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Centre for Maritime & Air Transport Management
University of Antwerp

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Improving passenger experience
- a view on technologies and innovations at airports

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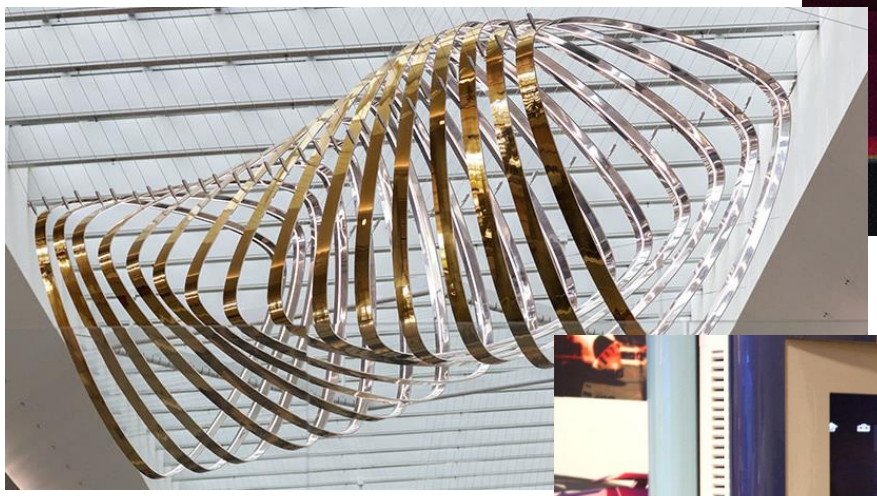
University of Antwerp

Antwerp, 6 December 2018



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Which of the following technologies did you use at an airport?

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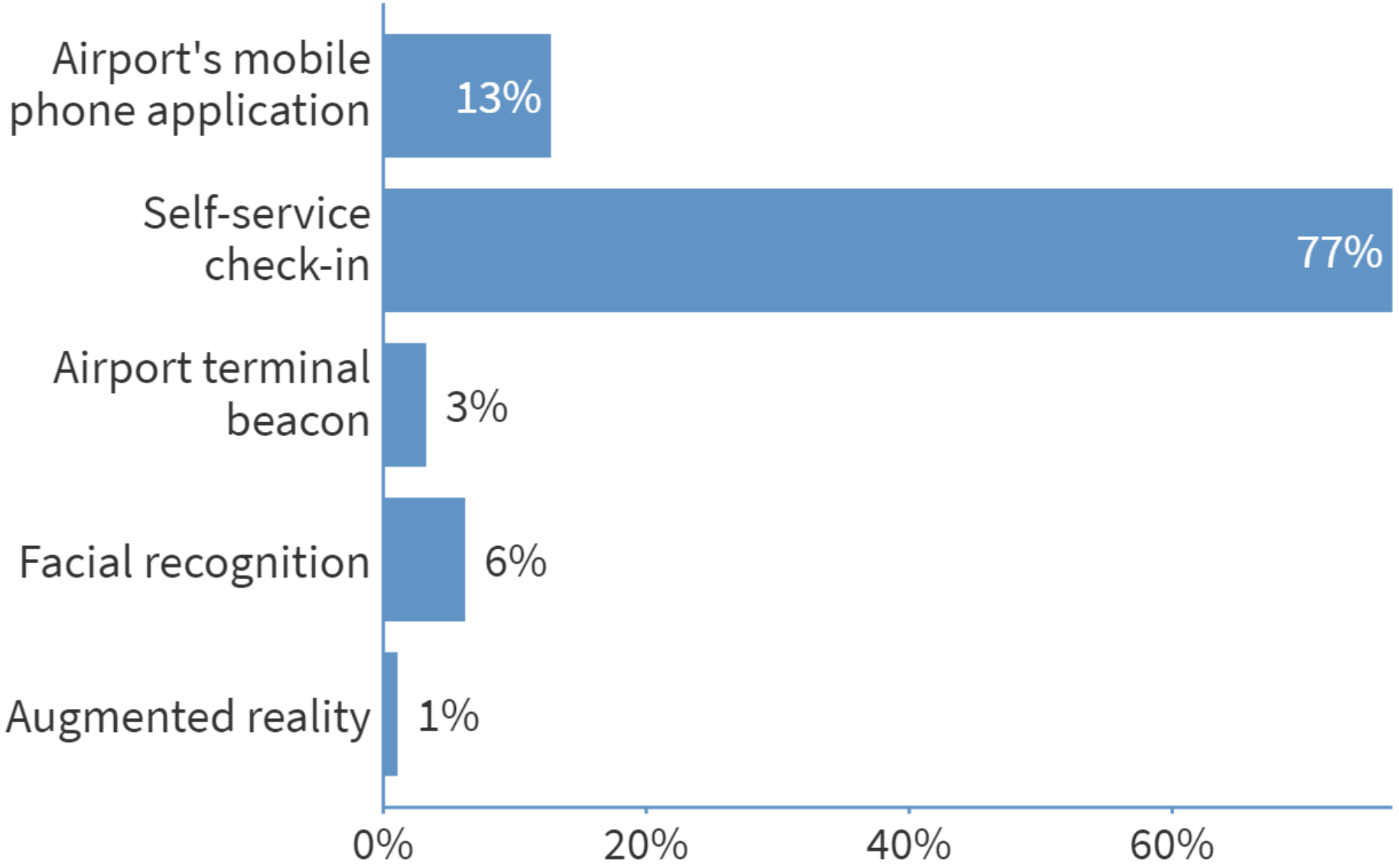


