Operations

Advanced Information Systems and Business Analytics for Air Transportation

M.Sc. Air Transport Management

June 1-6, 2015

Slides prepared by Benny Mantin

Operations

- Operations are at the core of the airline business
  - At the strategic level: network design
  - Tactical level: aircrafts and schedules
  - Operational level: day-to-day operations
  - Other key operational aspects:
    - Revenue management
    - Maintenance
    - Service
    - Irregular operations

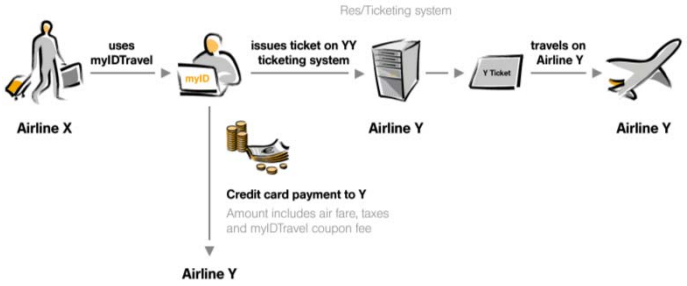
Current state

- Solutions generally
  - Paperless
  - Automation
  - Optimization
  - Shift to mobility

Digital cabin management (innova)
Recently transferred all flight reporting functions to iPads

flywize™
Cost-optimization for flight plan calculations

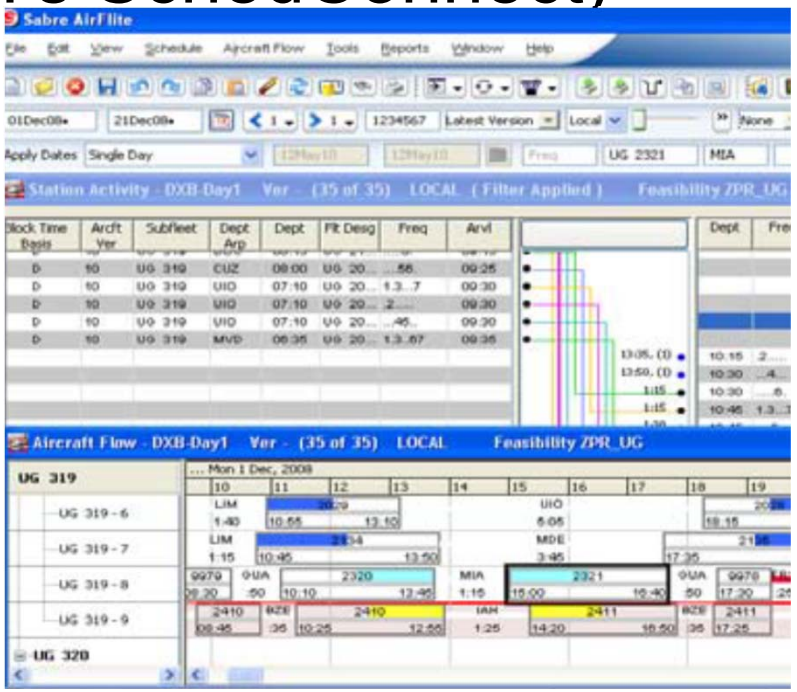
Navigation and charting
Lido/FlightOps optimizes process
Lufthansa Systems



