

**TURKISH
AVIATION
ACADEMY**



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Airline Network Structures

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Lecture Outline

- **Evolution of Airline Network Strategies**
 - From point-to-point to hub/spoke to global hub-to-hub
- **Hub Economics and Network Structure**
 - Hub/spoke vs. point-to-point
 - Revenue power and load consolidation
 - Operational advantages and incremental costs
- **Hub Network Impacts on Route Planning**
 - Incremental revenue logic for new routes
 - Hub growth by adding cities
- **Recent Trends: Hub Strengthening**
- **International Alliance Hub Networks**

Evolving Network Strategies

- **From linear – to hub construction – to hub-to-hub flying**
- **From regional/country dominance – to a continental footprint – to an inter-continental focus**
- **Intra-country networks supporting intra-continental and inter-continental growth**
- **International expansion contributed to improved revenue for the intra-country operations**

The Evolution of Networks and Competition

COMPETITION

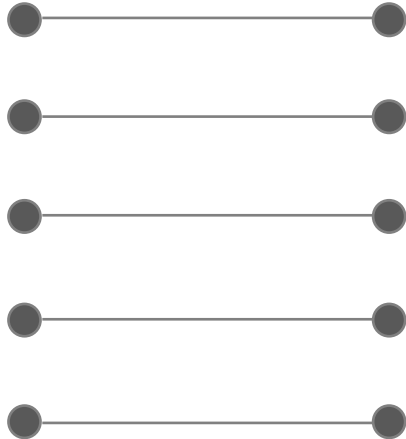
Pre-Deregulation
Route vs. Route

1980s-1990s
Hub vs. Hub

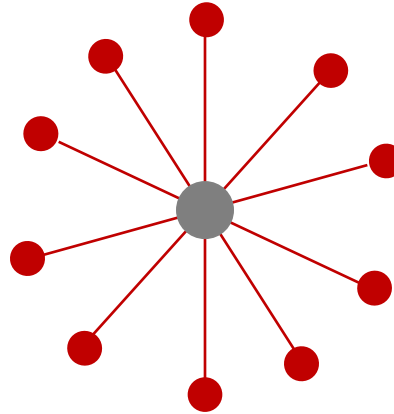
21st Century
Network vs. Network

STRUCTURE

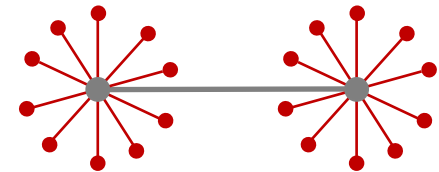
Point-to-Point
5 City Pairs



Hub Operation
55 City Pairs



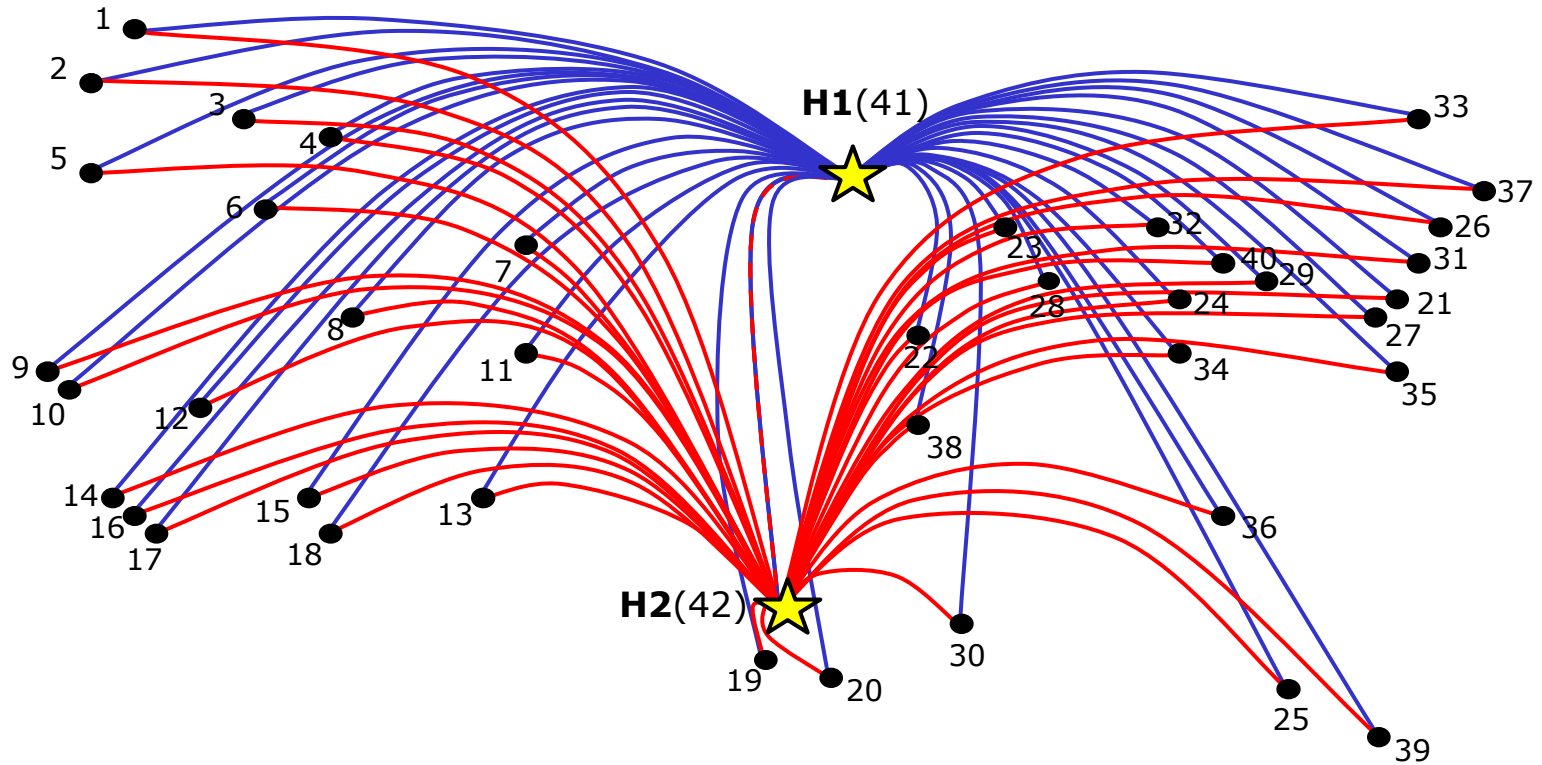
Network Operation
231 City Pairs



Hub Economics and Network Structure

- **Hub/spoke network structures allow airlines to serve many O-D markets with fewer flight departures.**
- **Consider a hub network with 20 flights in and 20 flights out of a single “connecting bank” at a hub:**
 - Each flight serves 21 O-D markets (1 local + 20 connecting)
 - Total of 440 O-D markets served with only 40 flight legs and as few as 20 aircraft flying through the hub
 - Consolidation of loads into and out of the hub allows connecting service to be provided to low demand O-D markets that cannot support non-stop flights
 - Several connecting departures per day in these markets may be more convenient for travelers than 1 daily non-stop flight (“Total Trip Time” is lower, when schedule displacement time included)