CONTENT

- **Introduction**
- Qualitative Comparative Analysis
- Research Results
- Highlights and Further Research

THE EVOLUTION OF THE AIRPORT BUSINESS MODEL

AIRPORT 1.0

- Limited infrastracture
- Objectives: safety and efficiency

AIRPORT 2.0

- Many services available
- Objectives: improved passenger service

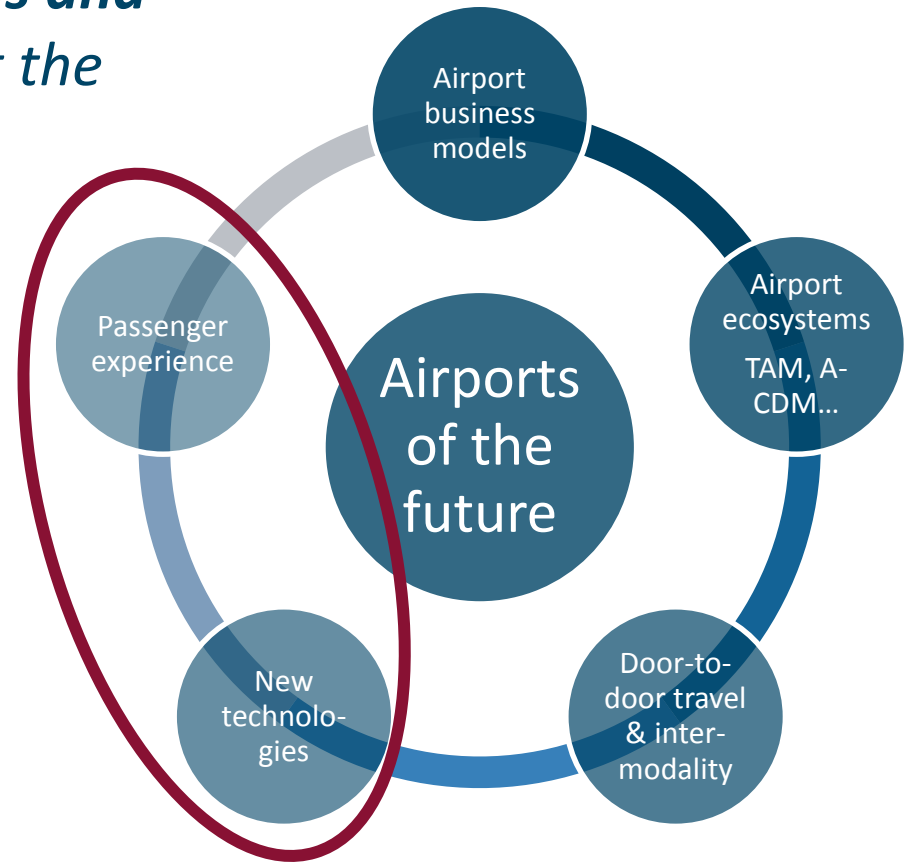
AIRPORT 3.0

- Beacons, LBS,
- Customer - centric approach
- Objectives: personalization and integration with the city

