of choice, benefits and costs
- 4 key concepts
  - Opportunity cost
  - Marginalism
  - Economic incentives
  - Economic efficiency



## OPPORTUNITY COST

- Value of best forgone alternative
- Generally misunderstood at policy and strategy level
- Is about the cost of alternative values
  - Added resources on any one project leaves us with fewer resources for remaining projects.
- Do we want the:
  - Best medical care, best environment, best education, best marketing plan, best work force?

## MARGINALISM

- Price is determined by marginal not total value
  - “education is more important than highways so we should spend more on education” or “research is more important than marketing so we should spend more on product development”
- How much advertising or where to place advertising? – balance incremental gain with incremental cost

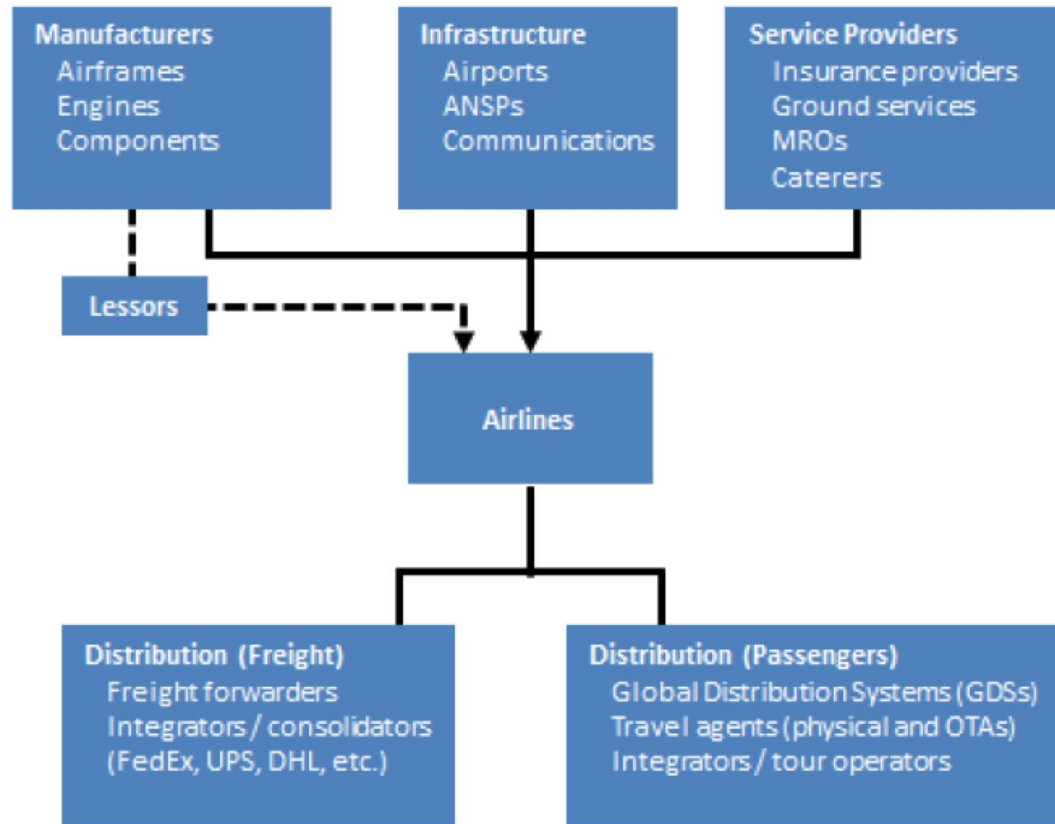
## ECONOMIC INCENTIVES

- Numerous examples of incentive effects:
  - Early retirement buyouts – reduces normal quits & causes best workers to quite (mobility!)
  - Air bags lead to increased accident rate
  - No peak-load pricing at airports, utilities, roadways
- Any policy or strategy must consider how it will affect customers and workers incentives

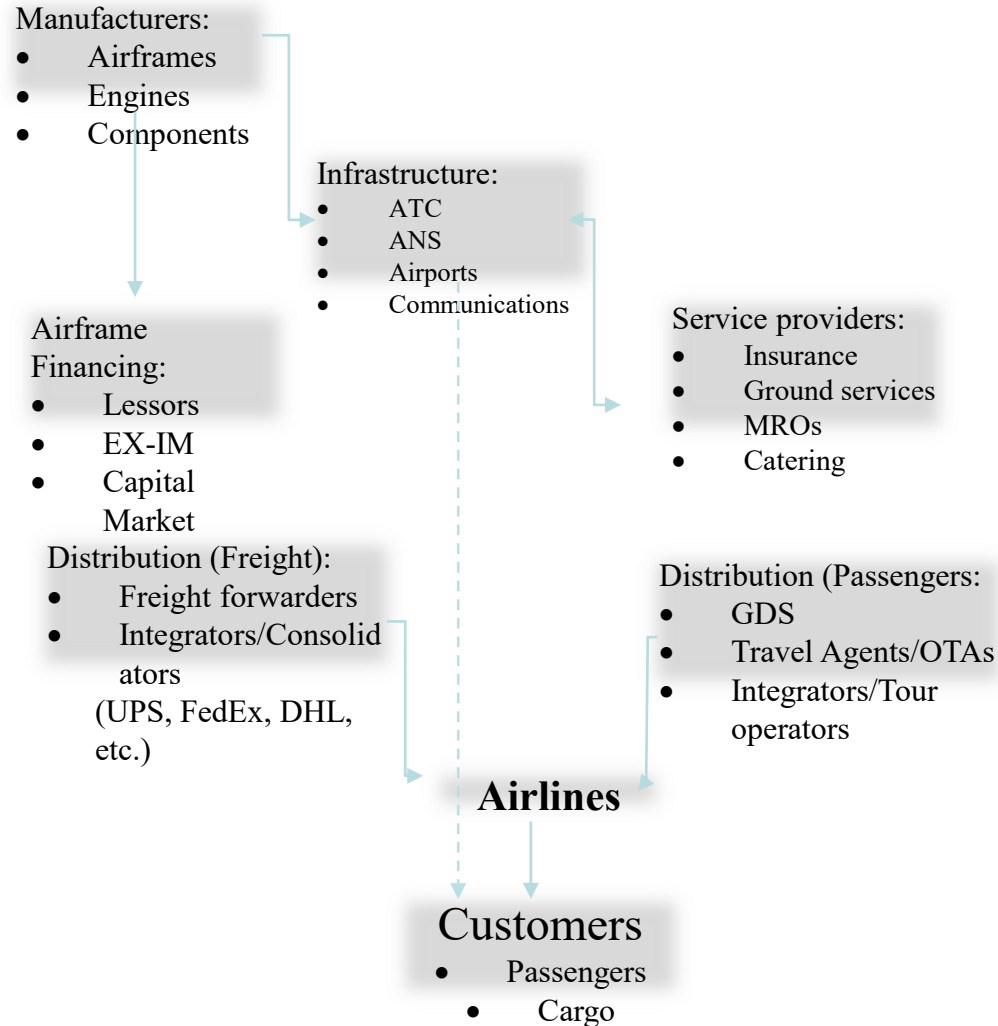
## ECONOMIC EFFICIENCY

- Be sure of what you mean
  - Management or productive efficiency
  - Allocative efficiency
  - Profit efficiency
- The right amount of any good or service is where marginal value equates with incremental cost
  - notion of Pareto improvement for society or the firm

## Aviation Value Chain

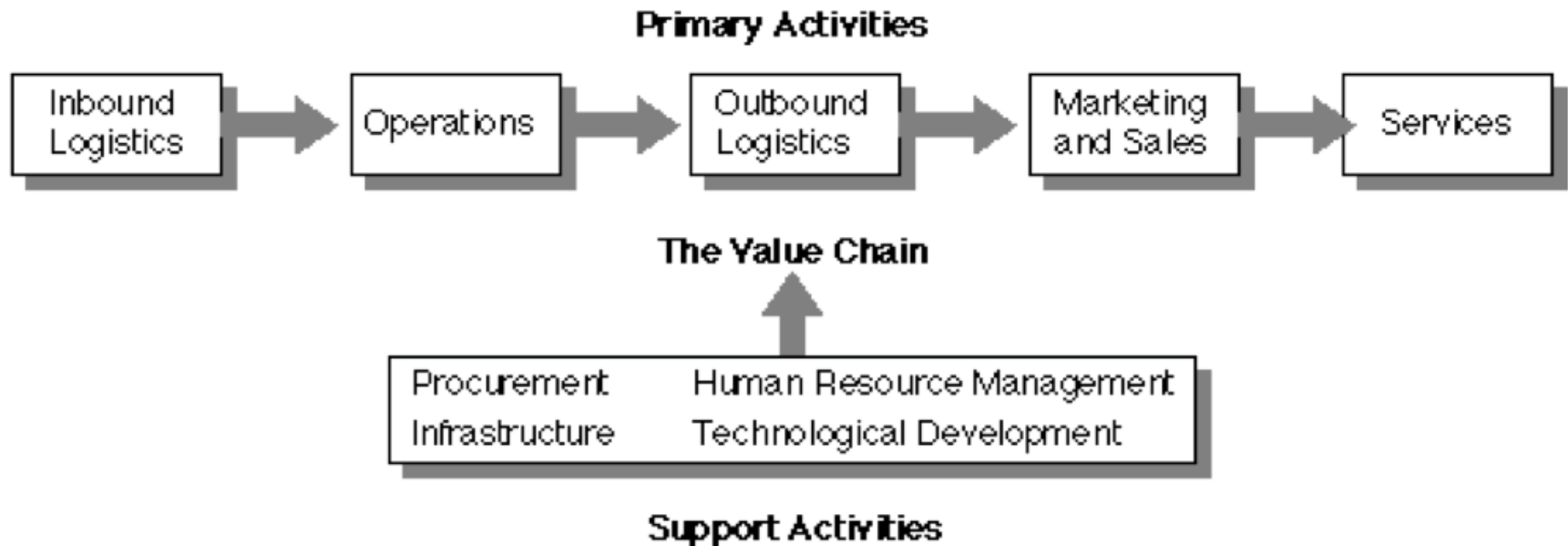


Source: Tretheway and Markhvida (2013)



