Presentation Title

Air Cargo – The Hidden Opportunity in Supply Chains

Presented by:

Dr. Heinrich Frye

The Fraunhofer-Gesellschaft

- More than 80 research facilities in Germany
- 22,000 employees
- 1.9 billion Euro research volume each year
- Affiliated international research centers and representative offices worldwide

- Institutes and facilities
- Further locations

The 3 Sections of the Fraunhofer IML

MATERIAL FLOW SYSTEMS

Information Logistics and assistance Systems,
Intralogistics and IT Planning,
Autonomous Transport Systems,
Machines and Facilities,
Packaging and Trade Logistics,
AutoID- and RFID-Systeme
Software Engineering

ENTERPRISE LOGISTICS

Enterprise Planning,
Supply Chain Engineering,
Production Logistics,
Maintenance Logistics,
International Enterprise Development

LOGISTICS, TRAFFIC, ENVIRONMENT

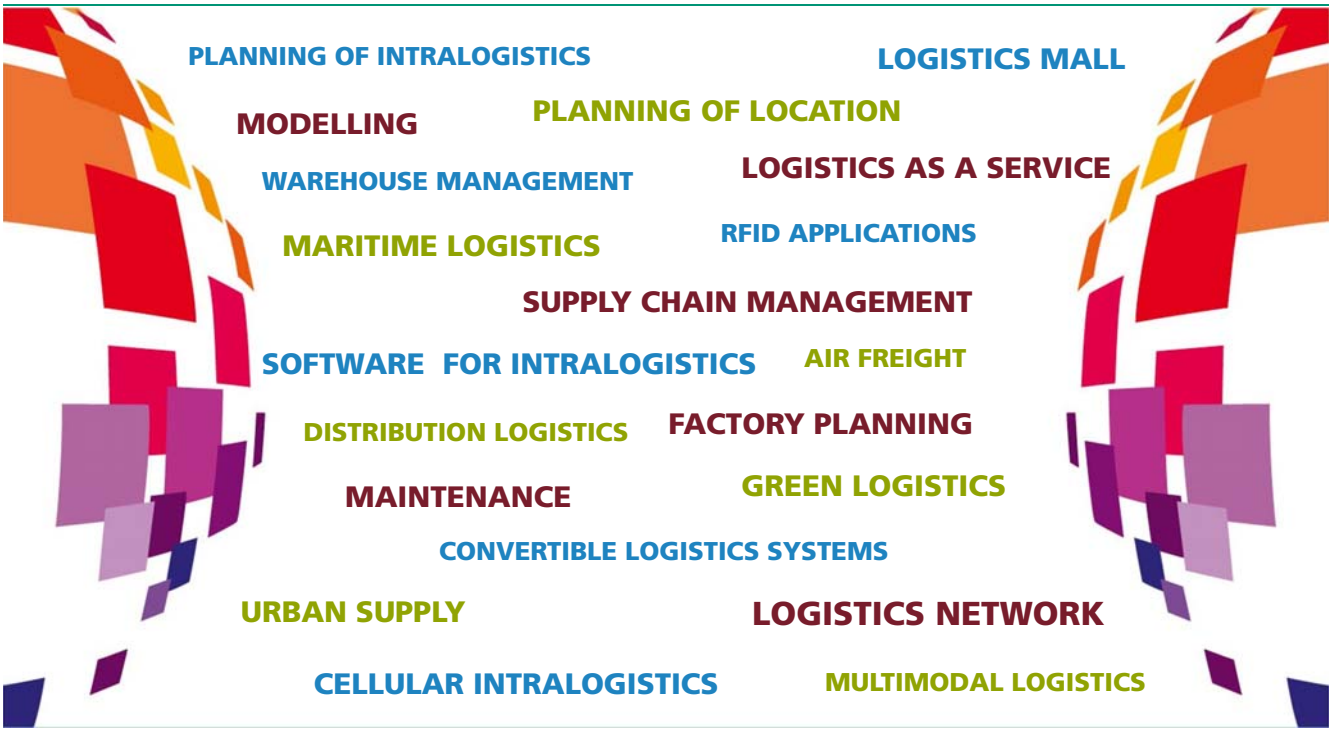
Environment and Resource Logistics,
Traffic Logistics,
Health Care Logistics,
Project Center Aviation Logistics,
Project Center Traffic,
Mobility and Environment,
Center for Maritime Logistics and Services