myIDTravel: ticketing management for employees

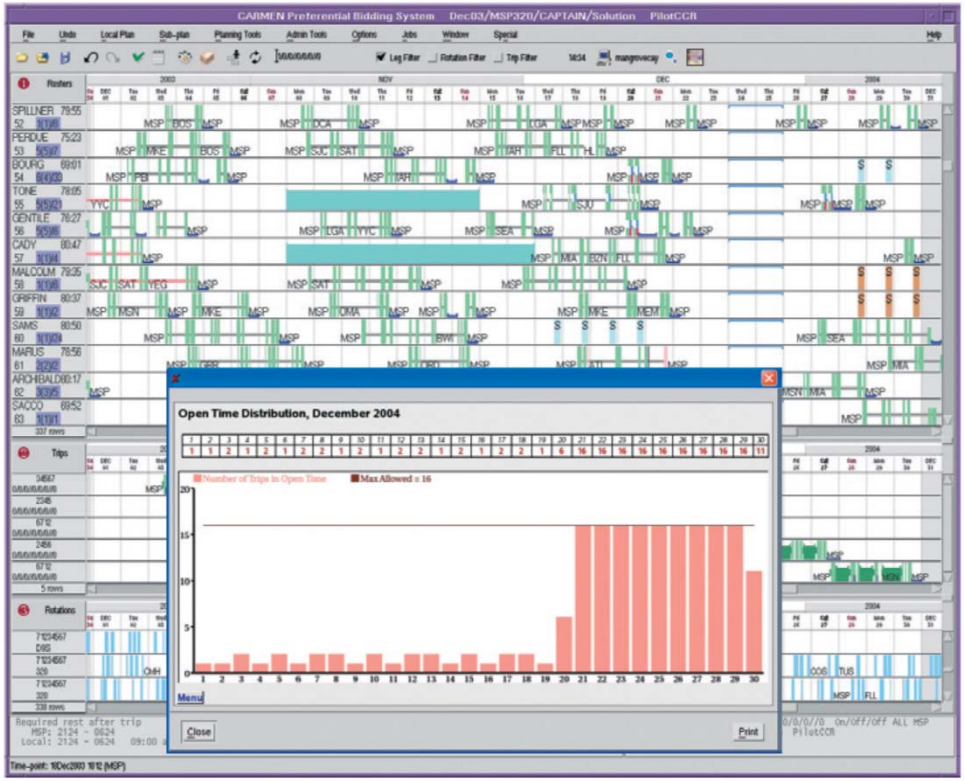
Examples

- Flight scheduling/management
  - A challenging problem
  - Generally no optimal solutions
  - Issue: code-sharing (LH's SchedConnect)