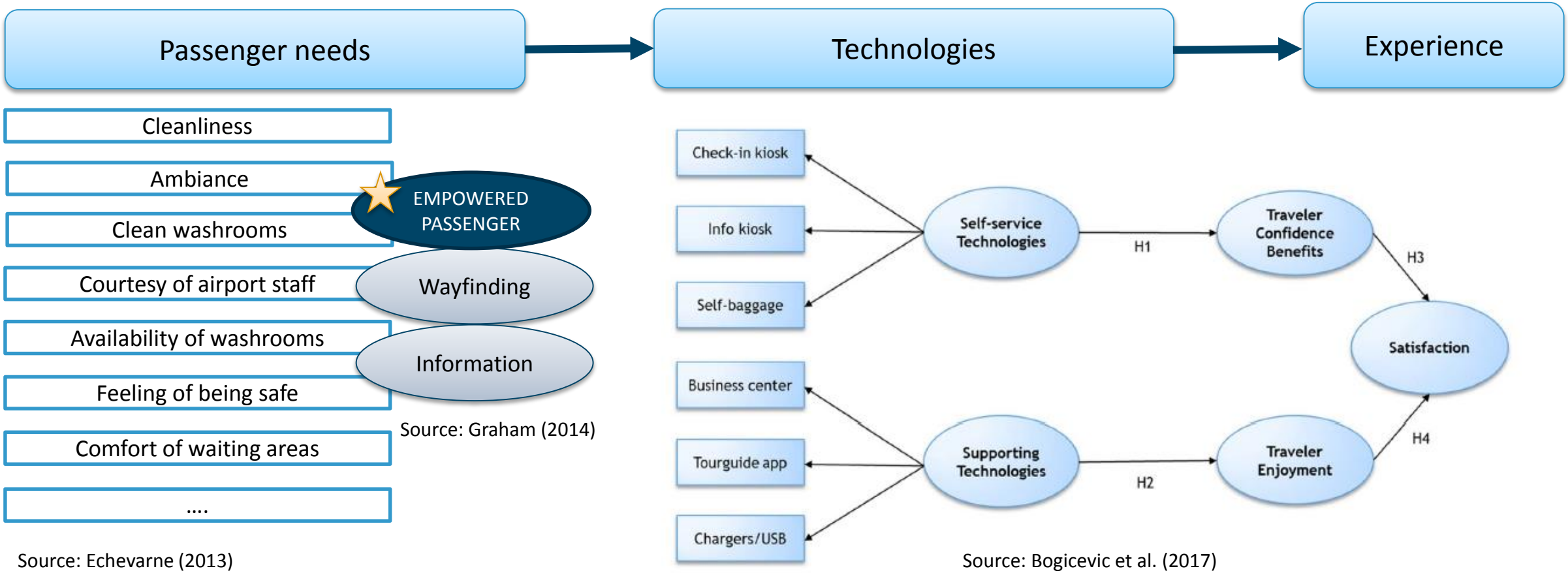
Source: Sinibaldi (2016)