## VALUE CHAIN

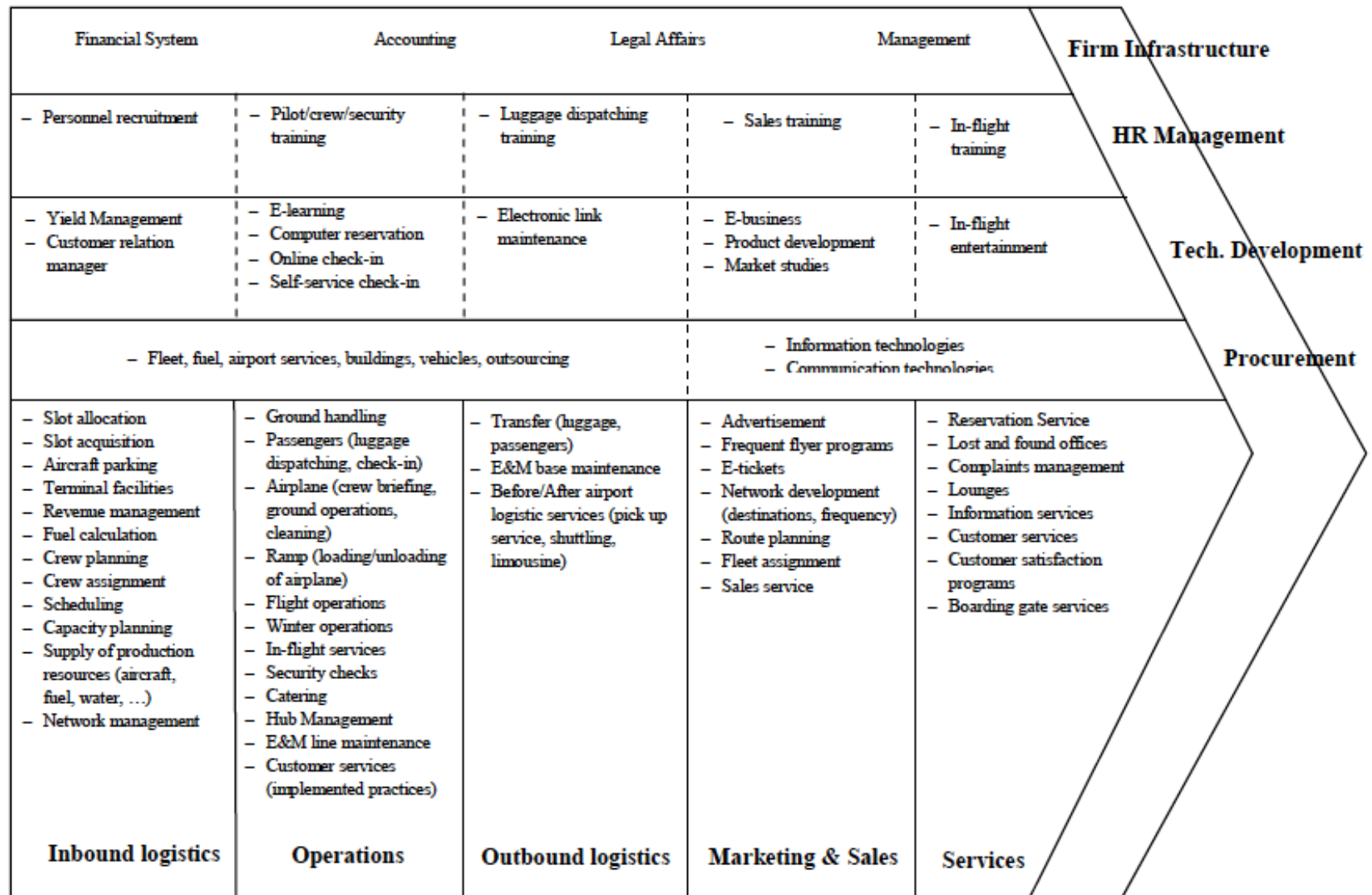
- Michal Porter, Competitive Strategy (1985) created concept of ‘value chain’



# PORTER'S VALUE CHAIN MODEL



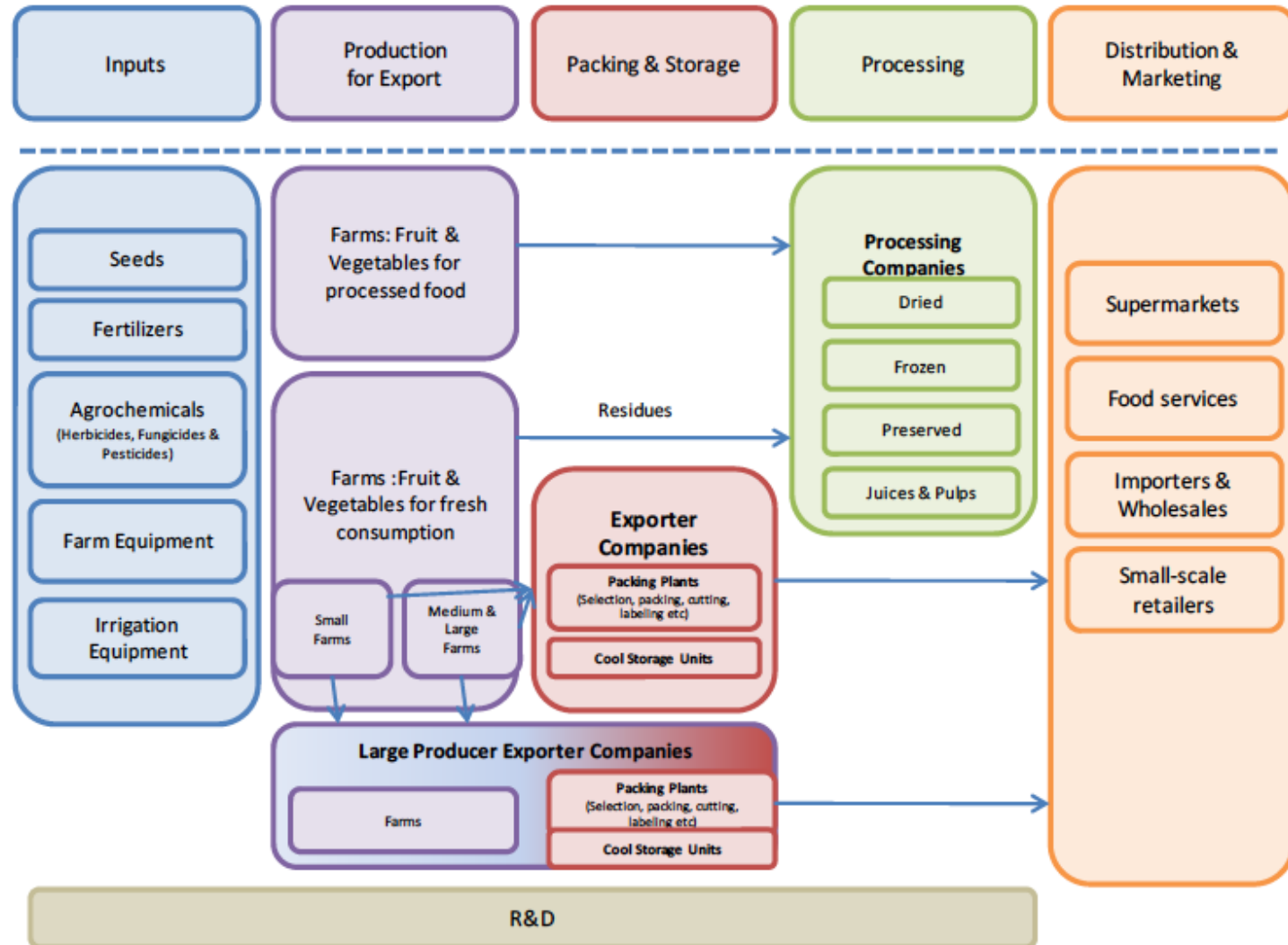




**Figure 3: Airline value chain**

*Source: Expanded from Albers et al., 2005*

**Figure 2. Fruit and Vegetables Global Value Chain**



Source: (Fernandez-Stark et al., Forthcoming-c)

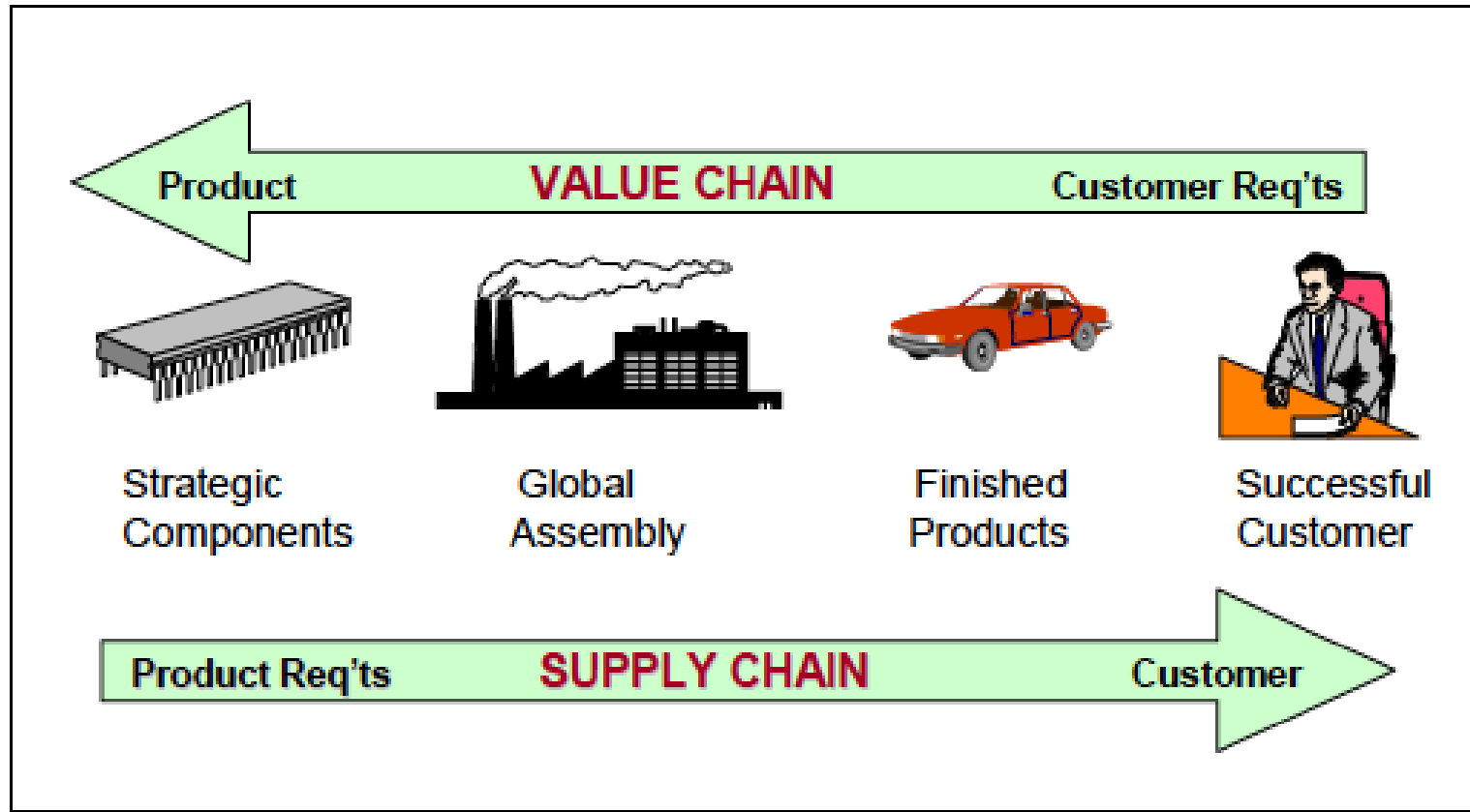
## VALUE CHAIN

- **Inbound Logistics** - involve relationships with suppliers and include all the activities required to receive, store, and disseminate inputs.
- **Operations** - are all the activities required to transform inputs into outputs (products and services).
- **Outbound Logistics** - include all the activities required to collect, store, and distribute the output.
- **Marketing and Sales** - activities inform buyers about products and services, induce buyers to purchase them, and facilitate their purchase.
- **Service** - includes all the activities required to keep the product or service working effectively for the buyer after it is sold and delivered.