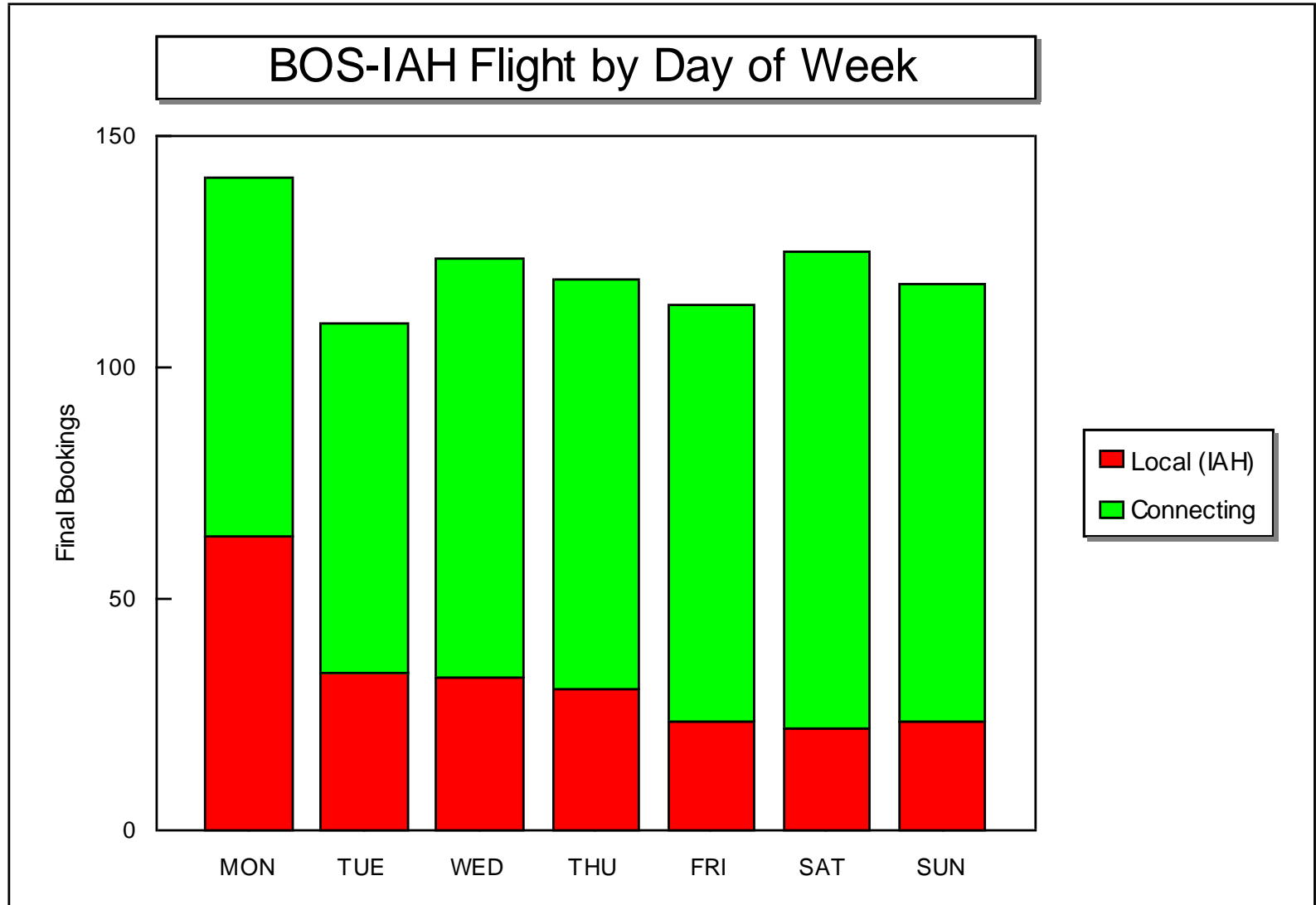
Example: Competitive Hub Networks



The Revenue Power of Hub Networks

- **Large hub networks result in market share advantages that translate into increased revenue:**
 - Potential for greater departure frequency for many O-D markets, meaning more convenient schedules and higher market shares
 - On-line “seamless” connections improve passenger convenience, compared to inter-line connections
 - Greater frequent flyer program earning and reward options for passengers given larger network coverage
 - Market dominance of “local” markets in/out of hub may lead to pricing and revenue advantages
- **Over 50% of Network Legacy Carriers’ revenue comes from passengers connecting at hubs**