Project Center Aviation Logistics

HOLM
FRANKFURT
HOUSE OF LOGISTICS AND MOBILITY

- Located at Frankfurt Airport since 1986
- 10 aviation logistics specialists
- Aviation logistics projects worldwide
- Analysis, development and realization
  - air cargo centers and terminals
  - air cargo hubs and networks
  - IT-concepts and process optimization
  - ground and aircraft handling
  - capacity analysis
  - construction and development

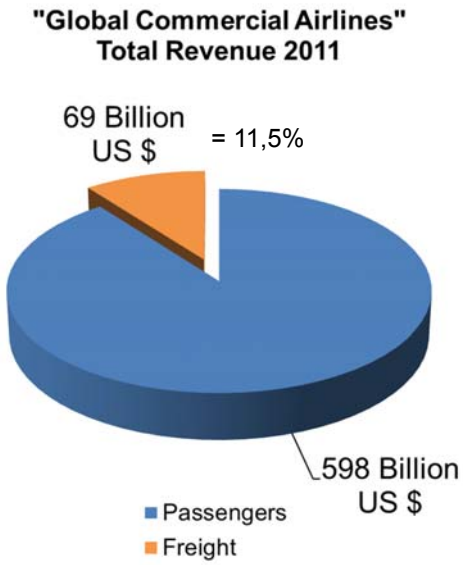
The Fraunhofer IML
Selection of Latest Research Topics

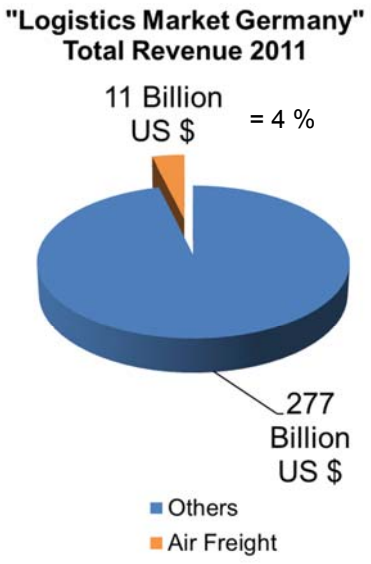


Topics

1. Mode of Air Transport
2. Complexity and Costs of Air Cargo
3. Relevance of Air Cargo for Global Transportation
4. Benefits and Opportunities for Supply Chains
5. Need for Integration and Optimization
6. Conclusion