## VALUE CHAIN-SECONDARY ACTIVITIES

- **Procurement** - is the acquisition of inputs, or resources, for the firm.
- **Human Resource management** - consists of all activities involved in recruiting, hiring, training, developing, compensating and (if necessary) dismissing or laying off personnel.
- **Technological Development** - pertains to the equipment, hardware, software, procedures and technical knowledge brought to bear in the firm's transformation of inputs into outputs.
- **Infrastructure** - serves the company's needs and ties its various parts together, it consists of functions or departments such as accounting, legal, finance, planning, public affairs, government relations, quality assurance and general management

# A COMPARISON OF A VALUE CHAIN WITH A SUPPLY CHAIN



## VALUE CREATION

- Who is the customer?
  - B2B
    - Technical or resource value-intrinsic to resource being provided
    - Organizational value-context of exchange, brand value for example
    - Personal value-managerial motivation, comfort of associations (old boy system)
  - B2C
    - Product value – technical value of product-flight
    - Service value – care and warranty
    - Enhanced service – make customer successful not just satisfied
      - IKEA – playgrounds, restaurants, fun to shop

## CUSTOMER VALUE – SHAREHOLDER VALUE

- What do they value?
  - A \$1000 flotation devise with a sinking ferry
  - A \$200 Uber ride after New Year's Party
- Create value in excess of costs – exchange of value drives market economy
- Value is derived from customer needs!
  - Careful attention to activities in the firm that satisfy those needs –
- Operational excellence - streamline processes, no waste

## SIMILARITIES AND DIFFERENCES BETWEEN A SUPPLY CHAIN AND A VALUE CHAIN

- SC originally conceived as viewing management of chain of supply as a single entity
  - Fix suboptimal deployment of inventory and capacity
  - E.g. Walmart uses point of sale data for continuous replenishment
  - Efficient supply chains reduce costs
- SC perspective – flows from upstream to downstream
- VC perspective – flows downstream to upstream
  - Customer is source of value
  - Value flows from customer to supplier
  - E.g think about how UPS and FedEx have increasingly added value to their service so customer is closer, customer can ‘pull’ value



## VALUE CHAINS- WHAT IS THE ‘*VALUE*’? WHY NOW?

- Increasing competition and Strategy:
  - as competition becomes more intense, firm needs to ask where can it add value for customers
- Evolving Governance Models:
  - Value chain provides framework for new business models
  - E.g. 2-sided markets and Uber, eBay, Craig’s List, AirB&B
- Globalization of Supply: is the world flat?
  - Globalization means countries, companies, and individuals to remain competitive in a global market where historical and geographical divisions are becoming increasingly irrelevant (global value chains are predominant form of business these days)

## VALUE CHAINS- WHAT IS THE '*VALUE*'?

- Diminishing returns in Supply Chain
  - Have managed to improve supply chain through operational excellence and TQM, lean manufacturing etc.
  - Enterprise development & success means turning to value chain (demand orientation) and not just supply chain (supply orientation)
- Customer focus-what adds value=WTP
  - Value chain is value adding activities and the ability to charge for that

## THE AVIATION VALUE CHAIN

- Made of a number of interlinked pieces
  - Upstream and downstream
- Supply chain is not vertically integrated
  - I.e., Airlines have limited investments in other sectors of the value chain
  - Some past investments were divested due to regulation
- Current airline investments include:
  - Fuel and ground handling services, cargo facilities, some airport terminals

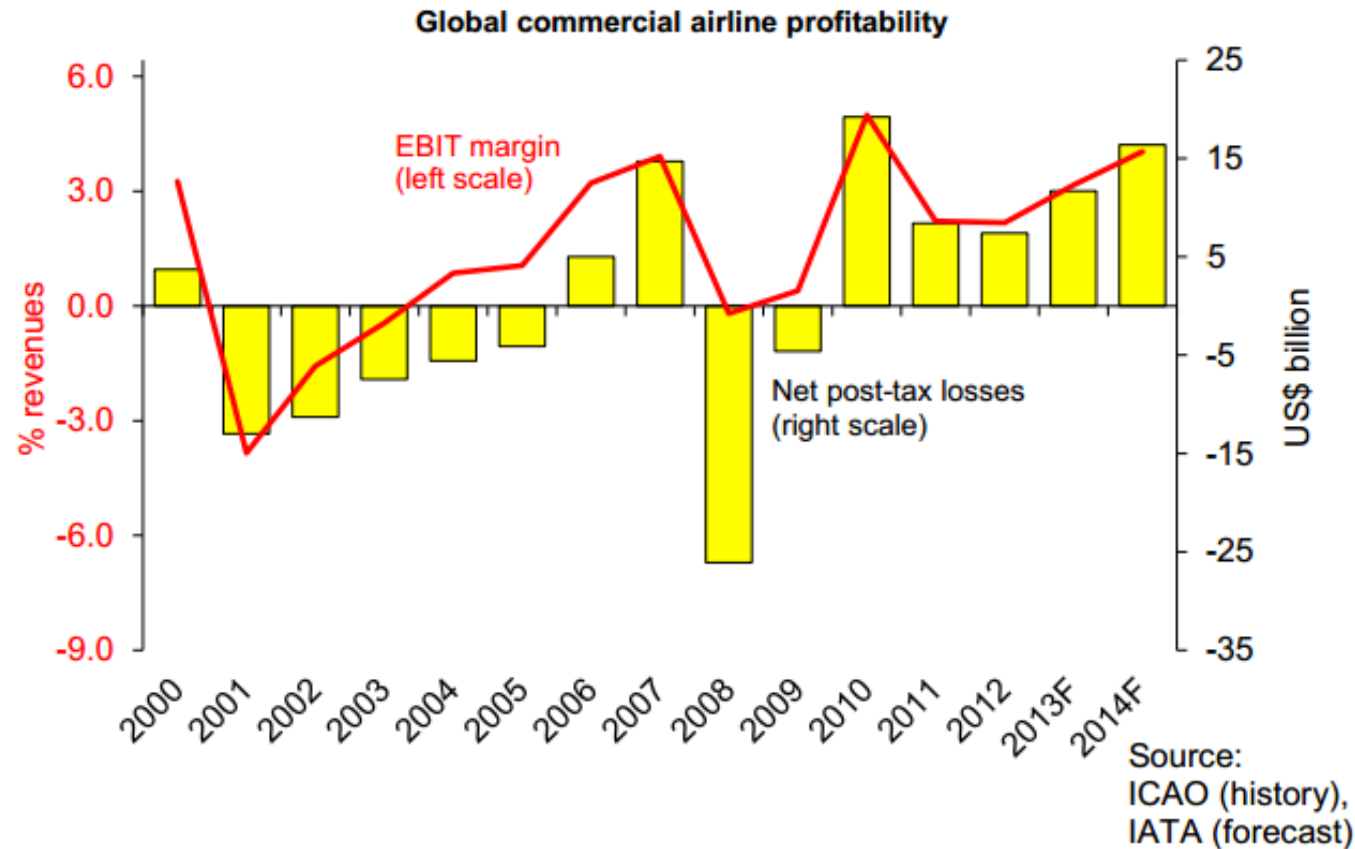
## THE AVIATION VALUE CHAIN – CONT.

- Even without vertical integration, there are standards and operating procedures across the value chain members (IATA, ICAO)
  - This has lowered industry costs and increased customer service levels
- E.g., IATA has established standards for:
  - sale and exchange of travel documents
  - clearing of financial transactions between value chain partners
  - Records for travel documents