Example: Local vs. Connecting Passengers



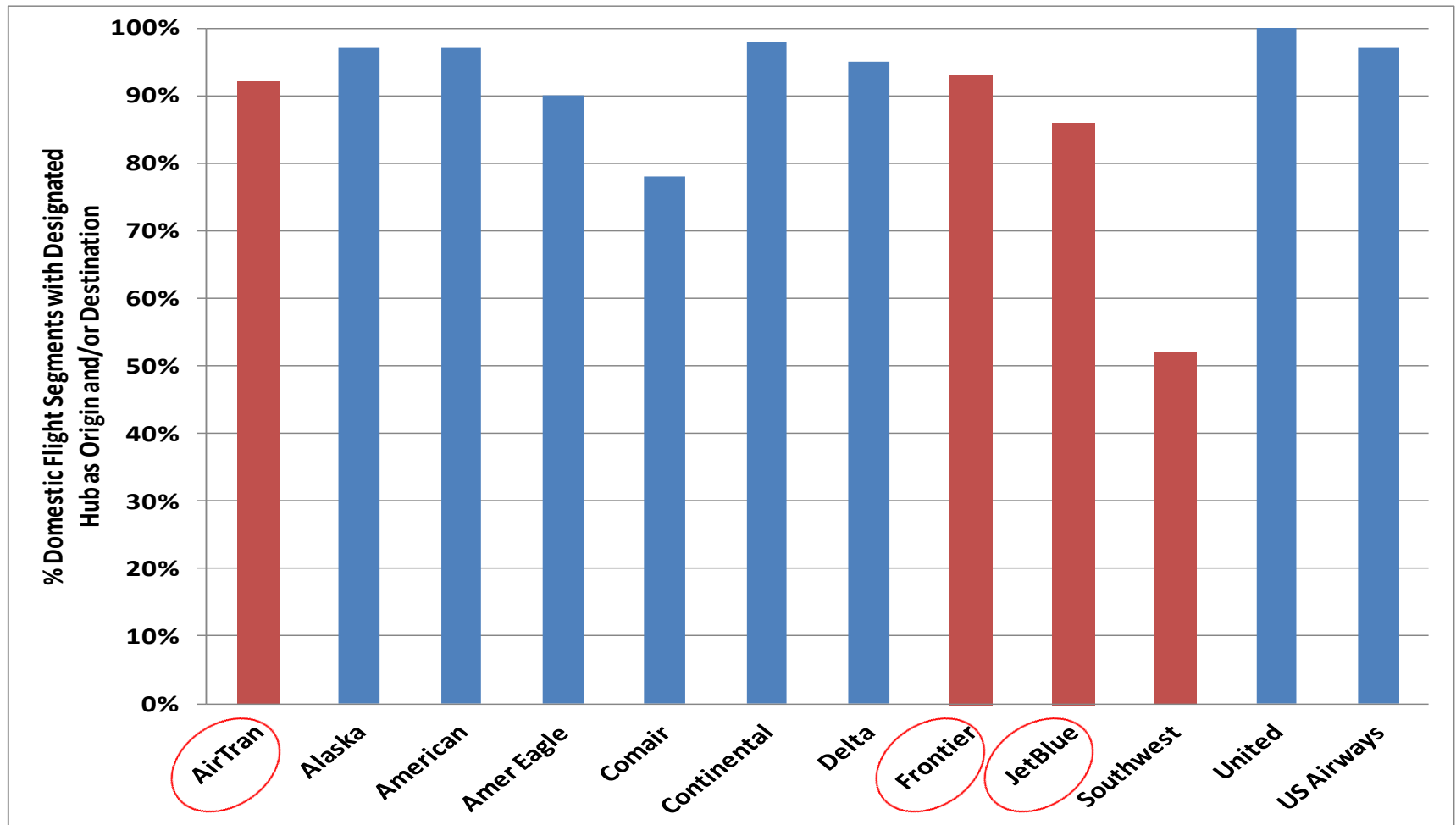
Operational Advantages of Hubs

- **Consolidation of airline operations at a large hub airport has operational advantages:**
 - Fewer aircraft and crew bases required, meaning reduced crew and aircraft maintenance expenses
 - Fewer locations where passengers or bags misconnect
 - Large volume of operations at the hub can result in economies of scale in aircraft maintenance, catering facilities, etc.
- **Scheduled connecting banks allow for:**
 - Simplified (if less flexible) aircraft and crew scheduling
 - Greater opportunities for “swapping” of aircraft in response to delays, cancellations and irregular operations
 - Planning for aircraft swaps in response to changing demand (“Demand Driven Dispatch”)

Incremental Costs of Hub Networks

- **Hub operations also raise the potential of reduced aircraft and crew utilization:**
 - Reduced flexibility in scheduling of departures, rotations due to fixed connecting bank timing at hubs
 - Increased ground times at hubs, to accommodate connections
 - Greater turn-around times at spoke cities, waiting for a given departure time to meet next connecting bank
- **Congestion and delay costs at the hub airport:**
 - Connecting banks create extreme staffing peaks
 - Peaks of scheduled operations above and beyond runway capacity
 - Weather delays at a hub will affect the airline's entire network

U.S. Example: Over 90% of US domestic flights are to/from hub airports – including most LCCs!