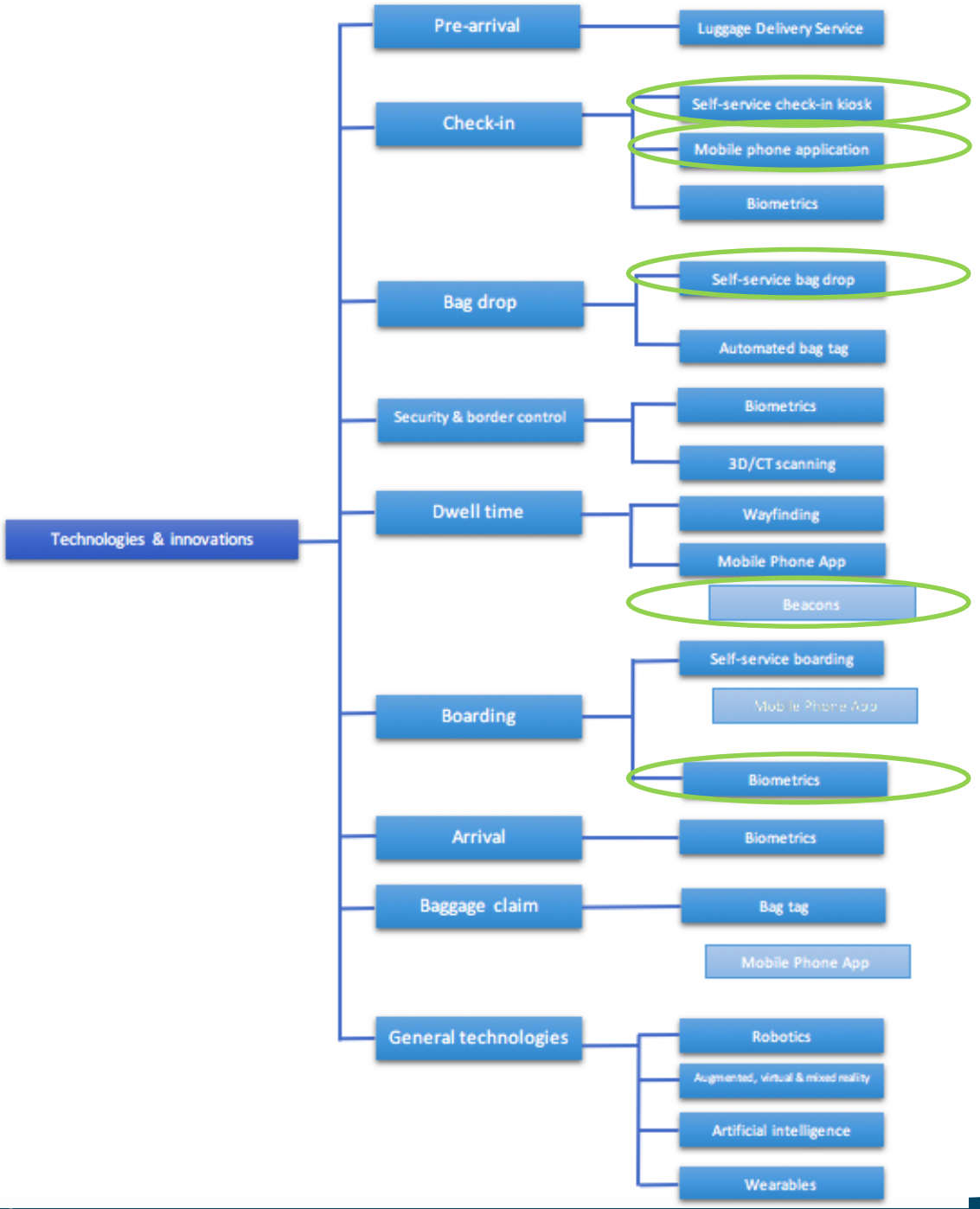
AIRPORTS OF THE FUTURE

*What are the successful combinations of **future trends and technologies** to improve the **passenger experience** at the **airports of the future**?*



PASSENGER NEEDS AND TECHNOLOGY




Technologies & innovations
Pre-arrival
Luggage Delivery Service
Check-in
Self-service check-in kiosk
Mobile phone application
Biometrics
Bag drop
Self-service bag drop
Automated bag tag
Security & border control
Biometrics
3D/CT scanning
Dwell time
Wayfinding
Mobile Phone App
Beacons
Boarding
Self-service boarding
Mobile Phone App
Biometrics
Arrival
Biometrics
Baggage claim
Bag tag
Mobile Phone App
General technologies
Robotics
Augmented, virtual & mixed reality
Artificial intelligence
Wearables