# RELATIVE PERFORMANCE IN THE AVIATION VALUE CHAIN

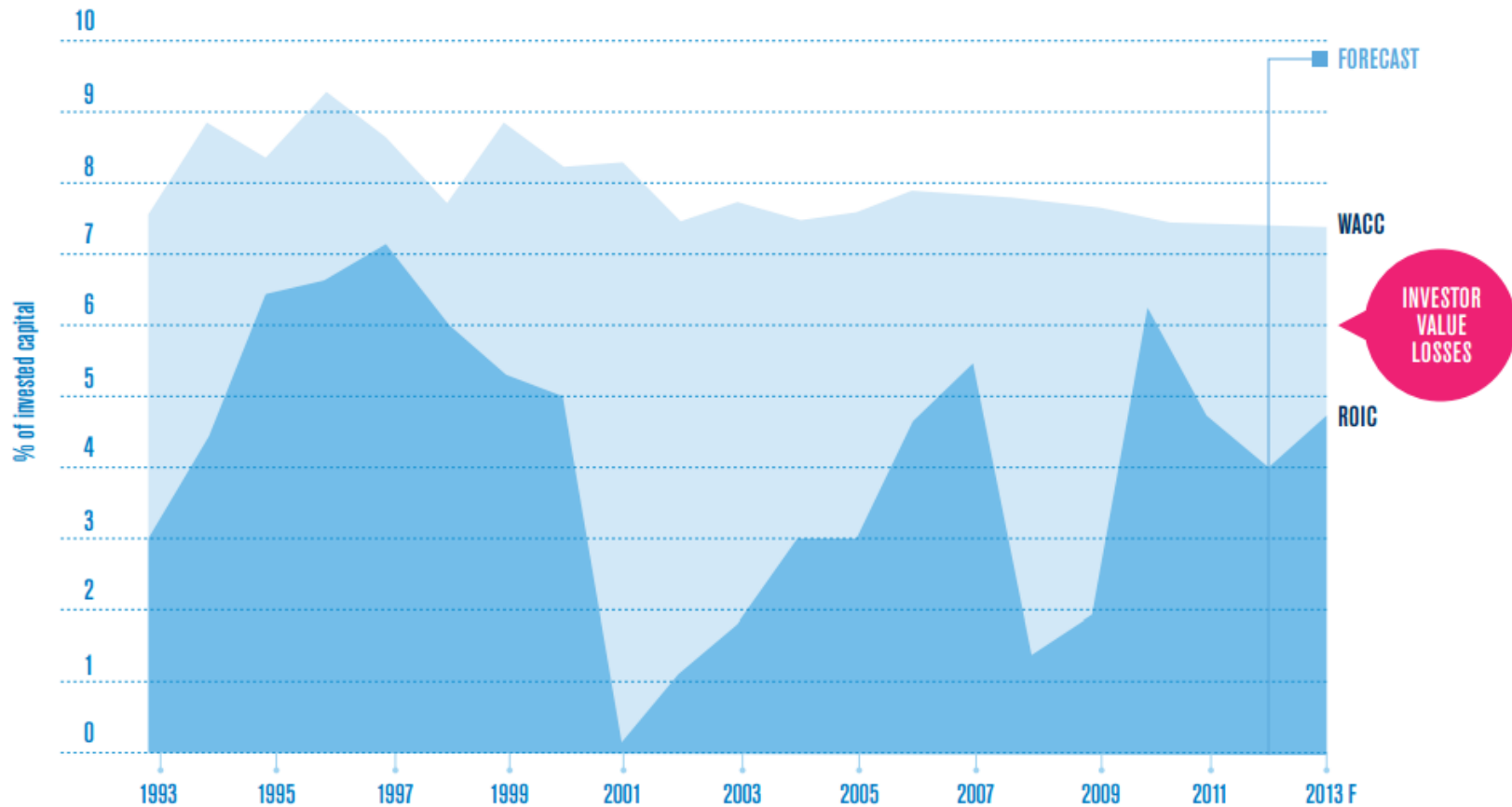
# AIRLINE INDUSTRY FINANCIAL PERFORMANCE

- Airline financial performance is highly susceptible to economic cycles.
- In 1970-2011, the industry's net profit margin (net of taxes and debt servicing costs) was 0.8%.
- Recently, the best net profit margin was 3.2%, insufficient to cover 7-8% capital costs
- The financial crisis resulted in a net operating loss of more than US\$25 billion in 2008



Source: International Air Transport Association (IATA), Financial Forecast, September 2013.

**CHART 5: RETURN ON INVESTED CAPITAL IN AIRLINES AND THEIR WACC**



Source: McKinsey & Company for IATA

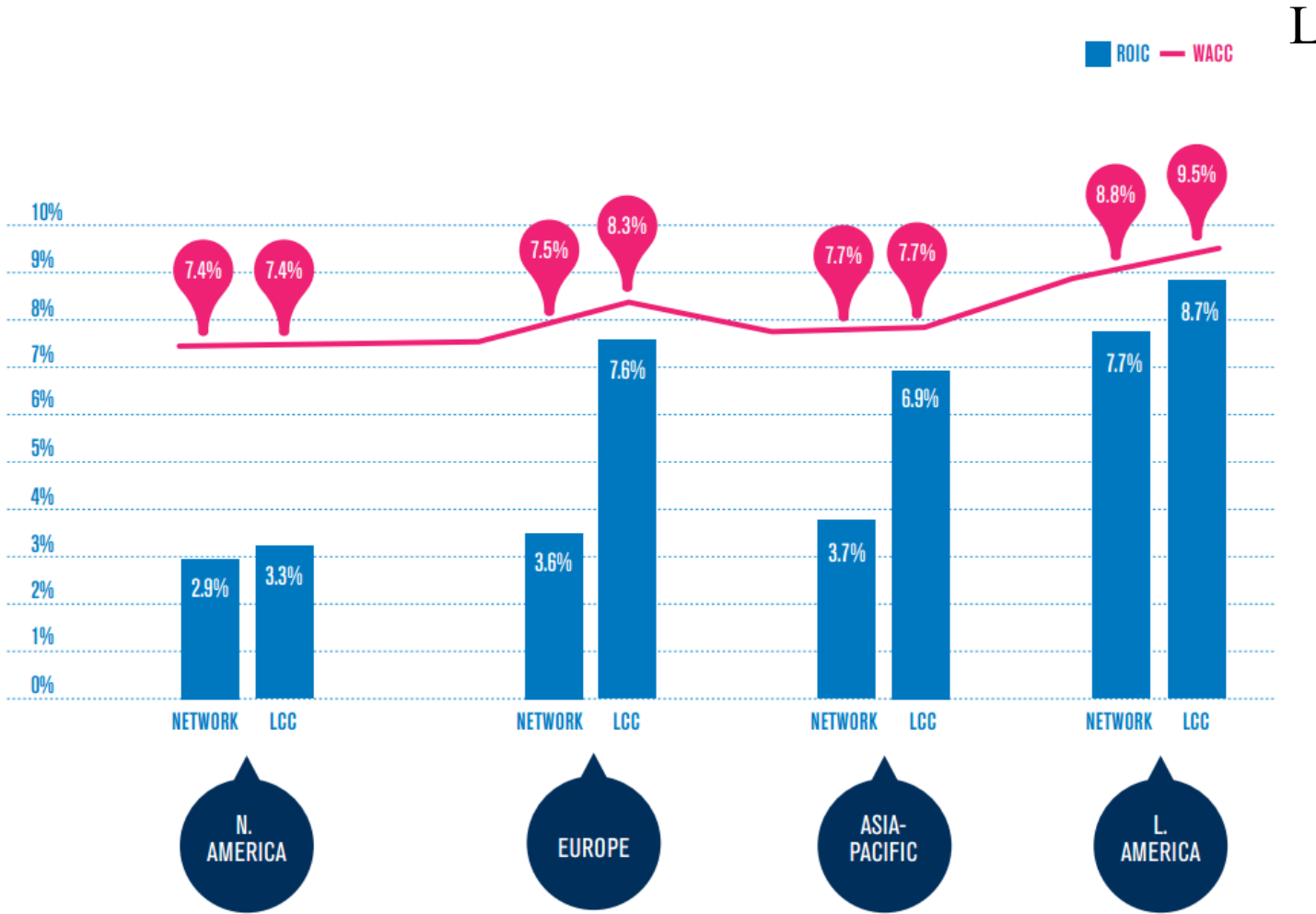
Source: International Air Transport Association (IATA)

# ANOTHER VIEW OF FINANCIAL PERFORMANCE

Year	ROIC	Pax LF	Capacity Growth ATK	Flights (M)	Profit Margin	Net Profit/Pax
2004	2.9	73.5	10.10	23.8	0.9	-2.7
2005	3.0	74.9	5.70	24.9	1.1	-1.9
2006	4.6	76	4.80	25.5	3.2	2.1
2007	5.5	77	6.60	26.7	3.9	5.8
2008	1.4	76	2.70	26.5	-0.2	-10.1
2009	2.0	76	-4.20	25.9	0.4	-1.9
2010	6.3	78.5	3.70	27.8	4.9	6.5
2011	4.7	78.4	6.00	30.1	3.1	2.9
2012	4.3	79.4	3.00	31.2	2.0	2.1
2013	4.9	79.7	3.60	32.0	3.5	3.4
2014	6.1	79.9	4.90	33.4	5.1	6.0
2015	7.0	79.6	6.80	35.4	6.0	7.1



CHART 9: ROIC AND WACC BY REGION AND BUSINESS MODEL, 2004-2011



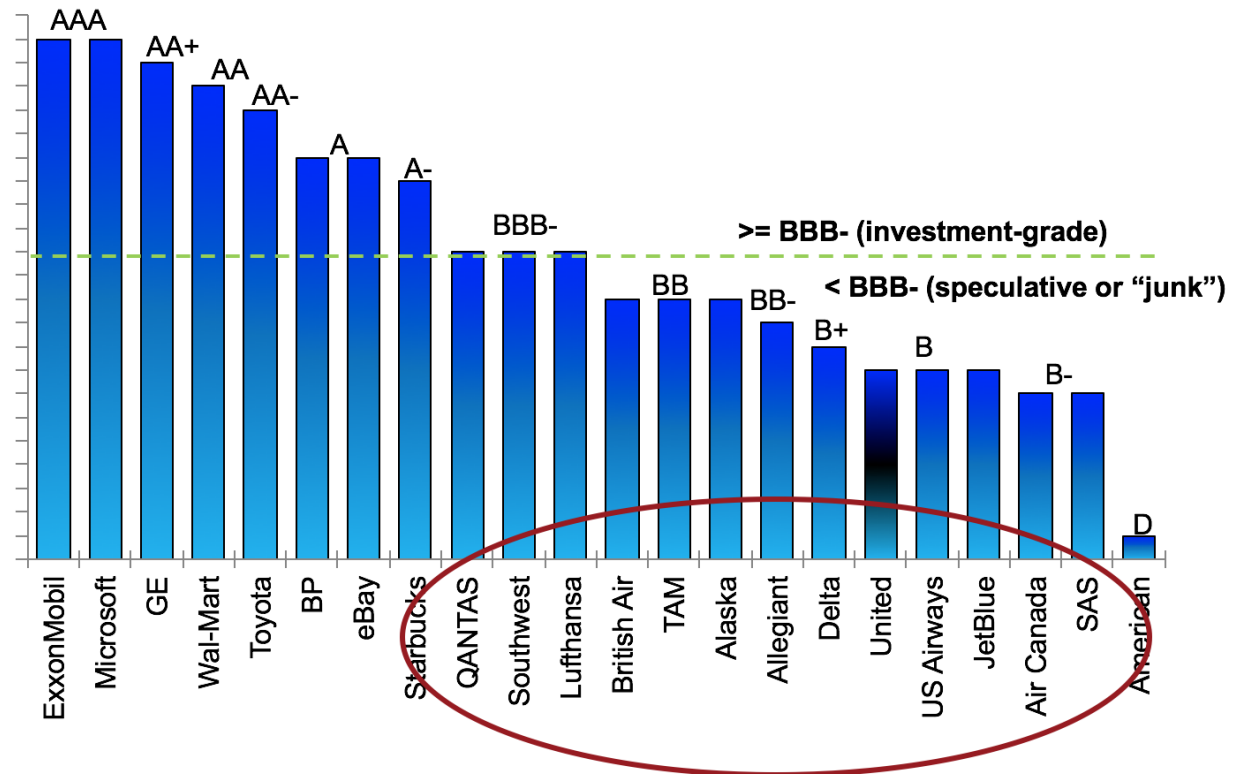
Source: McKinsey & Company for IATA

Source: International  
Air Transport  
Association (IATA)