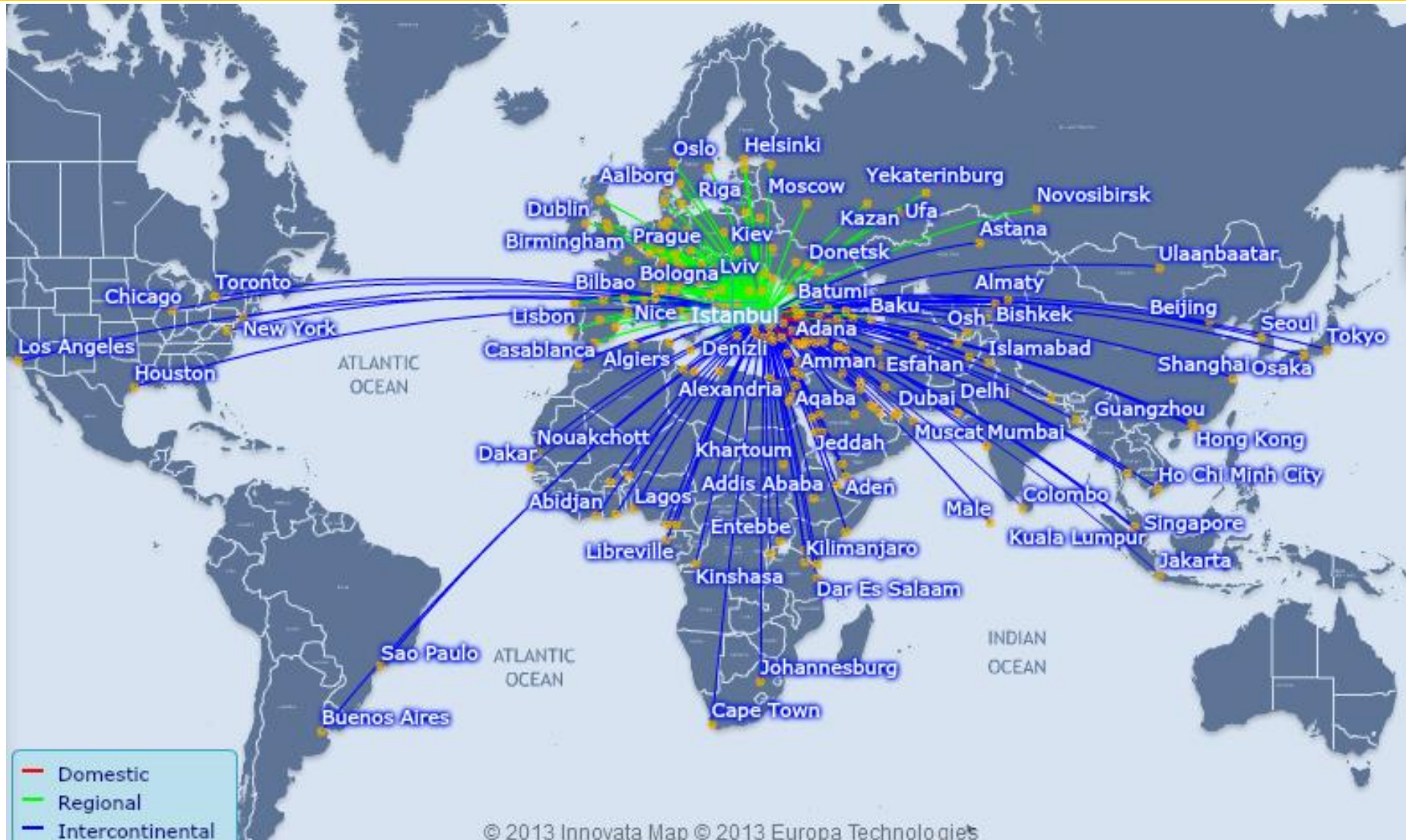


Source: MIT Airline Productivity Study (2011)

Chicago Hub Network: Which Airline?