Examples

- Crew Scheduling/management
  - Challenging
    - Pairing, bidding, experience…



Rosters
Incomplete assignments
Rotations
Distribution of unassigned

JEPPESEN
A BOEING COMPANY

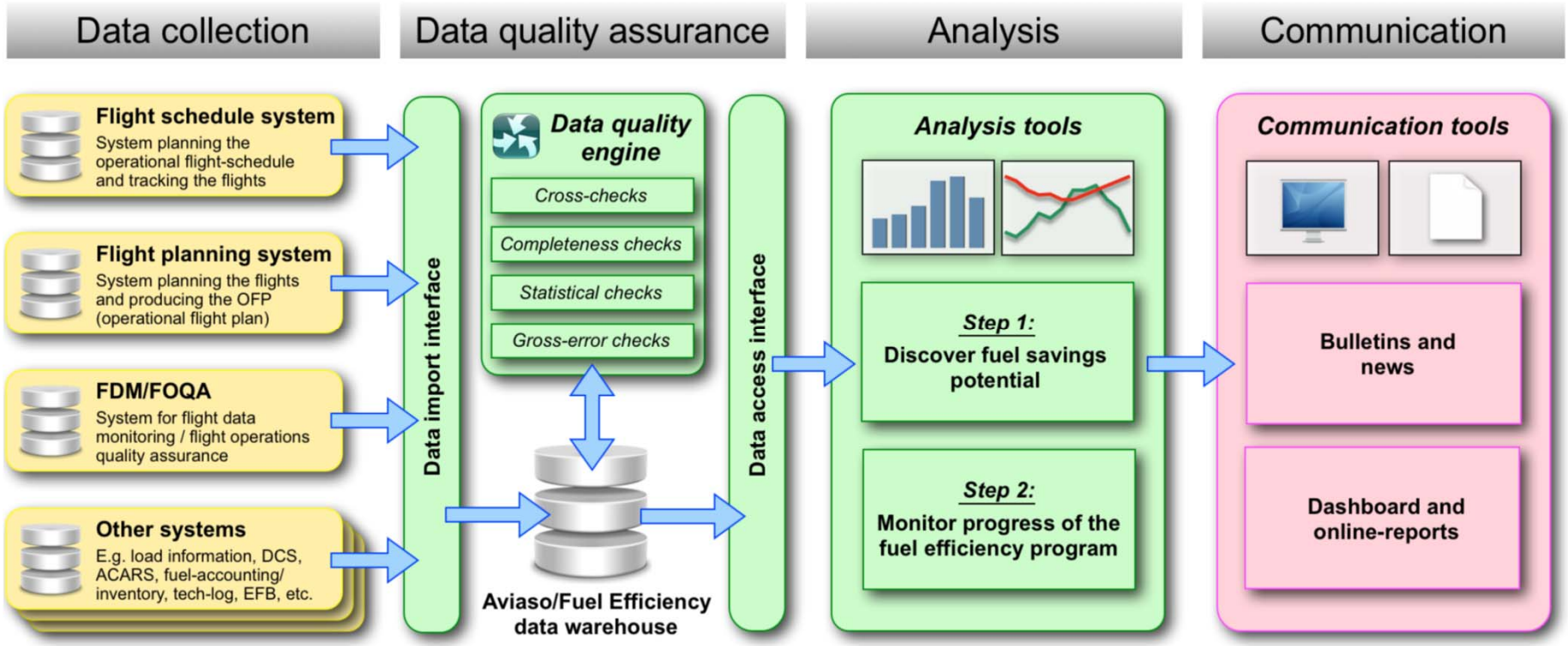
Opportunities

- Consider a passenger arriving at the gate departure lounge
  - What does the passenger want to know?
    - Which row is currently being board?
    - Are we departing on time, and if not when?
  - In both cases the available information is not adequate.
- Boarding process is still inefficient
  - Blockage
    - Seat interference
    - Aisle interference
  - Passengers bring luggage that does not fit, too heavy to lift.
  - Solution? Passenger profiling?

Fuel efficiency

- This is a major trade-off:
  - Too much fuel results with unnecessary weight
  - Not enough fuel and you might have to initiate an emergency landing…
- Solution approaches:
  - Optimization of flight profiles
  - Operational procedures such as
    - Reduced utilization of Auxiliary Power Unit (APU) or
    - One-engine taxi on the apron
  - Maximize aerodynamic characteristics
  - Reduce weight
  - Historical data to improve operations
    - IT systems that support post-flight analysis
  - Big Data
    - Predictive analytics to optimize fuel depending on the route, conditions, and other factors that may influence flight duration

Aviaso
connecting aviation and software



FuelPlus
Aviation Fuel Management

Openairlines

Airline Irregular operations

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Operational trends

- Operations research
  - Math formulas to optimize schedules and reduce delays
  - Limitation: abstract away from passengers' perspective
- Operational control centers
  - Complex computer systems, centralized; dedicated teams to different functions; specific teams reach out to premium customers
  - Limitation: no personalization to most passengers
- Re-accommodation technology
  - Automatic rebooking
  - Limitation: generally ignore passengers' preferences
- Self-service tools
  - Empower passenger to solve irregular operations problems
  - Limitation: airlines IS has not matured yet to provide customization
- Prioritizing customers
  - Minimize impact on loyal consumers
  - Limitation: hard to implement, especially at hub airports and due to mergers and alliances (many premium customers)

Source: Passengers first

Challenges

- Cross- carrier re-accommodation
  - Airlines try to re-accommodate passengers on their own airline for economic and loyalty reasons.
  - Legacy system constraints present obstacles to cross-carrier re-accommodation.
  - Individual agreements between airlines do not always adequately compensate the receiving airline for the full value of the seat.
  - Impact: reconsider and revise policies as my improve handling of IROPS, ease disruption to passenger
- Siloed nature of airline systems and functions
  - Siloed functions to provide greater focus on key areas of the business.
  - Key functions for irregular operations such as mobile strategy are driven by marketing.
  - Revenue impact of irregular operations on passenger loyalty is not adequately measured.
  - Impact: single view of customer is absent avoiding proper prioritizing; multiple departments need to coordinate efforts

Source: Passengers first

Challenges

- Ensuring information is timely and authoritative
  - Communication is often not timely.
  - Airlines compete with third-party apps that have better information.
  - Impact: Passenger communication must be more timely, provide greater insight into the nature of the delay, and be personalised to the passenger's needs.
- Collaboration between industry players
  - Account for 60-70% of pax booked
  - Impact: Key information, such as the passenger's mobile number, is often missing, preventing the airline from contacting the passenger. =>perceived conflict of customer ownership between airlines and distributors: Who will provide the solution for the irregular operations. If the distributor re-accommodates the passenger, this often results in a no-show on the re-accommodated flight provided by the airline.
- Airline-Airport coordination
  - Lack of coordination with airport and ground handlers, due to limitations in information-sharing across systems, or unwillingness to share
  - Impact: impact flow of baggage during journey disruptions, availability of staff to assist pax at airports (where agents are outsourced)