Air Cargo - Marginal in the Aviation as well as in the Logistics Market





Source: IATA 2012; Fraunhofer SCS 2012

The Visibility of the Value of Air Transport

CNNMoney

Ash cloud grounds U.S. produce, fish and parts

FOX NEWS .com

10 million roses ruined, 5K Kenya workers laid off

TIME World

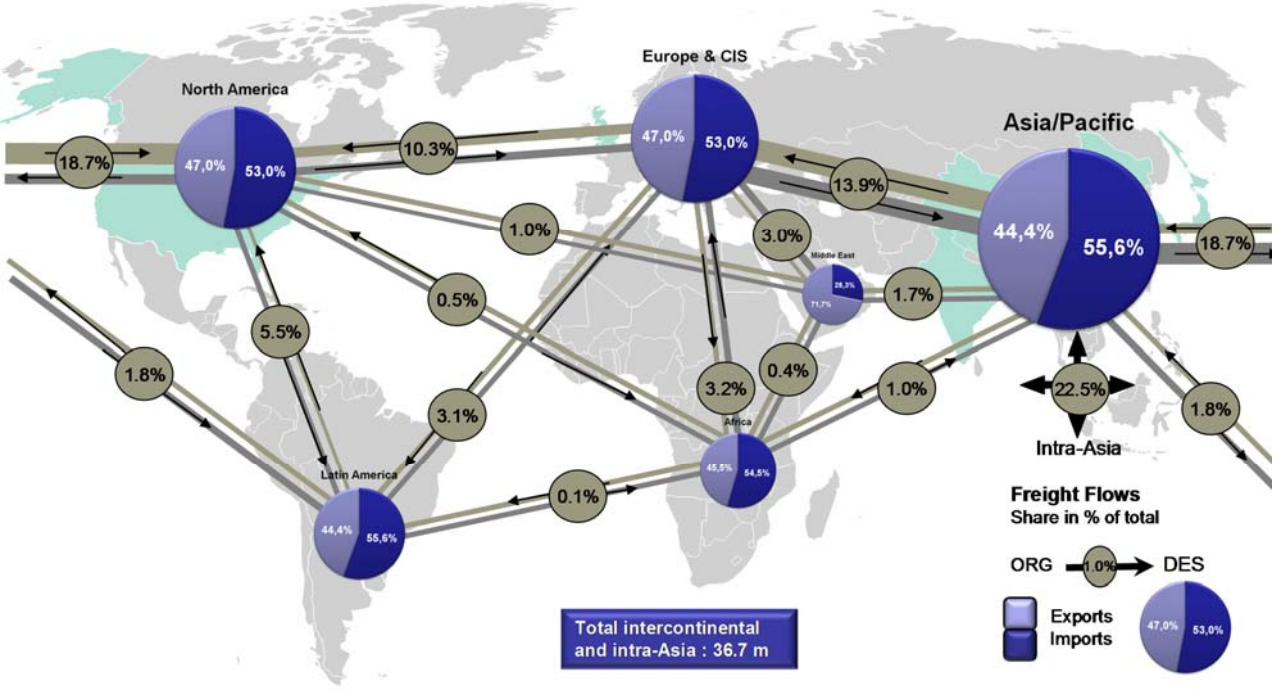
Volcano Fallout: Where's the Tuna and Pineapples?

The State
South Carolina's Newspaper

Volcano disrupts BMW supply chain to S.C.

Source: Welt

Global Air Cargo Trade Lanes 2011



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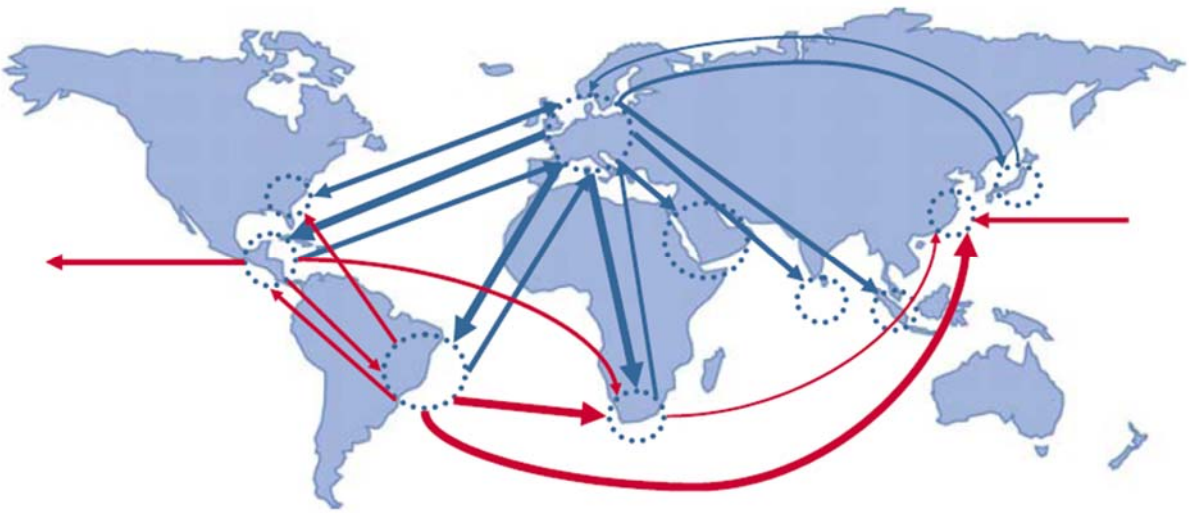
Source: aviainform TradeFlow