Turkish Airlines – IST Hub Network



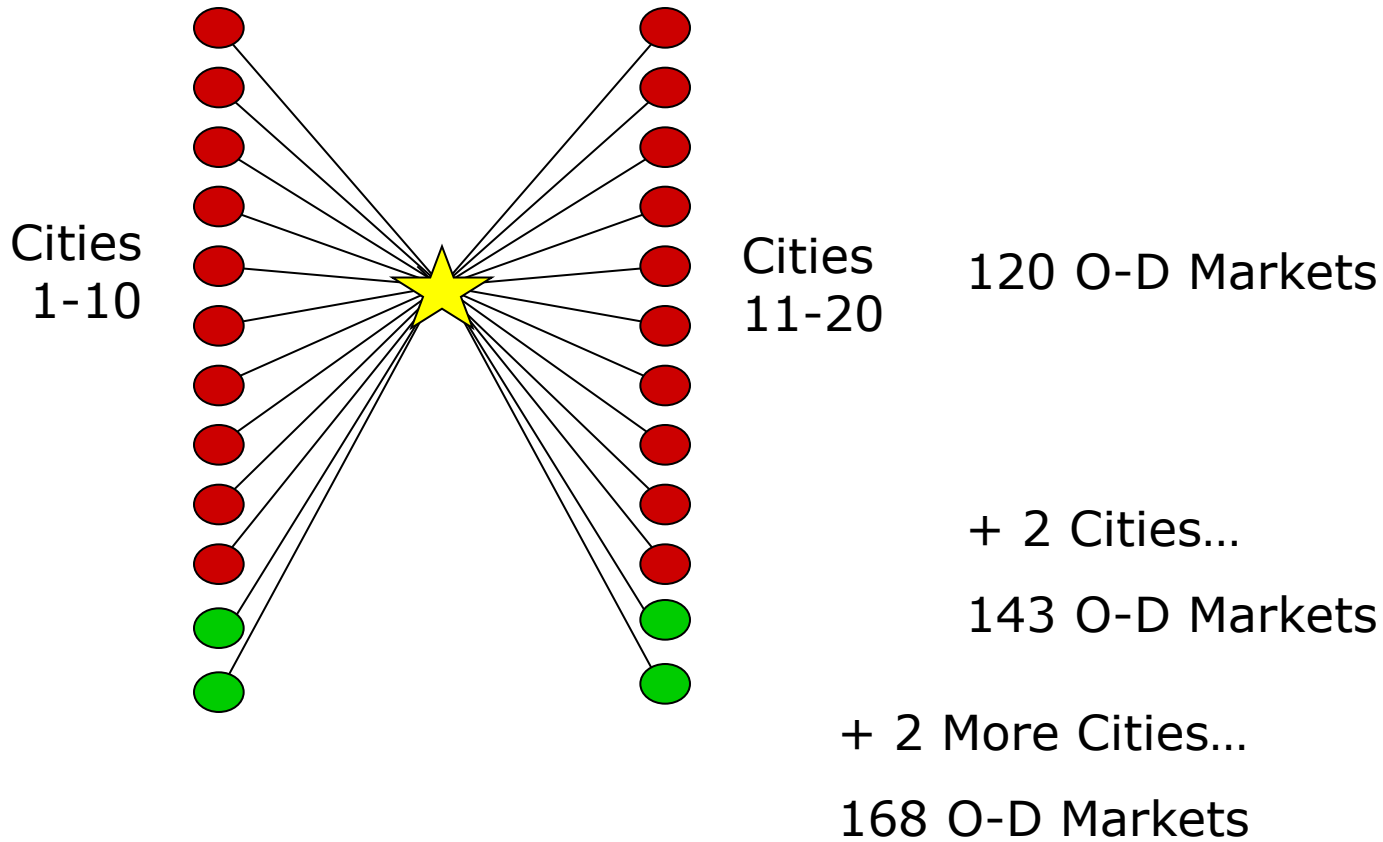
Source: <http://www.backrowflieger.com/category/turkish-airlines/>