DELTA
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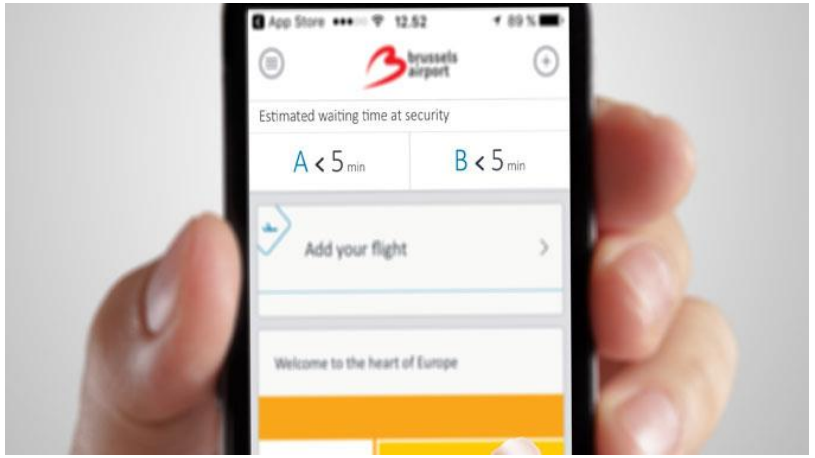
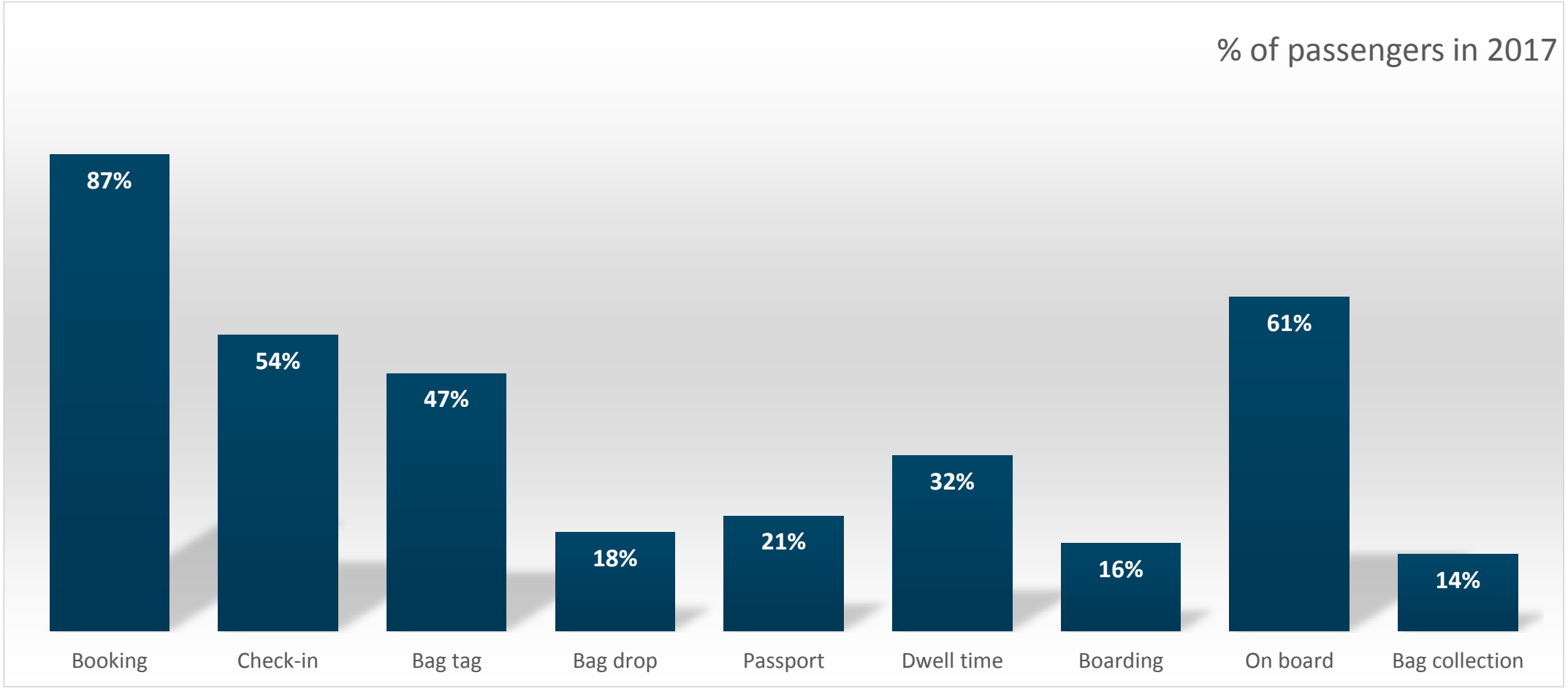

App Store
12:52
89 %
brussels airport
Estimated waiting time at security
A < 5 min
B < 5 min
Add your flight
Welcome to the heart of Europe


CPH Express
CPH
CPH
CPH

TECHNOLOGIES OF THE FUTURE



Technology adoption across the journey (SITA, 2017)

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- **Qualitative Comparative Analysis**
- Results
- Highlights and further research

QUALITATIVE COMPARATIVE ANALYSIS (QCA)