Costs and Speed of Air Cargo compared to Shipping

- At least 10 to 20 times faster
- Up to 50 times more expensive



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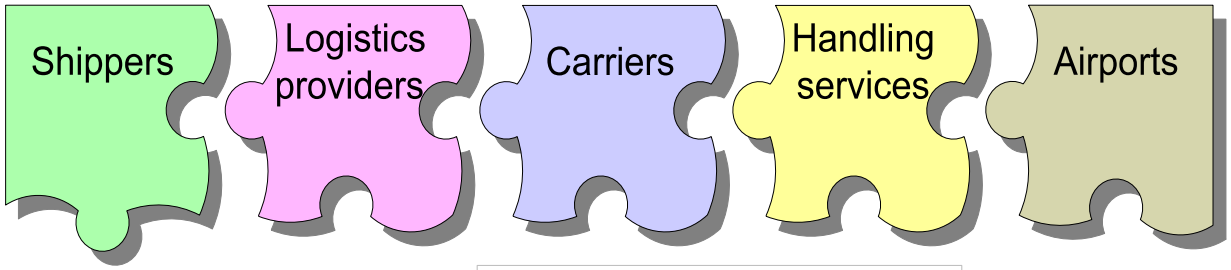
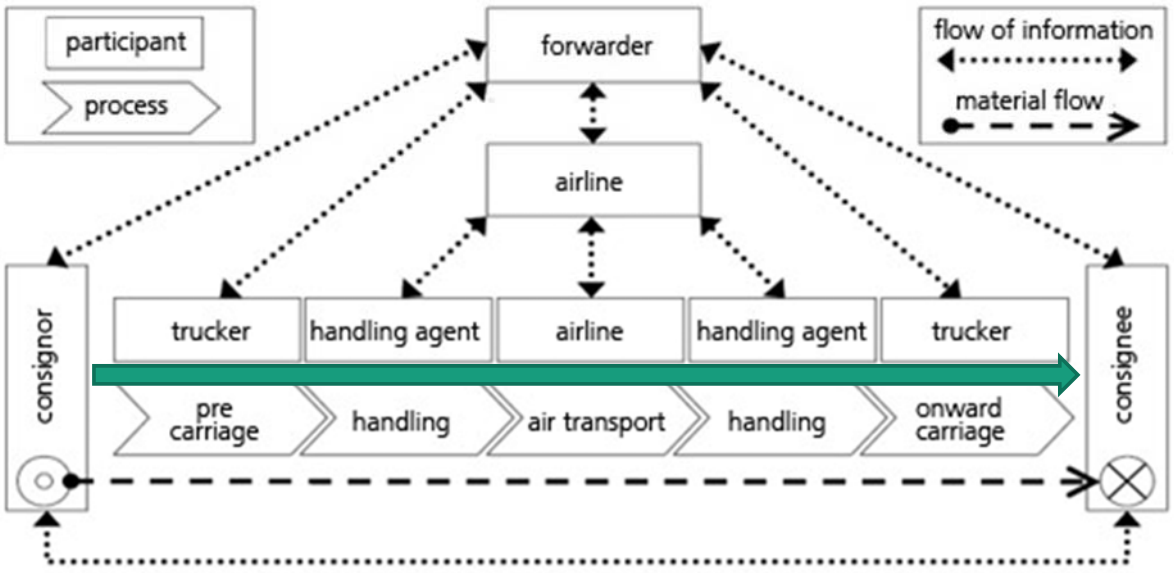
Source: Volkswagen AG