Hub Impacts on Route Planning

- **New routes to smaller spoke cities become much easier to justify in an established hub network:**
 - An airline needs only 1 or 2 passengers per flight to each of 30+ connecting destinations to make a 100-seat aircraft “profitable”
 - However, such incremental analysis leads to a tendency to overlook potential displacement of other traffic on connecting legs
 - Same “incremental” logic makes it more difficult to stop service to a potentially unprofitable destination, which provides connecting traffic support to other flights
- **Difficult to justify a new non-stop service to by-pass the hub, as it might steal traffic from hub flights:**
 - However, large number of departures in a connecting market can allow airline to build market share and perhaps introduce a non-stop flight supported by many connecting opportunities

Hub Growth by Adding Cities

City 1 ● ————— ● City 2 1 O-D Market

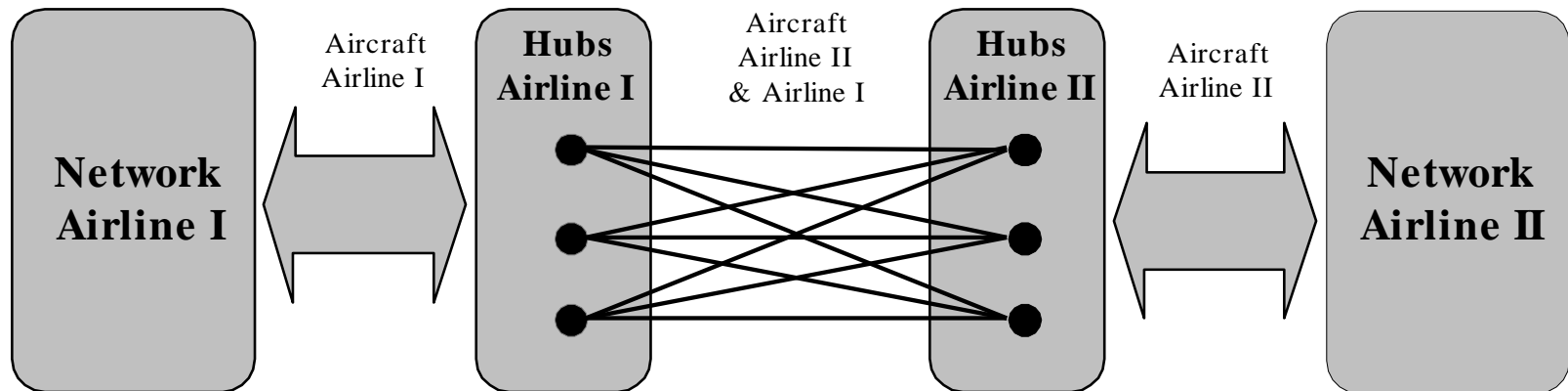


Recent Trends: Hub Strengthening

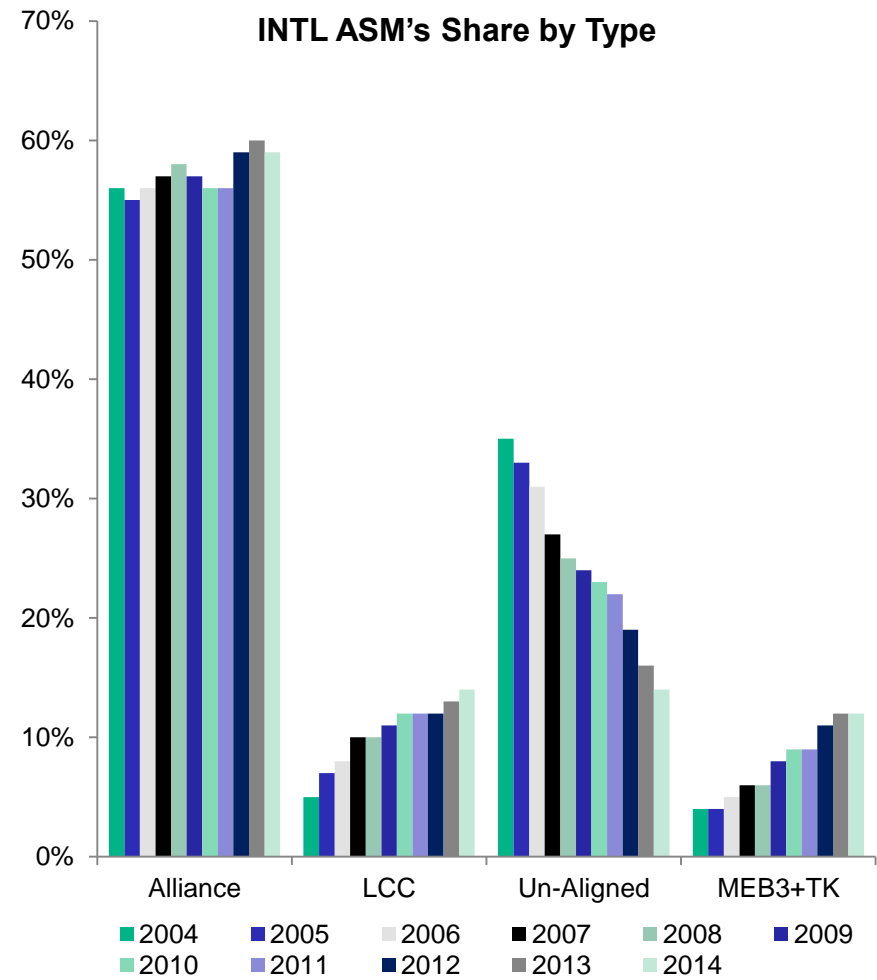