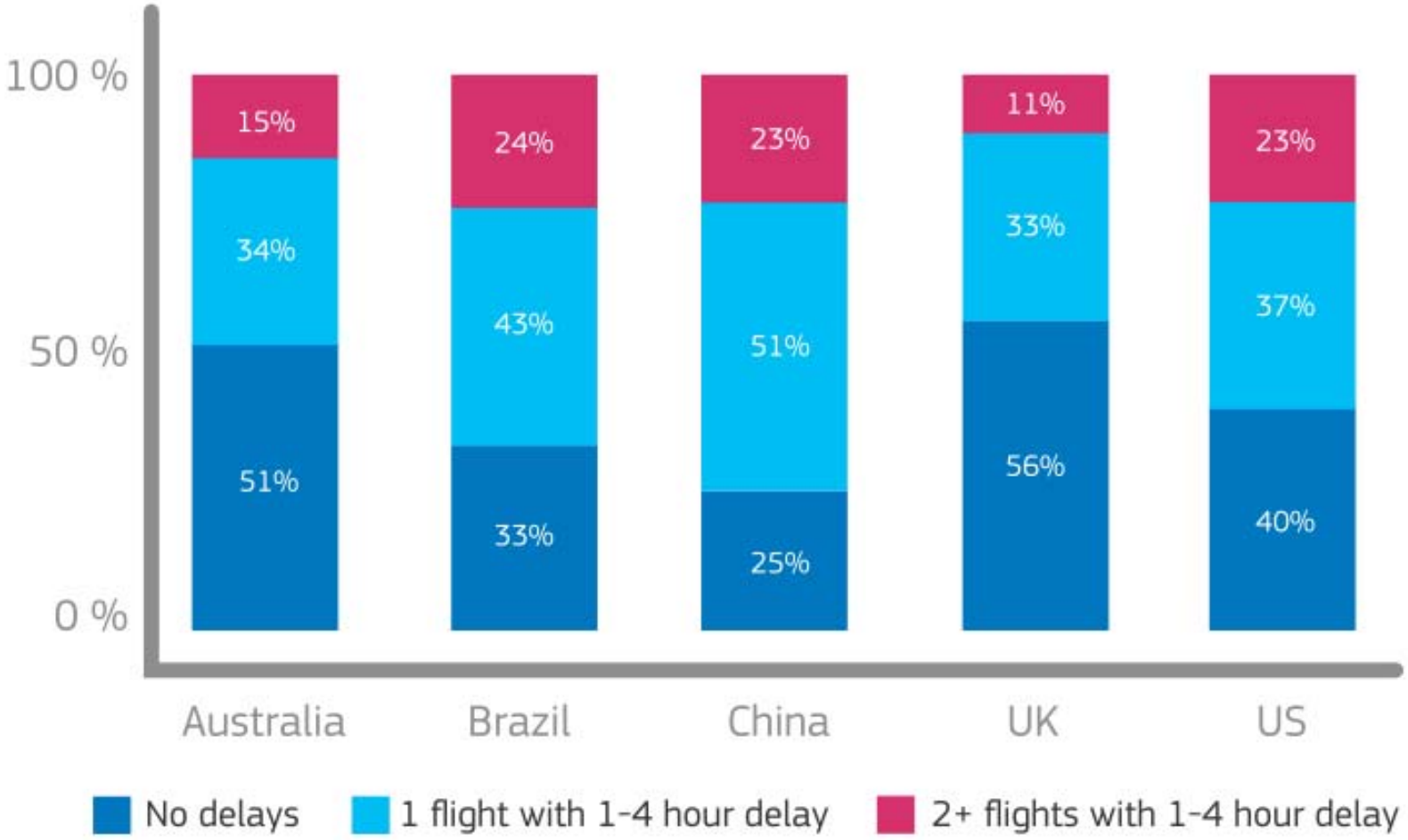
Source: Passengers first

Key Findings

- Greatest challenge/opportunity:
  - Managing moderately delayed passengers.
- Top issue:
  - Lack of communication
  - Airlines must alter customer sentiment by providing proactive, authoritative communication around delays/disruptions.
- Passengers believe they should be compensated:
  - Many are happy with soft compensation.
  - Soft compensation should be viewed as an investment in loyalty, regardless of whether the carrier is at fault.
- Experiences and expectations may differ by culture
- Passengers continue to talk through social media.
- Airlines must embrace social network analysis
  - Understand the influences and find ways to change passenger sentiment.