Stakeholders in the Air Cargo Market

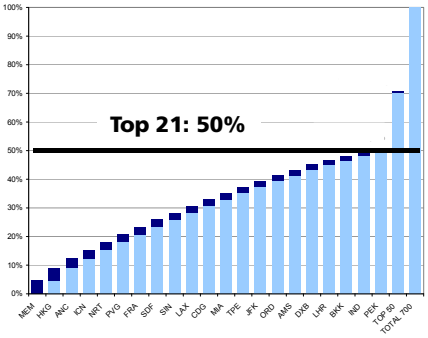


Shippers	Logistics providers	Carriers	Handling services	Airports
❑ Industry	❑ 4PLP/3PLP	❑ Air carriers	❑ Air carriers	❑ Traffic infrastructure
❑ Trade	❑ International forwarders/ agents	❑ Road (RFS) carriers	❑ Handling agents	❑ Handling facilities
❑ Service sector				❑ Customs and border inspection
	❑ Integrators	❑ Integrators	❑ Integrators	❑ Marketplace for added services

The Lead and the Structure of the Air Cargo Chain



The Concentration in the Global Air Cargo Market is going on



Air cargo loaded/unloaded at airports worldwide

Total=100%: 88 Million Tons

Top 10 Air Cargo Airlines:

50% Market Share (RTK)

TOP 18 Air Cargo Forwarders:

50% Market Share (Revenue in US $)

Top 21 Major Hub Airports:

50% of Global Air Cargo Transshipments (Volume in tons)

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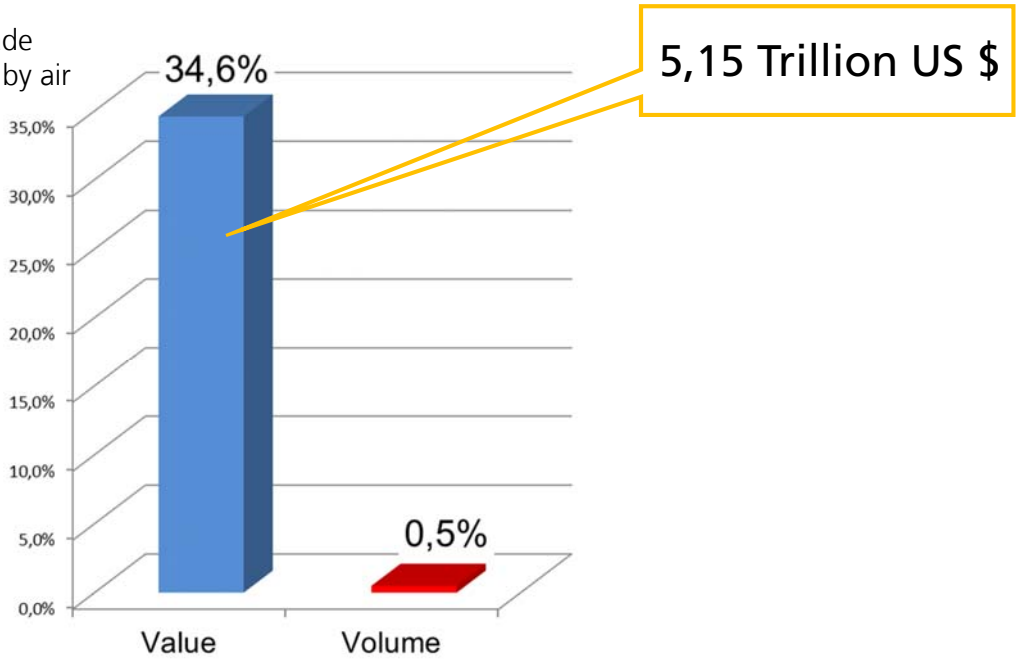
Source: ACI, IATA, aviainform 2012