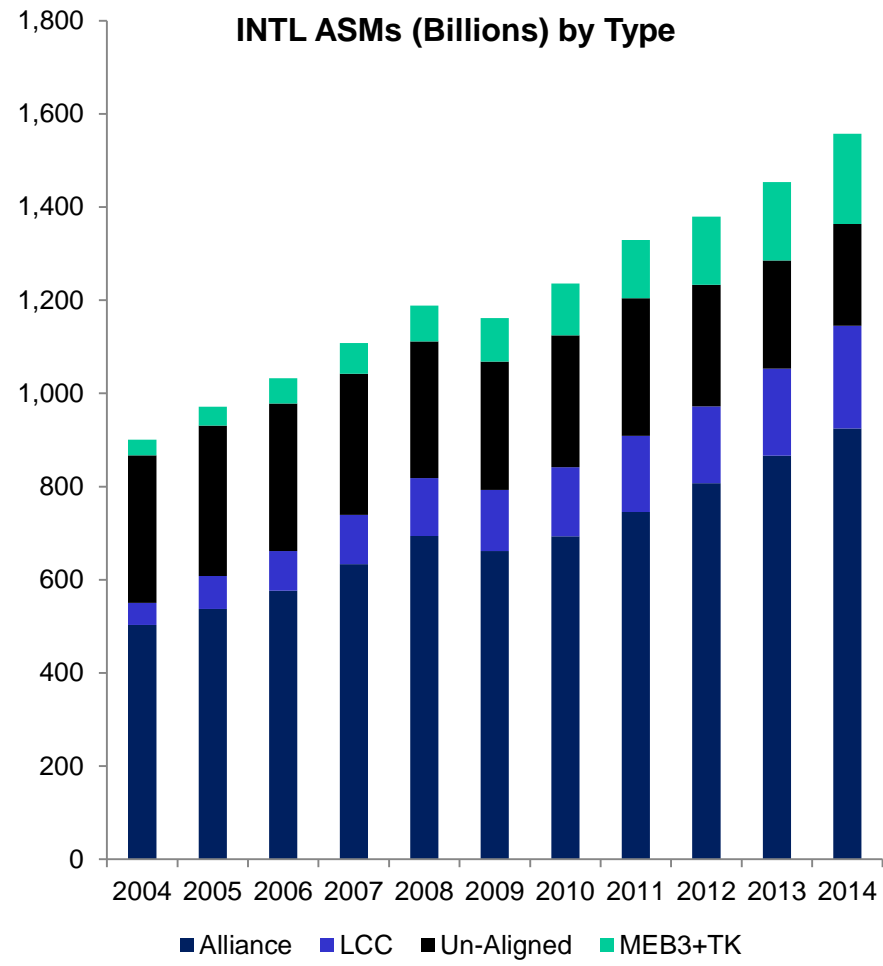
- **Despite forecasts of more non-stop flights, a trend toward bigger and stronger hubs has re-emerged:**
 - Largest US and European airlines have cut virtually all flights that do not originate or terminate at their hubs
 - Several smaller, weaker US hubs have been shut down
- **Factors that continue to reinforce hub growth:**
 - Liberalized bilateral agreements have allowed airlines to fly even low-density international routes from their hubs (e.g., CVG-MUC)
 - Small regional jets are being used to increase frequency of flights to small spoke cities, not to over-fly the hub with non-stops
 - Airline alliances focus on linkages between major hub networks
- **Hub operations will continue to be important, given their fundamental economics.**

International Alliance Networks

- **International alliances link their networks through hub-to-hub flights**
- **The Global Strategic Alliance -- Strongly connected domestic networks linked together through high-density flights between international hubs**