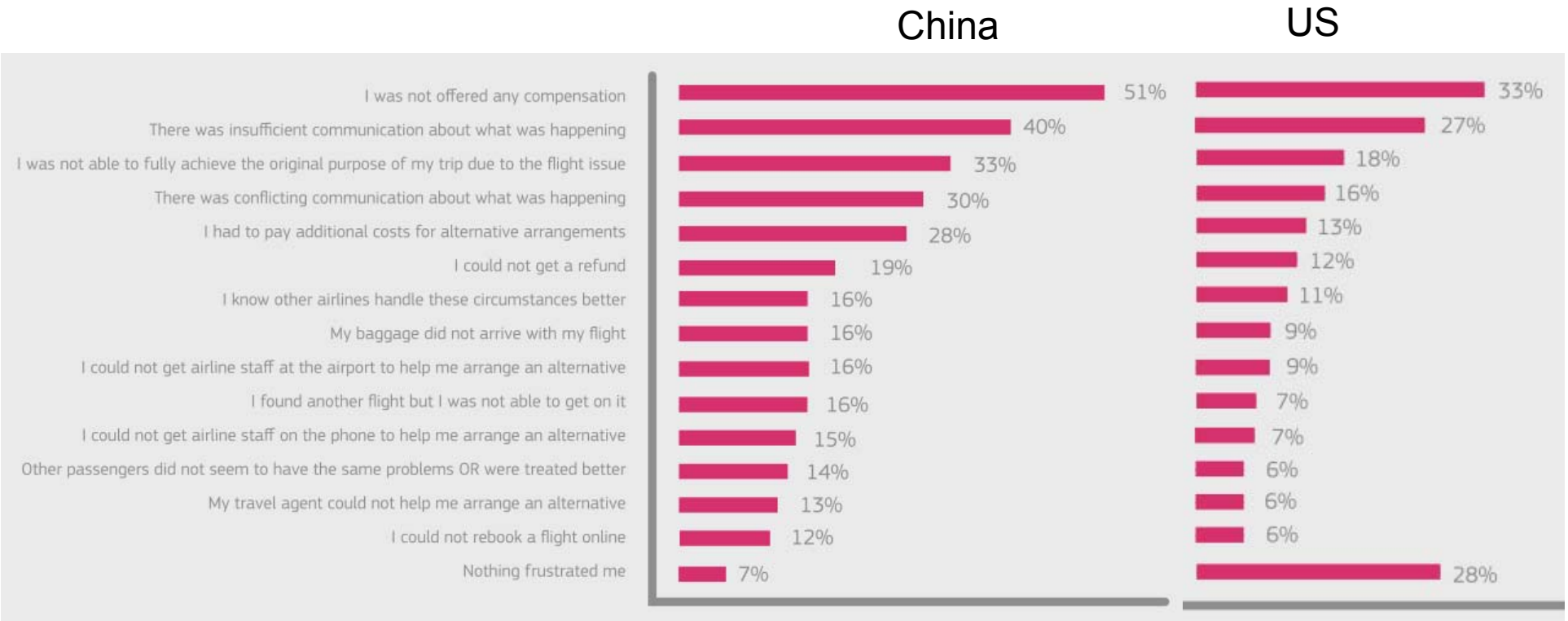
Source: Passengers first

Passenger Journey Disruptions, 1-4 Hour Delays, by Market



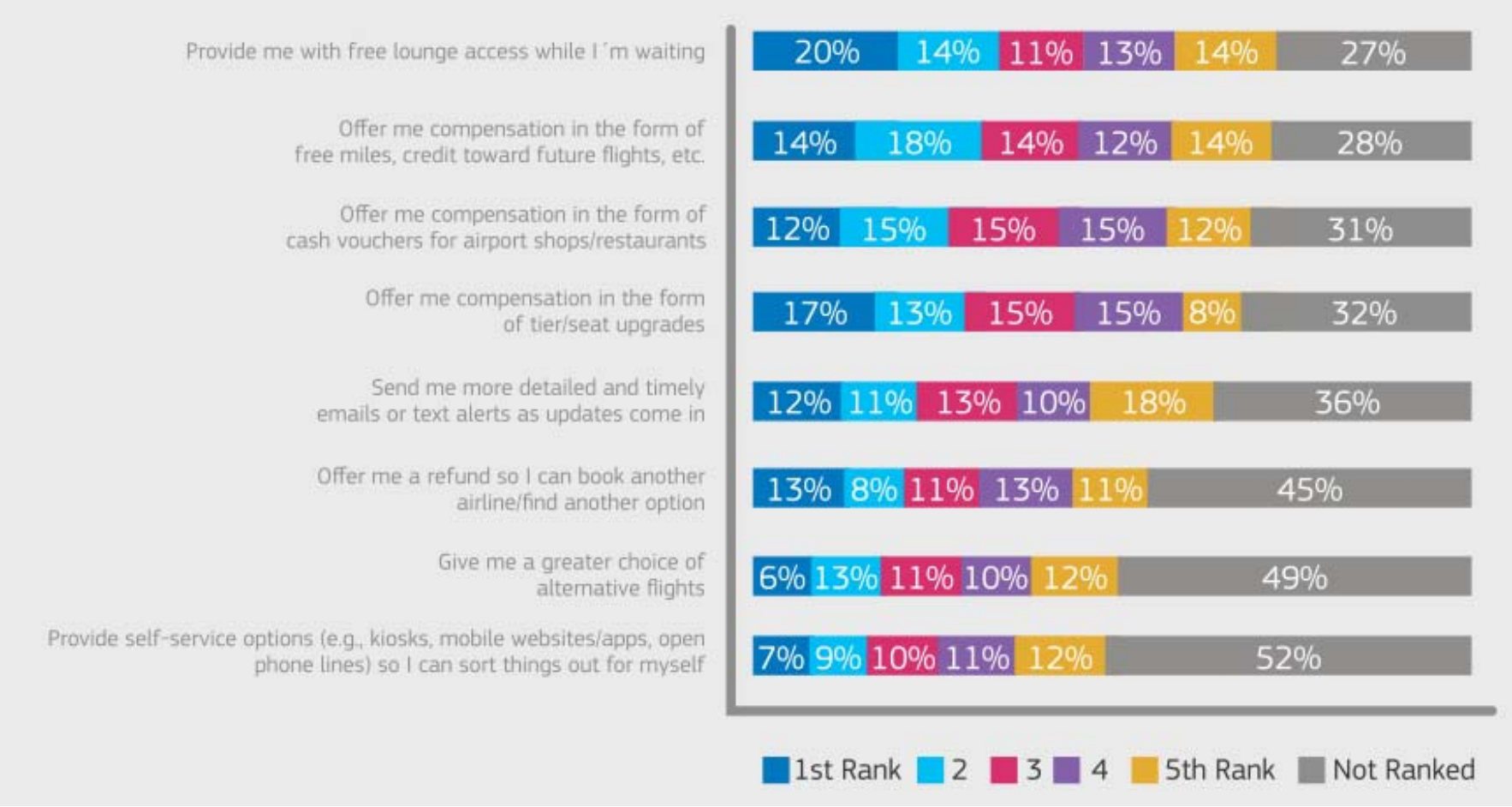
Source: Passengers first

Frustration with Airline Delays/Disruptions



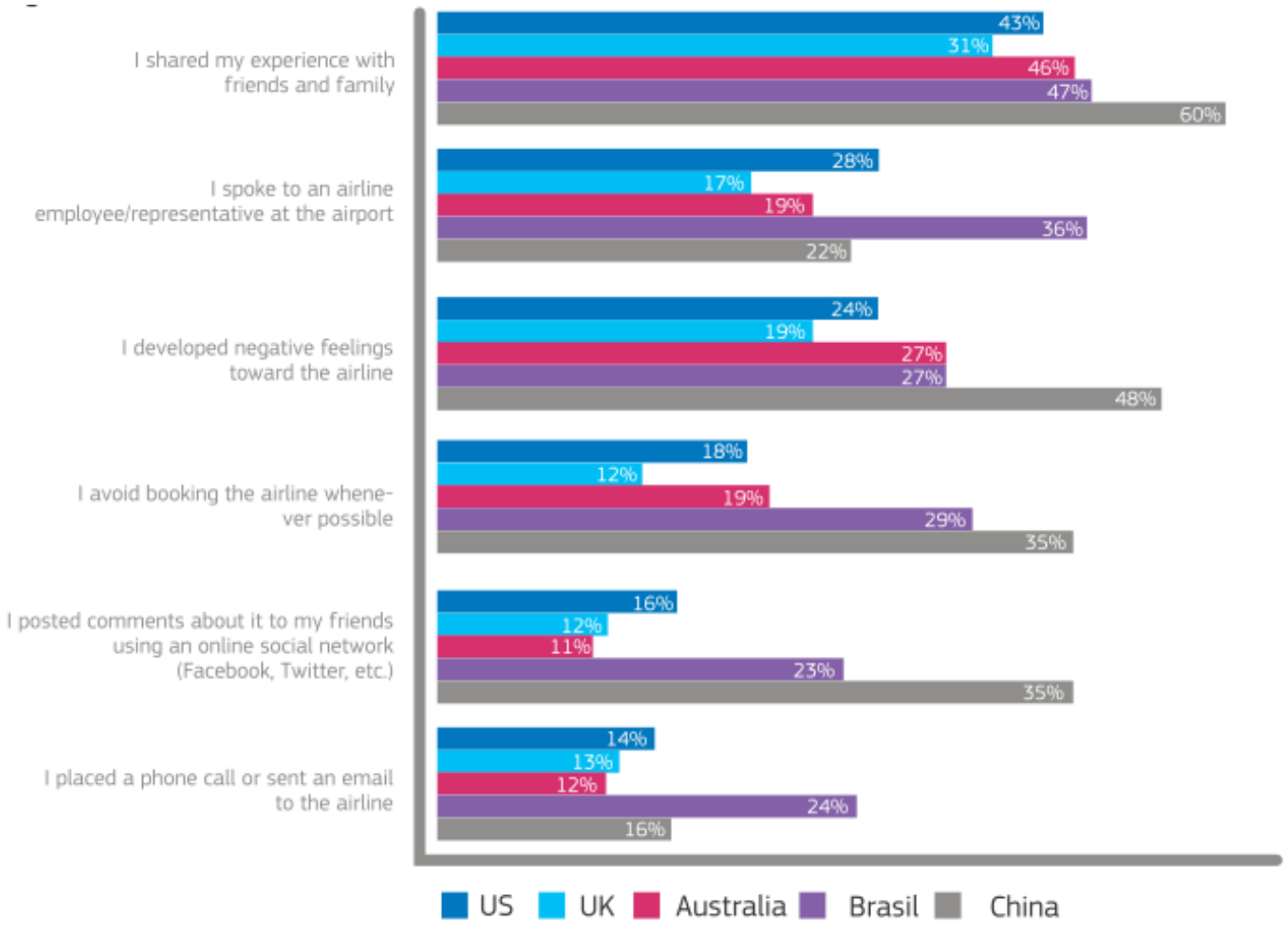
Source: Passengers first

Top Solutions to Improve Passenger Journey Disruption: Australia



Source: Passengers first

Reactions to flight Delays Disruptions



Source: Passengers first

Social Media & Passenger Frustrations

- Often social media amplifies passengers' negative sentiment about irregular operations.