# CORPORATE CREDIT RATING (U.S.)

## Credit rating of select airlines and U.S. companies

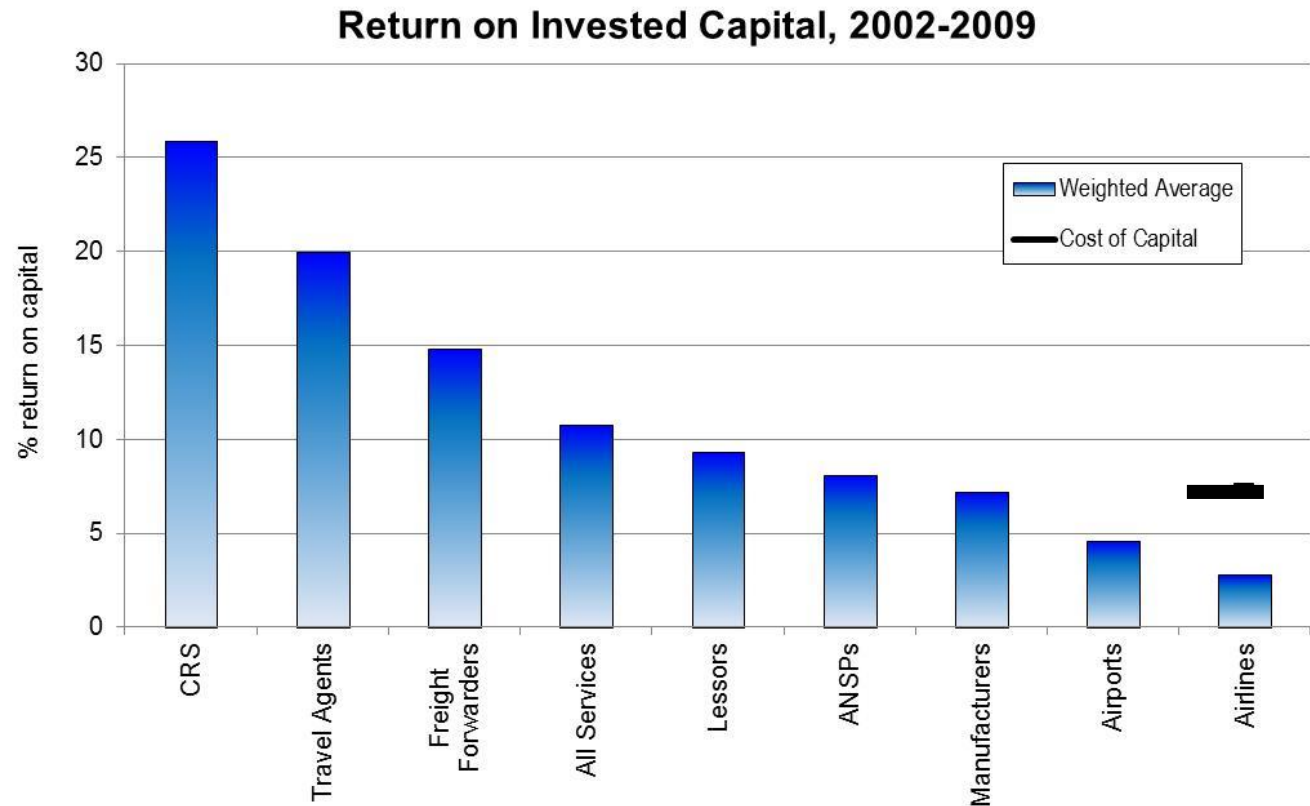
- Most airline credit ratings are junk grade.
- Many airlines have consistently ranked as speculative grade
- E.g., Delta, United, American Air Canada



Source: Airlines for America Presentation "A4A Industry Review and Outlook", November 2013

- Airlines have the lowest returns in the aviation value chain, well below that of travel agents and CRSs
- Airline returns are well below their cost of capital

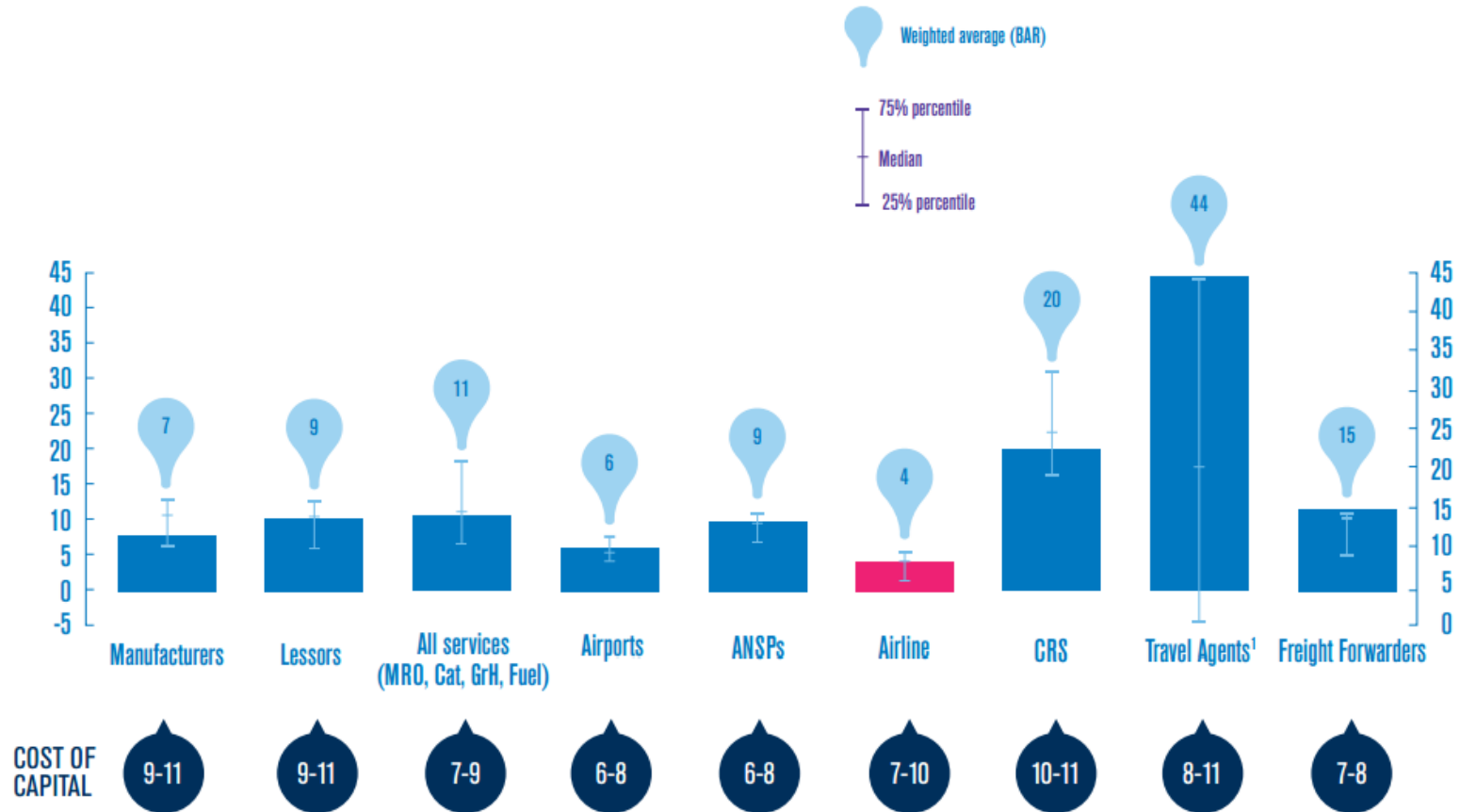
## RETURN ON INVESTED CAPITAL: AVIATION VALUE CHAIN