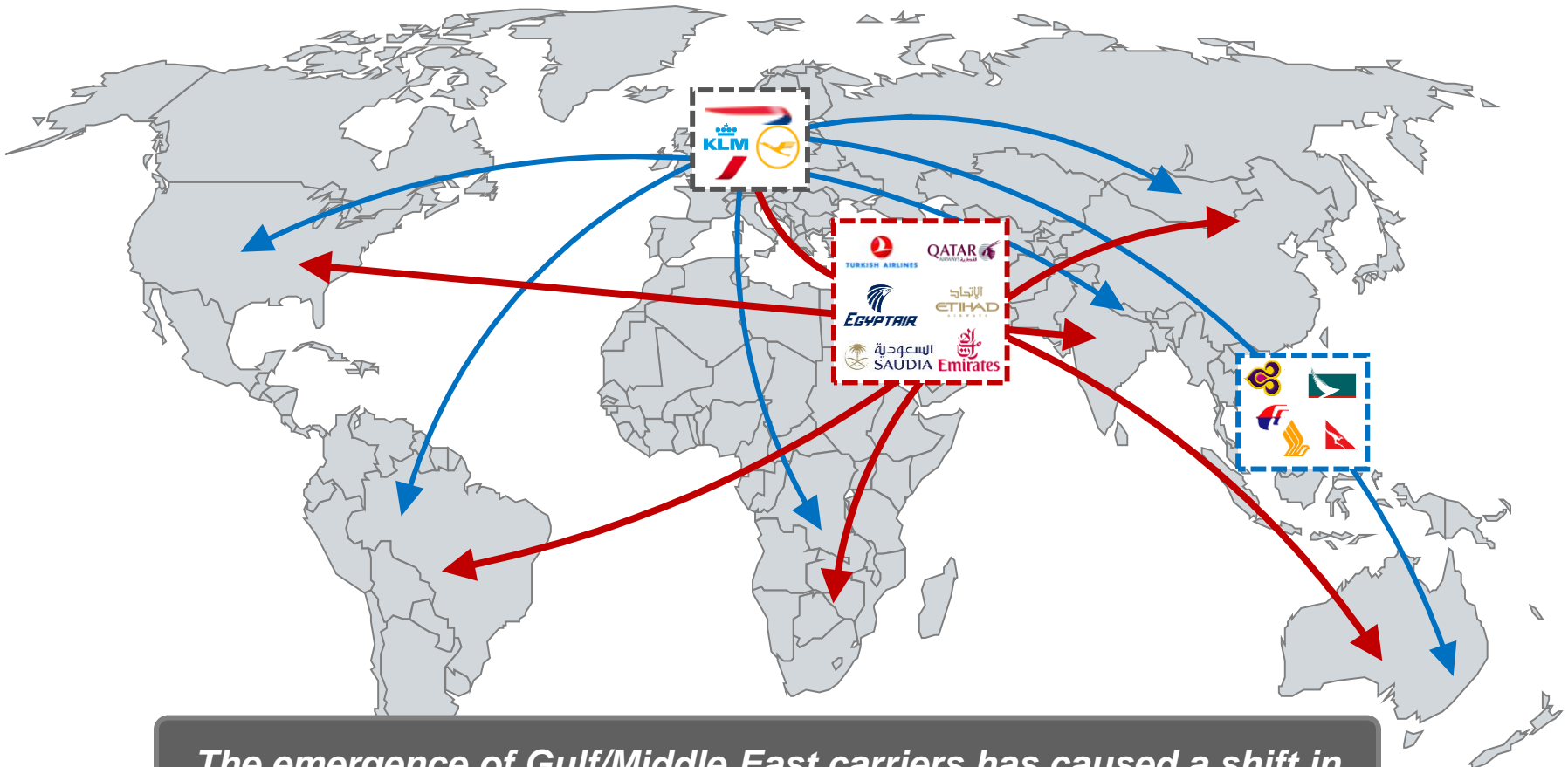


Share of International ASMs



Source: OAG 2004-2014

Global Traffic Flows Are Shifting with Alliance and Emerging Hubs



The emergence of Gulf/Middle East carriers has caused a shift in global traffic flows across major connecting hubs

Strategic Partnerships Both Within and Outside Alliance Structures

jetBlue

الخط
Emirates

Gulf Carrier + Hybrid Carrier:

- Hugely important for growth to large markets with no huge alliance connection – JFK/BOS.
- Provides feed into large JetBlue markets like MCO



AIR CANADA

TURKISH
AIRLINES



Intra-Alliance Partnership transcending JV:

- Growth between Canada and Turkey but facilitating feed into Africa and Asia
- Partly political in nature to increase frequencies between countries



CATHAY PACIFIC

AIR NEW ZEALAND



Inter-Alliance Partnerships:

- Better for local market ties and increased access to China through Dragonair for booming NZ-China market
- Better access to Europe based on hub times than SIN

الإتجاه
ETIHAD
AIRWAYS

Alitalia

Equity Partnerships:

- Allows a carrier to guide decision make in a non-competitive manner
- Sometimes helps carriers obtain increased access into a particular region