- Most airlines manage social media only rudimentarily and lack sophisticated analytics to measure brand impact
- Airlines' typical social media strategy:
  - Counting followers
  - Promotions
  - Brand management

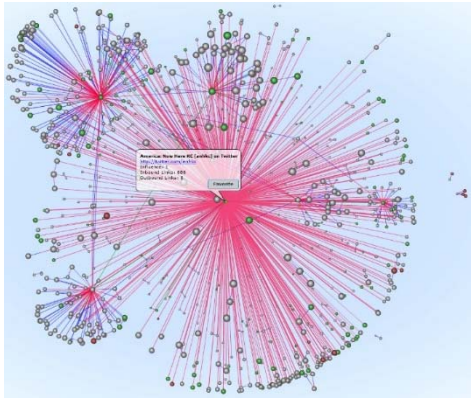
⇒Airlines need to embrace and execute a more strategic approach to social media and better understand passengers' true influence.

- Learn from certain airlines that have used social media as a communication platform when other systems have failed (e.g., AA).

Source: Passengers first

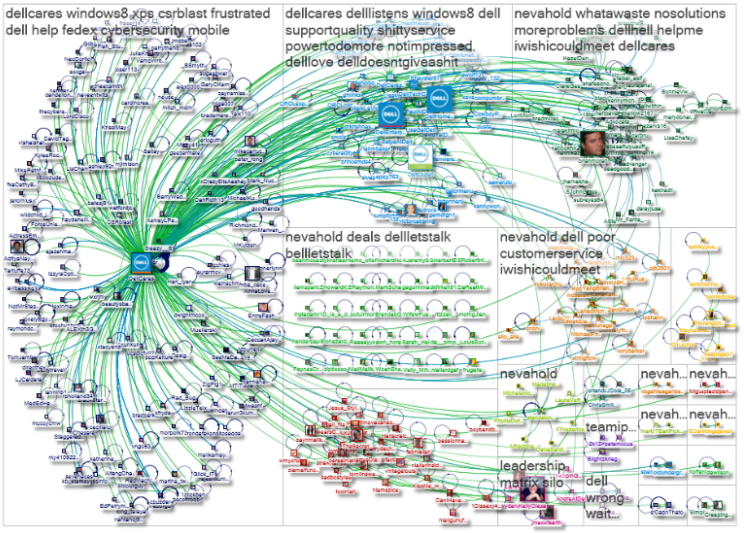
Social Network Analysis & Mapping

- Emerging field, graphical representations of that social network.
- Visual representation of conversations
  - Identify the level of influence key passengers have as they express frustration about journey disruptions.
  - Allow airlines to change passenger sentiment
  - Identify valuable passengers
  - Distribute personalized offers



Mapping social media mentions can show which Twitter users are the most influential within one specific topic.