Source: McKinsey & Company for IATA, 2011

**CHART 12: RETURN ON CAPITAL VARIES THROUGHOUT THE VALUE CHAIN**

ROIC excluding goodwill of sample, period 2004-2011, %



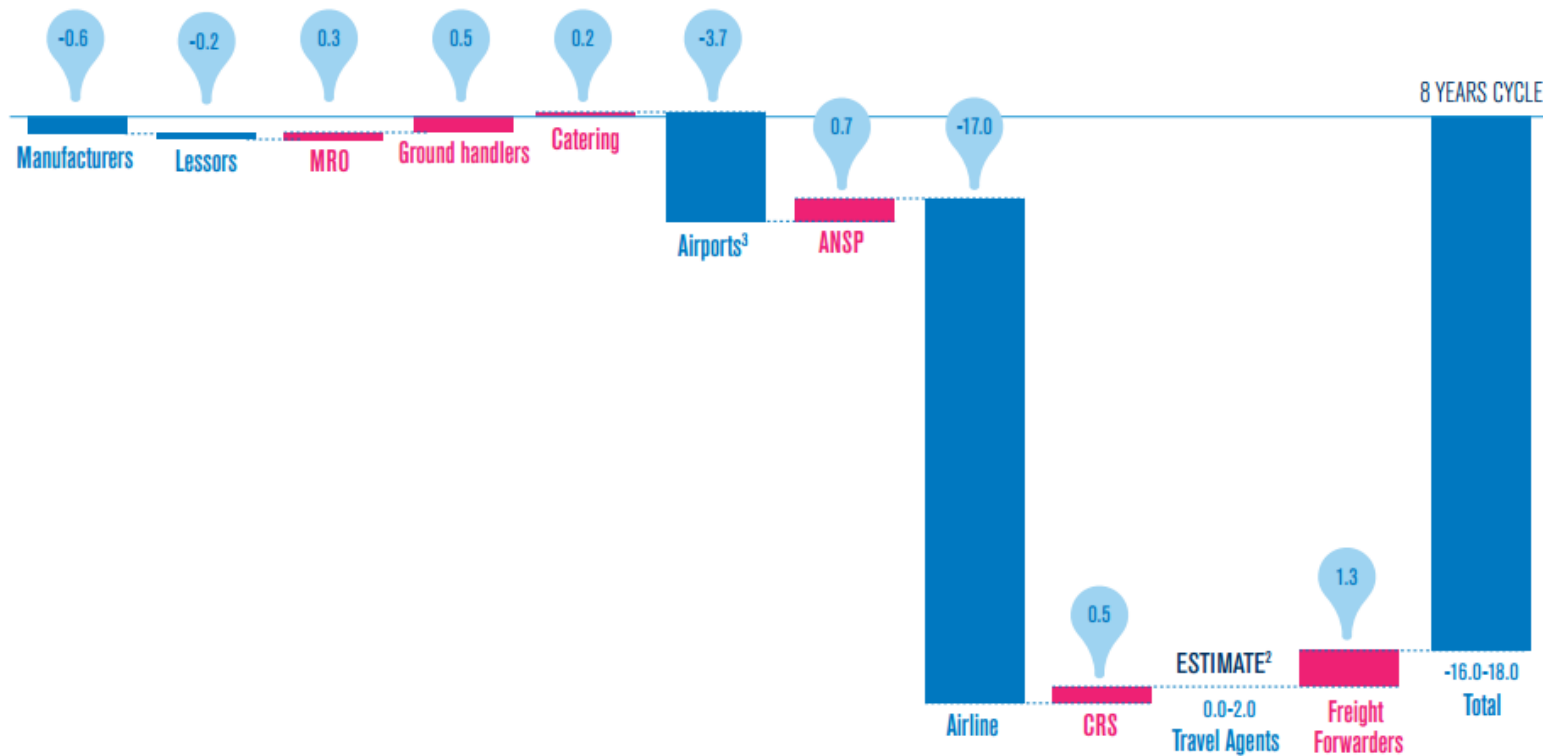
<sup>1</sup> Limited sample

Source: IATA

Source: McKinsey & Company for IATA

# CHART 14: ECONOMIC PROFITS IN THE AIR TRANSPORT VALUE CHAIN (EXCLUDING FUEL AND LABOR)

Average economic profit<sup>1</sup>, (ROIC-WACC) × invested capital, USD billion, 2004-2011



<sup>1</sup> Based on invested capital excluding goodwill, extrapolated to total industry

<sup>2</sup> Sample too small to give meaningful estimate

<sup>3</sup> Economic profit for airport sector extrapolated based on weighted average of sample excluding AENA. AENA subsequently added back to sector estimate

Source: McKinsey & Company for IATA

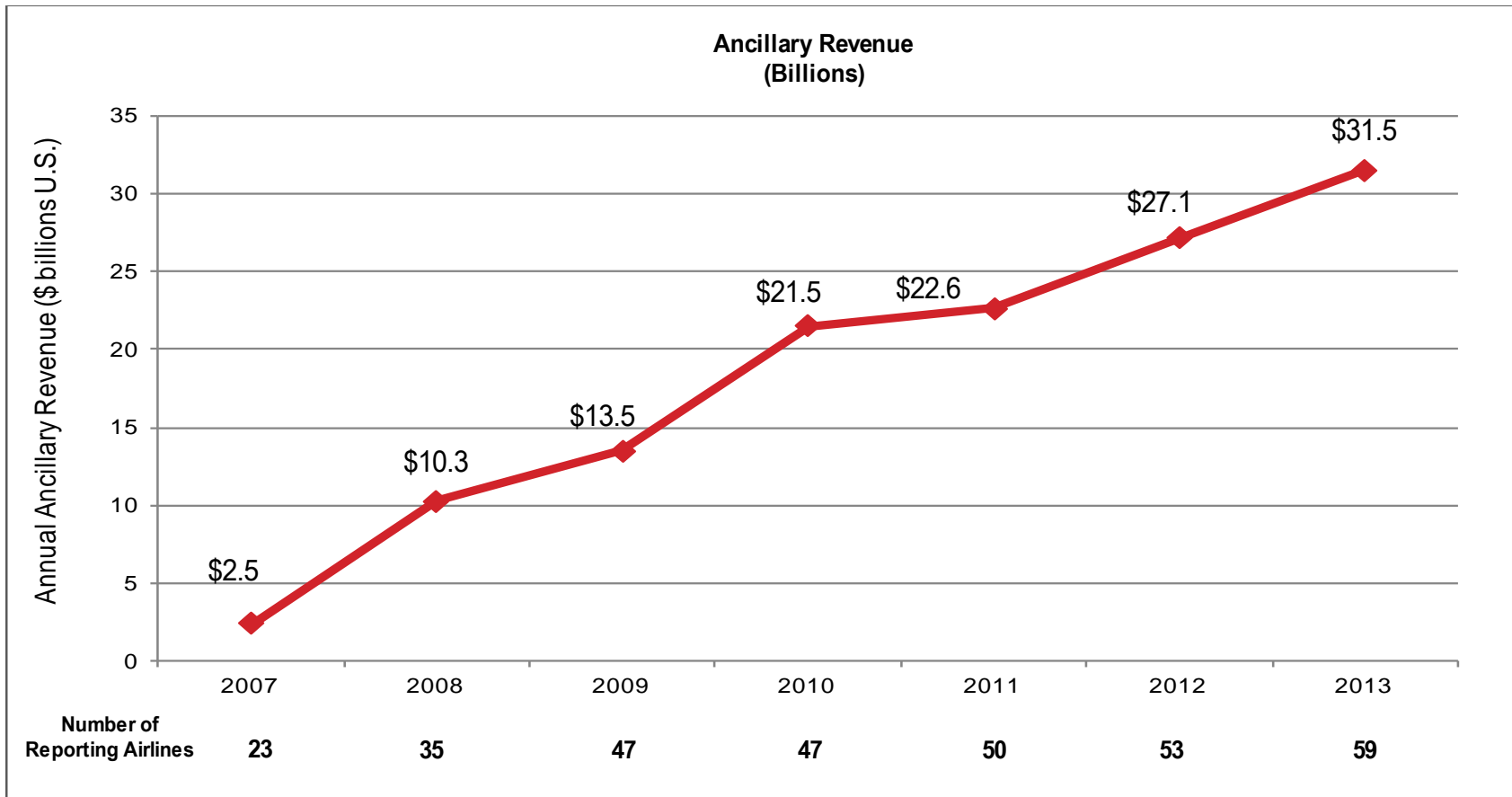
Source: IATA

# The emerging role of ancillary products/services

## THE GROWTH OF ANCILLARY REVENUES

- Airlines have identified elements of services that are of higher value to some passengers
  - Seat selection, priority boarding, luggage checking, entertainment, etc.
- Airlines are now monetising the value in these non-core services
- Growth in this revenue has been growing steadily
- A major source of income for LCCs and ULCCs
  - New sources of revenue for legacy carriers

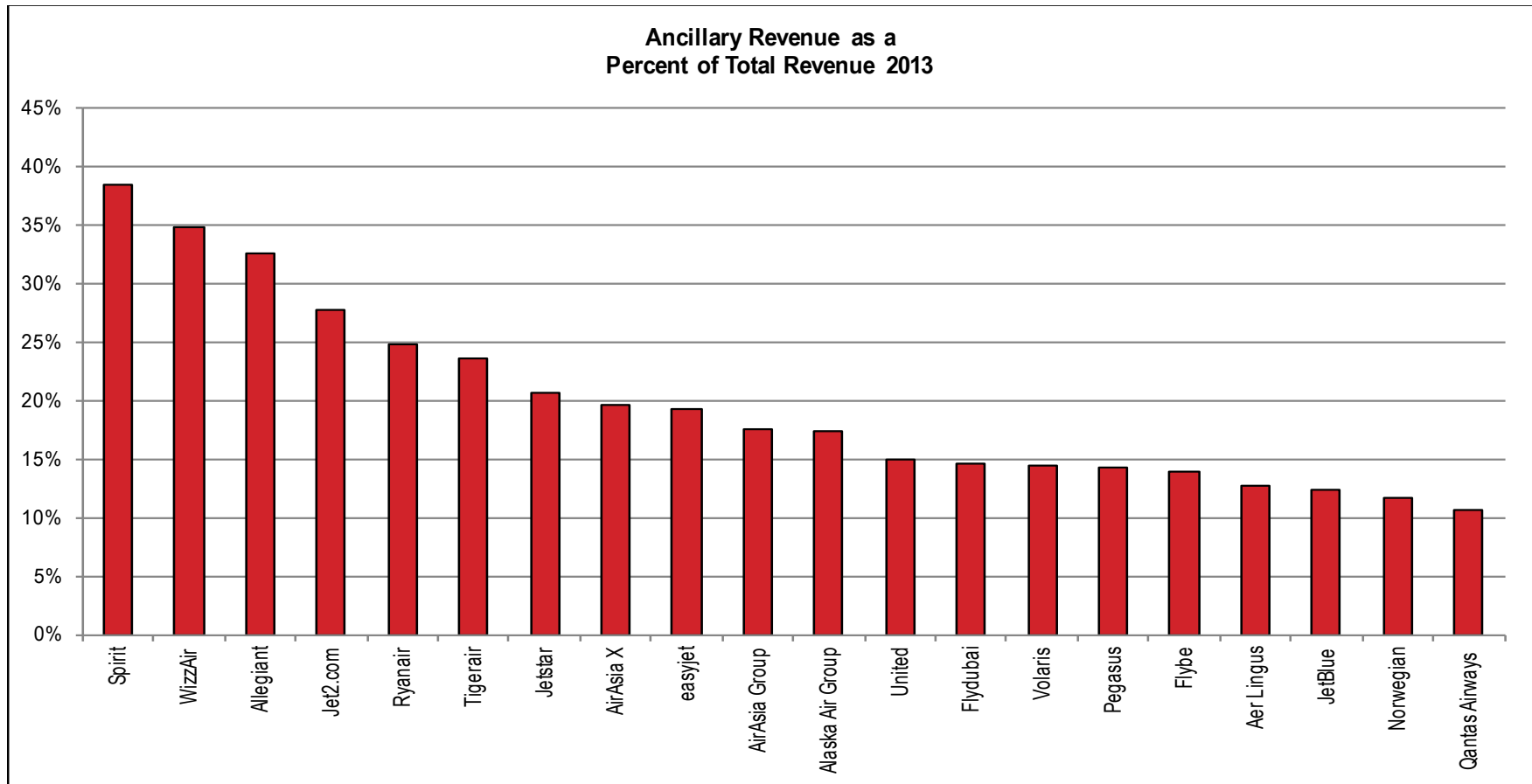
## ANCILLARY REVENUES



Source: The Amadeus Yearbook of Ancillary Revenue by IdeaWorks Company, 2012, IdeaWorksCompany Press Release June 2013 and July 2014.