Aircargo is the Exception in Terms of Volume

Proportion of global trade transported by air



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Source: Oxford Economics 2012

Air Cargo – Small but Relevant

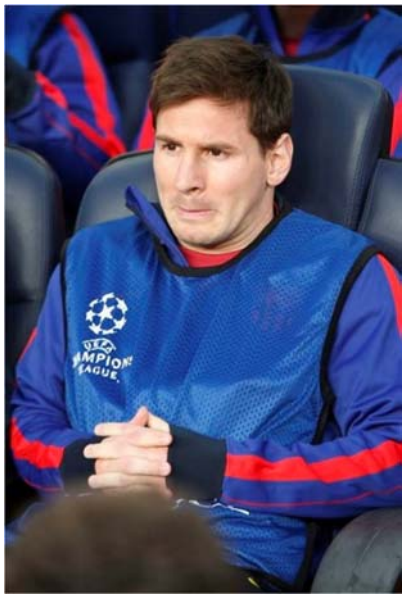
Source: www.zukunft-mobilitaet.net; www.Boeing.de

Management of Global Supply Chains

Supply chain management should include

- Accurate planning
- Readiness for planning
- Ability for alternatives

Air Cargo in the Supply Chain
like a very costly Player on the Bench



- For cost reasons Air Cargo is not the regular transport in the supply chain
- There are only two reasons for Air Cargo in the Supply chain:
  1. if the planning was not accurate or in case of unforeseen disruption
  2. if the worth of goods leads to a high capital tied up or value loss

Source: www.20min.ch/sport

Integrating
Supply Chain and Air Cargo Chain

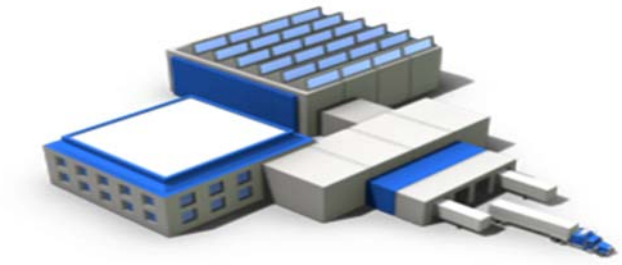
Supply Chain

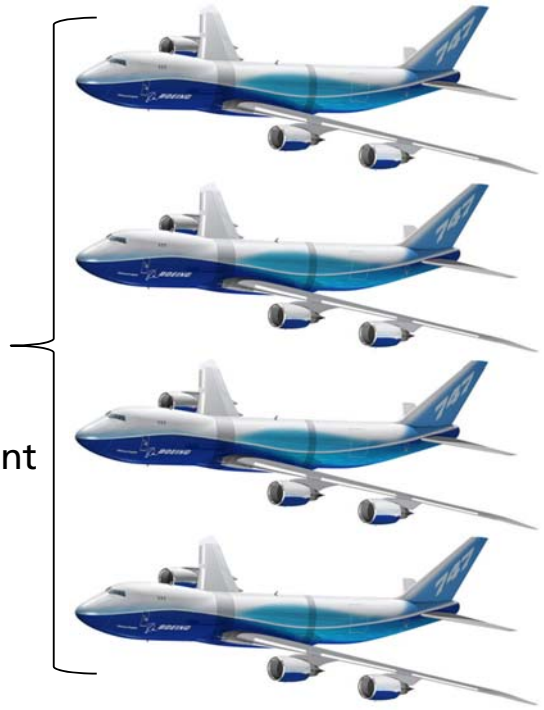
- Primary resource in manufacturing is the assembling line
  - The aim in the supply chain is just in time and sequence
    - Supply chain partners are the **OEM**, suppliers and logistics providers

Air Cargo Chain

- Primary resource in air cargo is the aircraft
  - The aim is the best utilization of aircraft in terms of space and time
    - Air Cargo Partners are the shippers, **forwarders** and carriers

The One Billion Euro Investment





1,000,000,000 EUR:

1 Complete Automotive Production Plant
(about 700 Vehicles per Day)

or

4 Boeing 747-8 Freighter
(about 500 Tons Payload)

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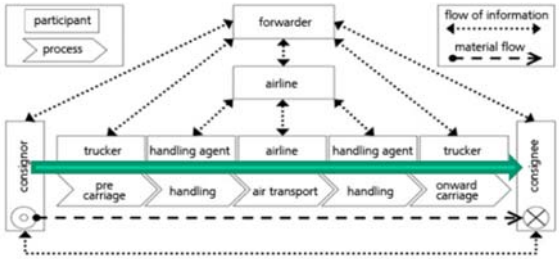
Source: Boeing

The Way of Integrating: Integrated Air Cargo Hub (IACH)

Bundesministerium für Bildung und Forschung · Fraport · DB SCHENKER · aviainform · SIEMENS



Project Objectives

- Optimize process across company borders
  - Reduce resource demand and process times at the hub airport
  - Integrate processes, planning tools and information flow
- Demonstrate improved processes by implementing prototypical applications
- Develop business models among cost-benefit-sharing aspects

EffizienzCluster LogistikRuhr

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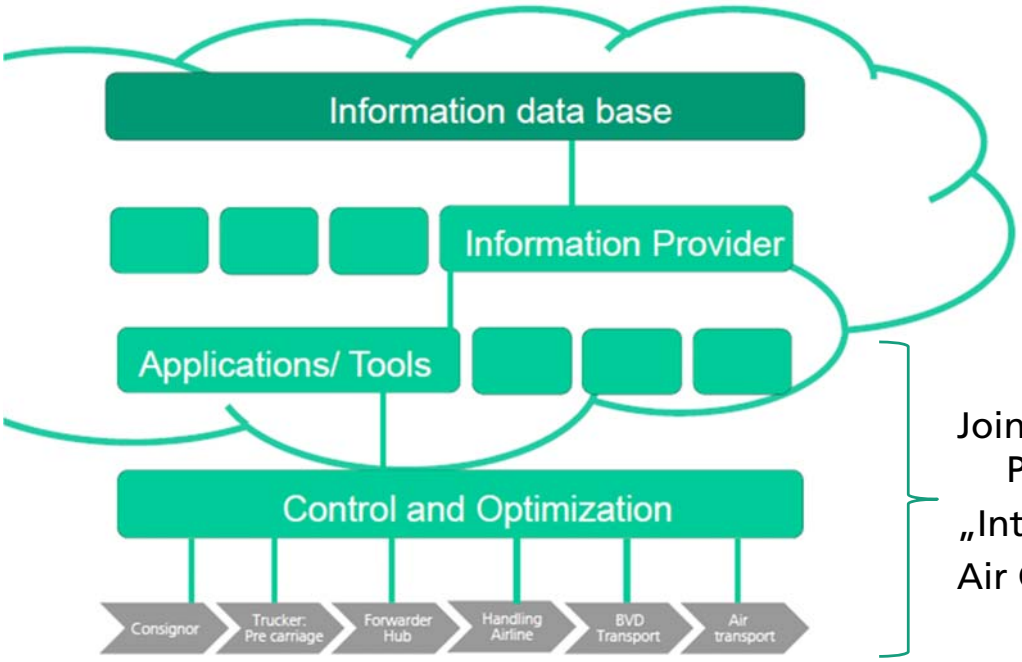
Source: Fraport AG

Will Clouds control the Air Transport Chains of the Future?



Joint Research Project „Integrated Air Cargo Hub“

Conclusion

A single bank has been systemically significant for the global economic system!

- Air cargo marginal in the aviation market
- Air cargo underestimated and denied in the logistics market
- But air freight systemically significant for the global logistics system
- Carriers and airports substantially for the overall system "air freight”
- Optimize and expand processes and infrastructure
- Integrate in the supply chain for efficiency and sustainability

(Photo by Michael Nagle/Getty Images)

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