Social Network Twitter Map for customer complaints for a major business



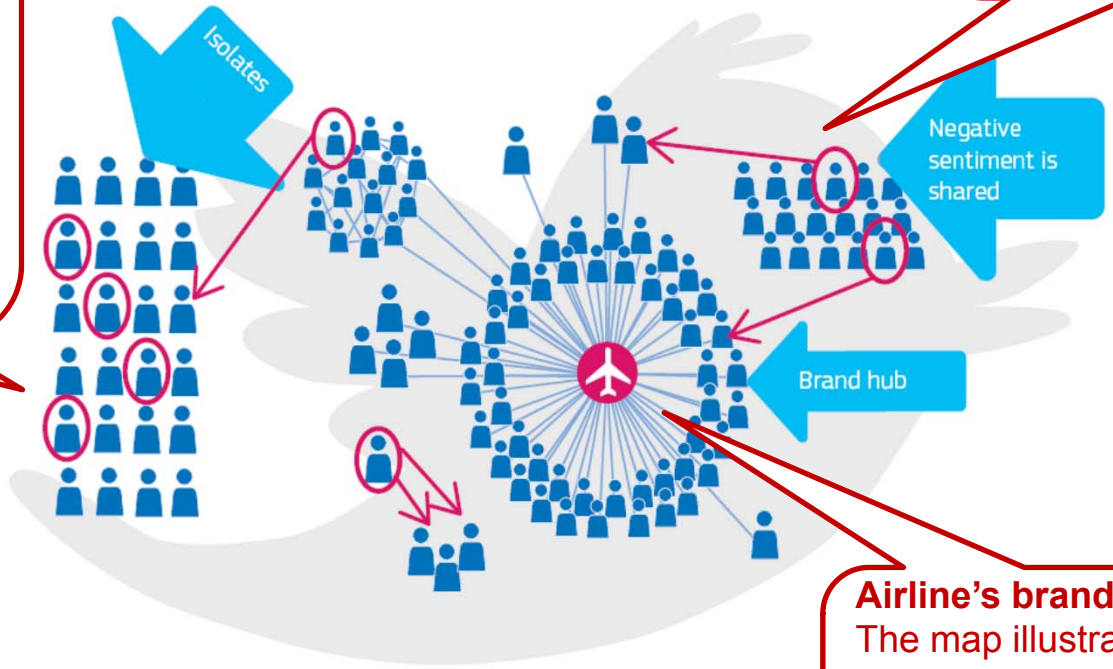
Source: Passengers first

Social media mapping: characteristics

Network Graphs
The Social Media Research Foundation

Tracking negative sentiment – This part of the map shows how negative sentiment from one customer can be communicated to others who are inter-connected.

Isolates – These passengers tweeted about the airline, but have not been engaged by the brand. Engaging with them provides an opportunity for the airline to address the negative sentiment.



Airline's brand hub – The map illustrates how airline brand accounts tend to use a broadcast (i.e. one-to-many) social media strategy.

Source: Passengers first

Analyzing the True Revenue Impact of Irregular Operations

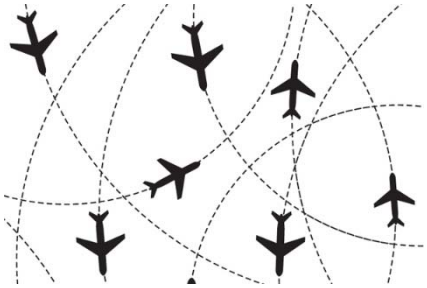
- How to measure the impact of irregular operations on customers?
  - Not only focusing on direct costs
    - fuel, crew and aircraft maintenance
  - Customer-centric approach is needed
    - customer loyalty, lifetime value and customer influence.
- What is an individual's revenue contribution and influence?
  - Depending on the individual's influence on a social network
  - Integrating traveler data with operational performance, to clearly track how customer behavior is influenced.
- Substantial cost in implementing a customer-centric approach to irregular operations management.
  - Need to balance relative cost of losing a customer's life-time revenue against investing in proactive tactics

Source: Passengers first

Implementing a Standard Service Approach

- Delays and cancellations are part of daily operations
  - Minor and moderate delays represent the biggest opportunity
  - Implementing a standard service approach to managing irregular operations forces the airline to rethink the process of re-accommodation.
- The question to ask is not how an airline can shift people from a delayed or cancelled flight to another aircraft, but how the delay impacts each passenger's planned journey
- Airlines must be the authoritative source for real-time information
  - Avoid passengers relying on a third-party flight-tracking app
- Airlines must deliver to each passenger, through social media, meaningful information about the impact of a delay on that passenger's journey.

Other considerations



- Robust scheduling
  - Can react to irregular operations
  - Consumers weigh irregular operations more than statistics
  - Create schedules flexible enough to enable the vast majority of passengers to stay on their scheduled itineraries, if delays occur
- Passenger compensation
  - Abandon a compensation model that only focuses on fault.
  - The reality: passengers' expectations have been impacted.
  - Improve effectiveness of response to delays/cancellations, even if the airline is not at fault.
    - Economical: based on passenger value.
    - Electronic delivery and personalized