# ANCILLARY REVENUE



Source: IdeaWorksCompany, 2014 Yearbook of Ancillary Revenue Results

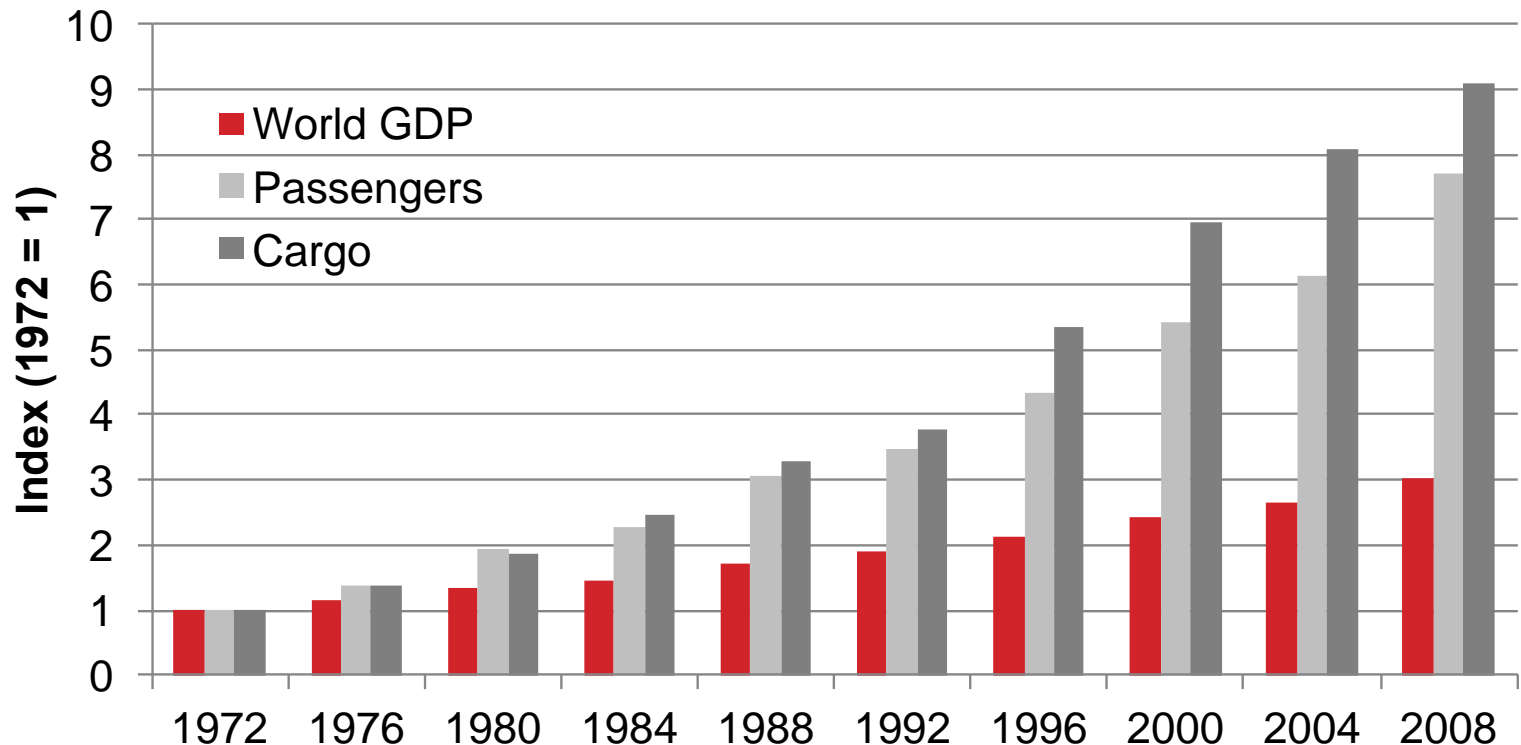
## THE BENEFIT OF ANCILLARY REVENUES

- Consumers can choose and pay for only the services they require
- Airlines can offer the core product at low prices
  - marginal costs possibly
- Carriers are starting to adopt a merchandising approach for service offerings

# The role of aviation

# WORLD GDP VS AIR TRAFFIC (PAX & CARGO)

## World GDP versus Air Cargo Transport



Source: World Bank and International Civil Aviation Organization.

## Medium-term Passenger Traffic Forecasts to 2016

### *International and Domestic Traffic*

*Passenger-kilometres performed (PKP)*

	Annual Growth Rates				
	History		Forecasts		
	2012	2013*	2014	2015	2016
Region of State's AOC Holders	(%)	(%)	(%)	(%)	(%)
Europe	4.8	4.6	5.4	5.7	5.9
Africa	2.2	4.4	4.8	5.9	6.3
Middle East	14.3	11.2	11.6	12.1	12.3
Asia and Pacific	6.7	7.7	7.2	7.4	7.5
North America	1.6	2.0	2.7	3.1	3.3
Latin America and Caribbean	9.0	6.7	8.9	8.2	8.6
<b>World</b>	<b>5.3</b>	<b>5.5</b>	<b>6.0</b>	<b>6.3</b>	<b>6.5</b>

\*preliminary figures

The historical passenger traffic results are the revised figures in May 2014.

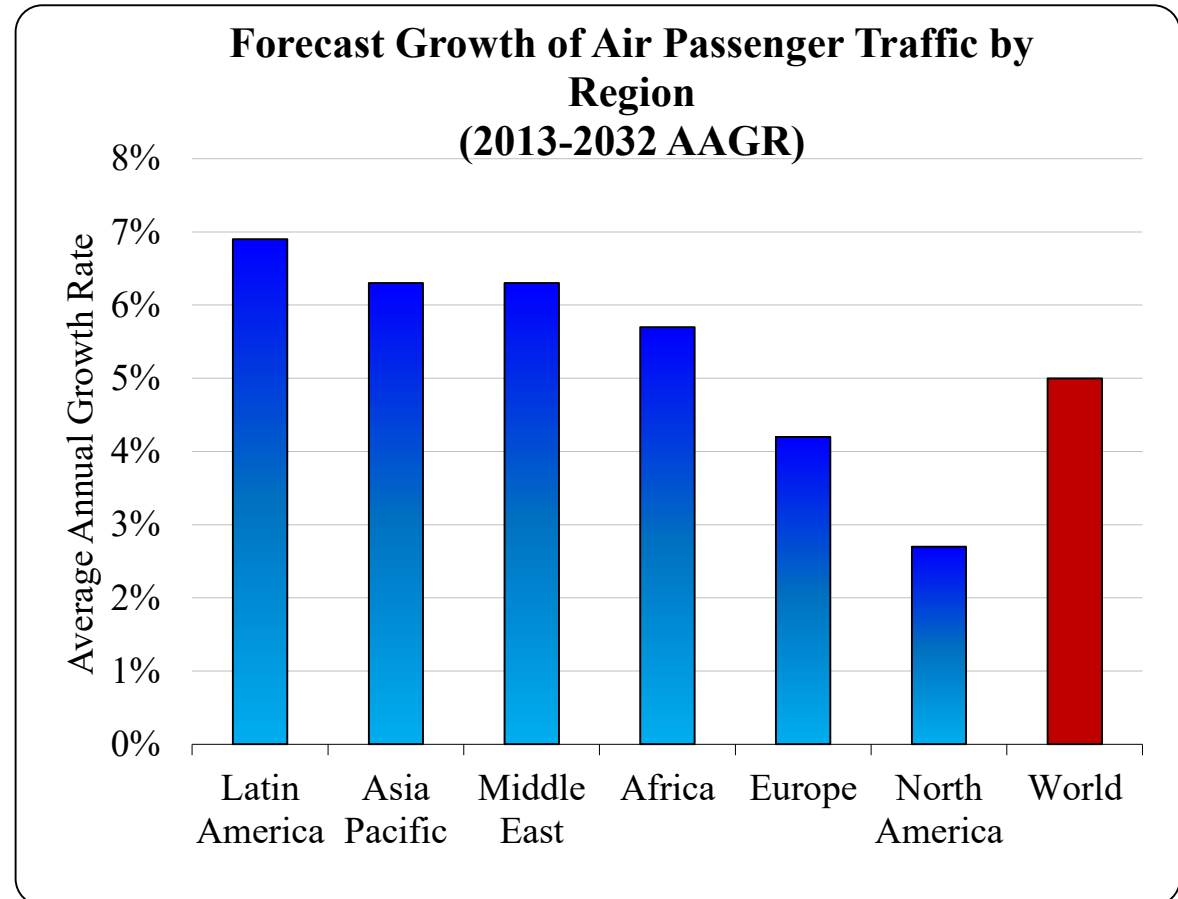
Source: International Civil Aviation Organization (ICAO), News Release, 16 July 2014

<http://www.icao.int/Newsroom/NewsDoc2014/COM.21.14.EN.pdf>

# REGIONAL AIR PASSENGER TRAFFIC

**Growth will occur in regions other than N. America**

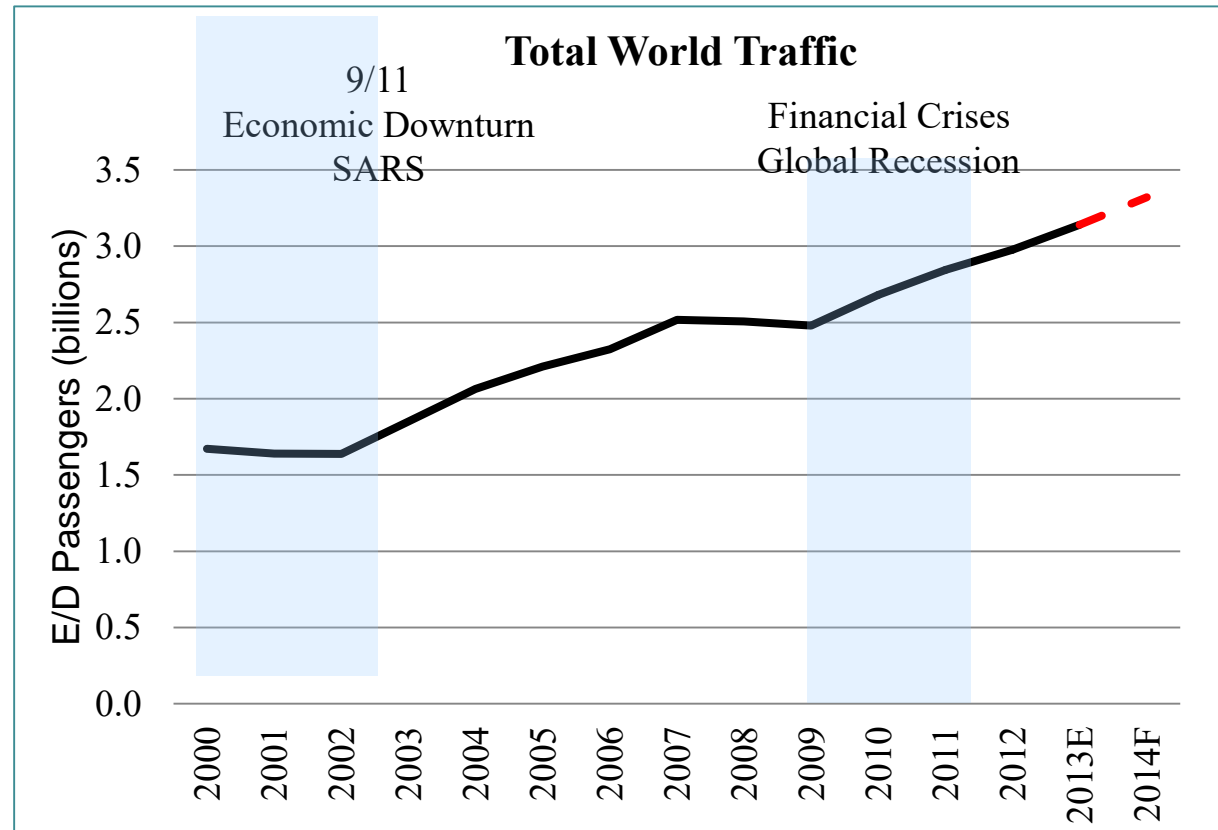
- Canada will be among the slowest growing regions in the world, falling well below world average
- FAA has lowered forecast for US:
  - from 2.6%
  - To 2.2%



Source: Boeing Current Market Outlook 2013-2032

# GLOBAL AIR PASSENGER TRAFFIC

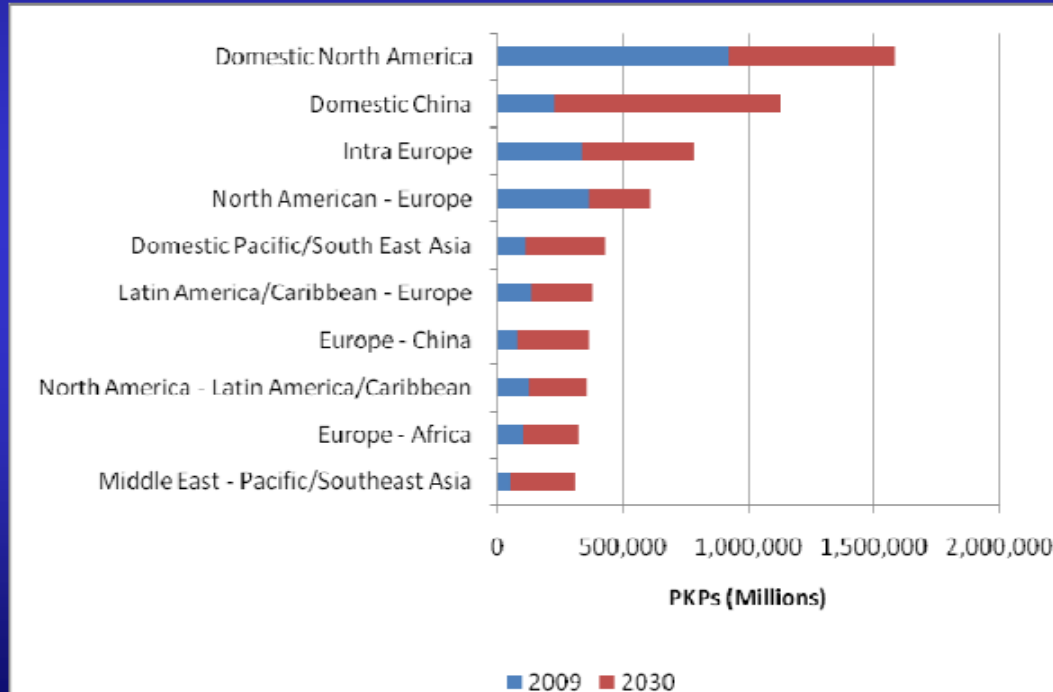
- Air travel continues to grow, but has its ups and downs.
- Airbus forecasts passenger traffic growing 4.7% (CAGR) over the next twenty years.



Source: International Air Transport Association (IATA) Fact Sheet, ICAO Facts and Figures and Airbus Global Market Forecast (2014-2033).



## Top ten traffic flows in 2030



20-Year Growth %	% World RPKs
2.6%	15.0%
7.9%	10.7%
4.3%	7.4%
2.6%	5.7%
6.7%	4.1%
5.3%	3.6%
7.8%	3.5%
5.0%	3.3%
5.9%	3.1%
9.0%	2.9%

Source: International Civil Aviation Organization (ICAO)

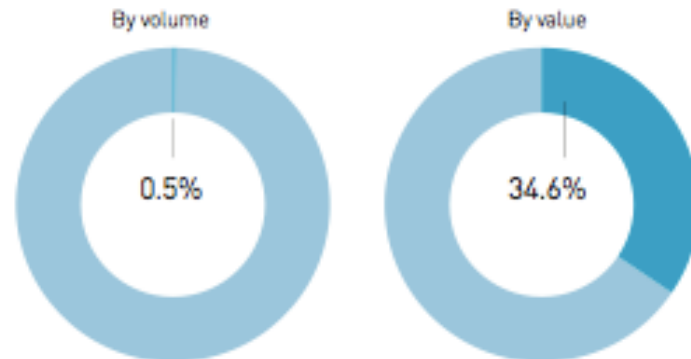


## AIR CARGO

**35%**

Air transport carries around 35% of world trade by value and only 0.5% by volume<sup>24</sup>

Proportion of global trade transported by air<sup>29</sup>



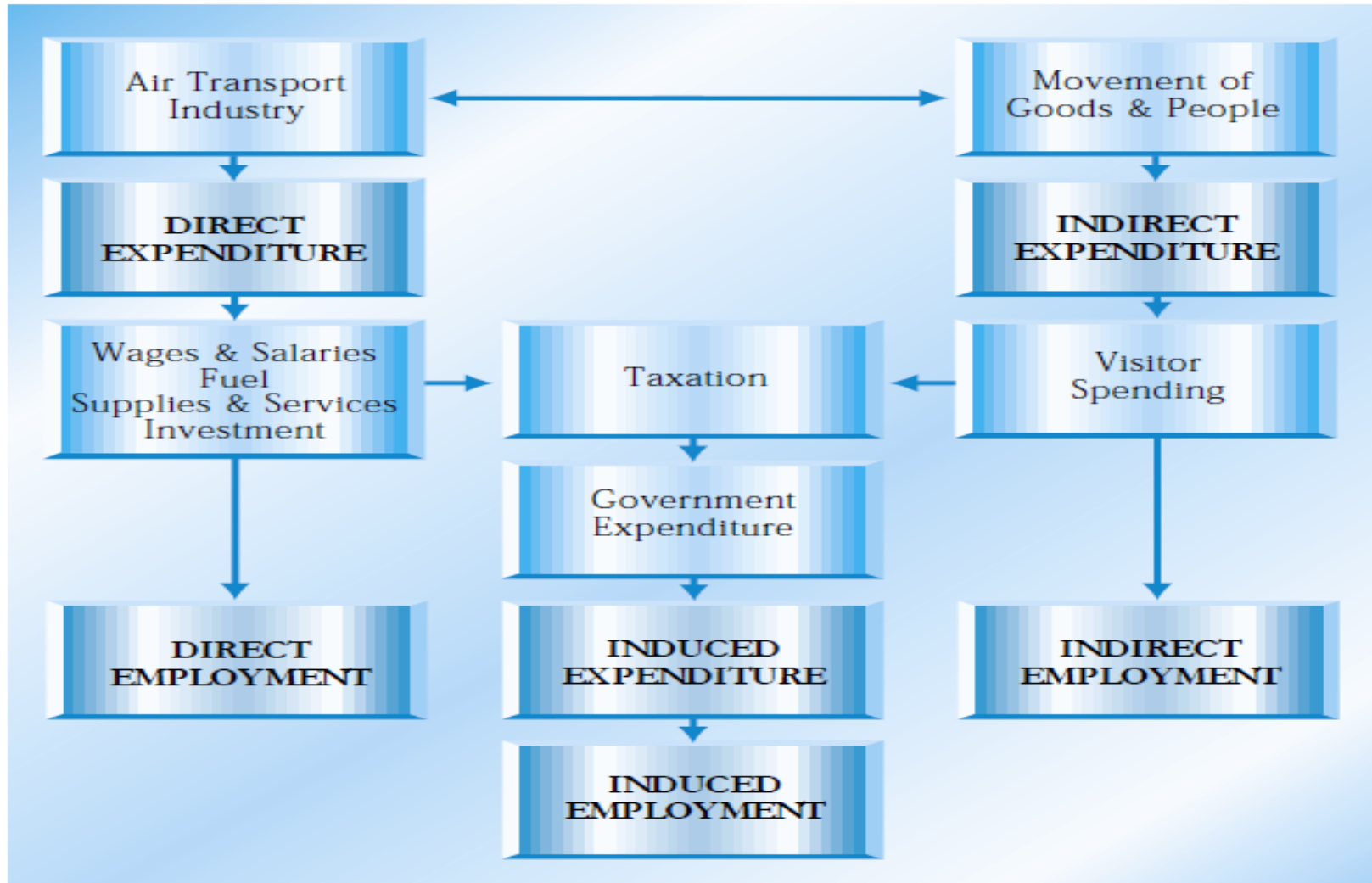
Source: ATAG, 2010 data

- 48 million tons of freight
- \$5.3 trillion goods value
- 172 billion freight ton kilometers
- High value items are shipped by air (e.g. perishable items)

# THE SOCIAL RETURN FROM AVIATION *-PROFIT, PEOPLE, PLANET-*

## IMPORTANCE OF AIR TRANSPORT

- Trade and tourism
- Social and cultural exchange
- Economic growth (hotels, automobiles, tourist destinations, other industries)
- Business-to-business transactions
- Government interactions
- Global interdependent world



## ECONOMIC IMPACT: SUMMARY

- The air transport industry itself creates value in the economy.
  - The industry drives direct, indirect and induced impacts.
- Air transport becomes the vehicle for promoting economic growth in other sectors.
  - ‘Catalytic Impacts’

## COVERAGE & LEARNING OBJECTIVES

- Understand concept of a value chain
- Linkages between supply chains and value chains
- Variability of performance in different segments of the aviation supply chain
- Evolving business models and revenue strategies for airlines and airports
- Aviation plays a facilitating role

END OF MODULE 1