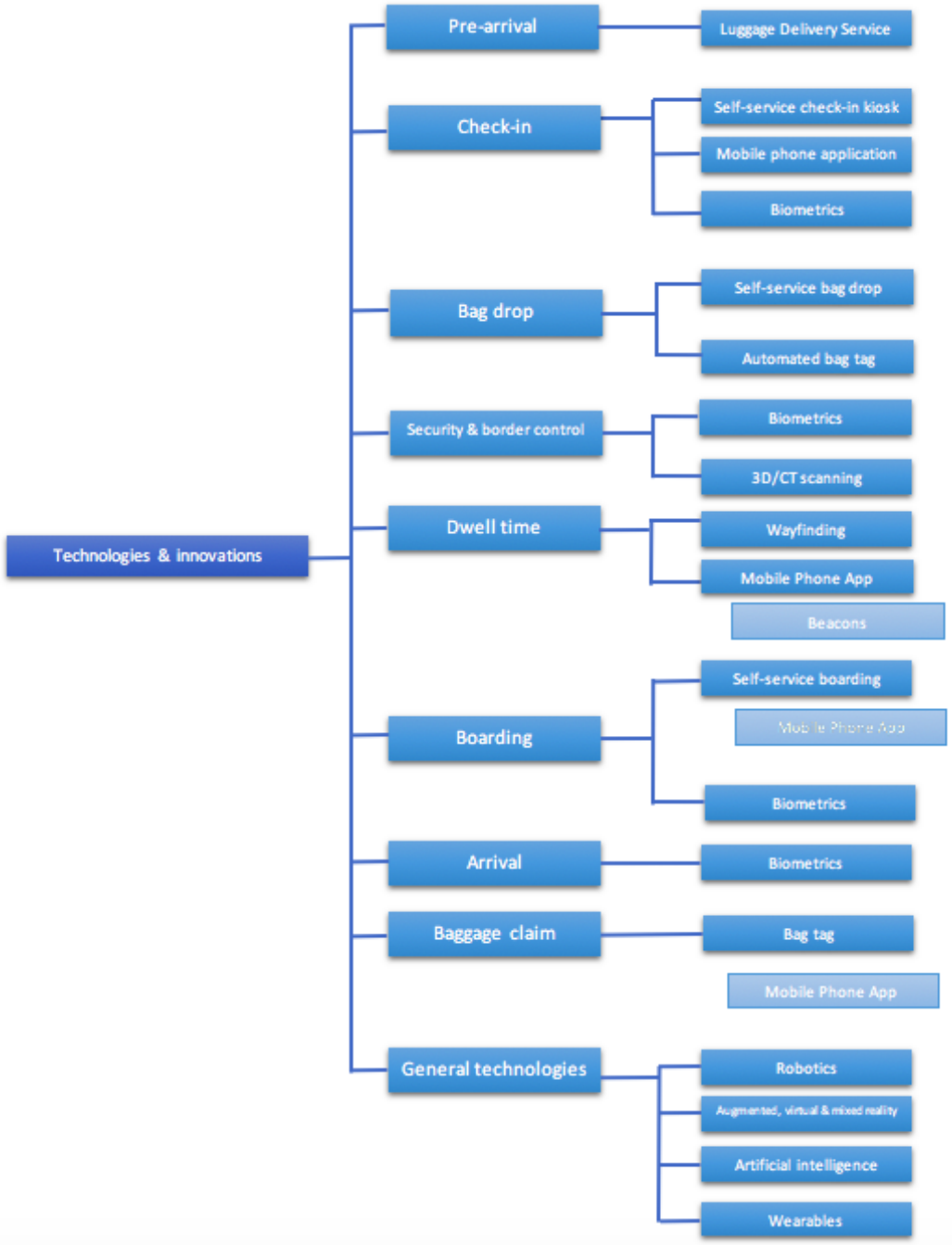
- Purpose: identify successful combinations of technologies to achieve higher passenger experience
- How: by comparing the presence or absence of technologies and passenger satisfaction of different airports and identify patterns
- Results: demonstrate combinations of technologies that in a significant number of cases leads to a ‘high passenger satisfaction’ score or a ‘lower overall satisfaction’ score

Selection of cases:
22 airports (members of ACI/ASQ)

Selection of Independent variables:
Presence or absence of certain technology

QCA

Selection of dependent variable:
Airport Service Quality ACI

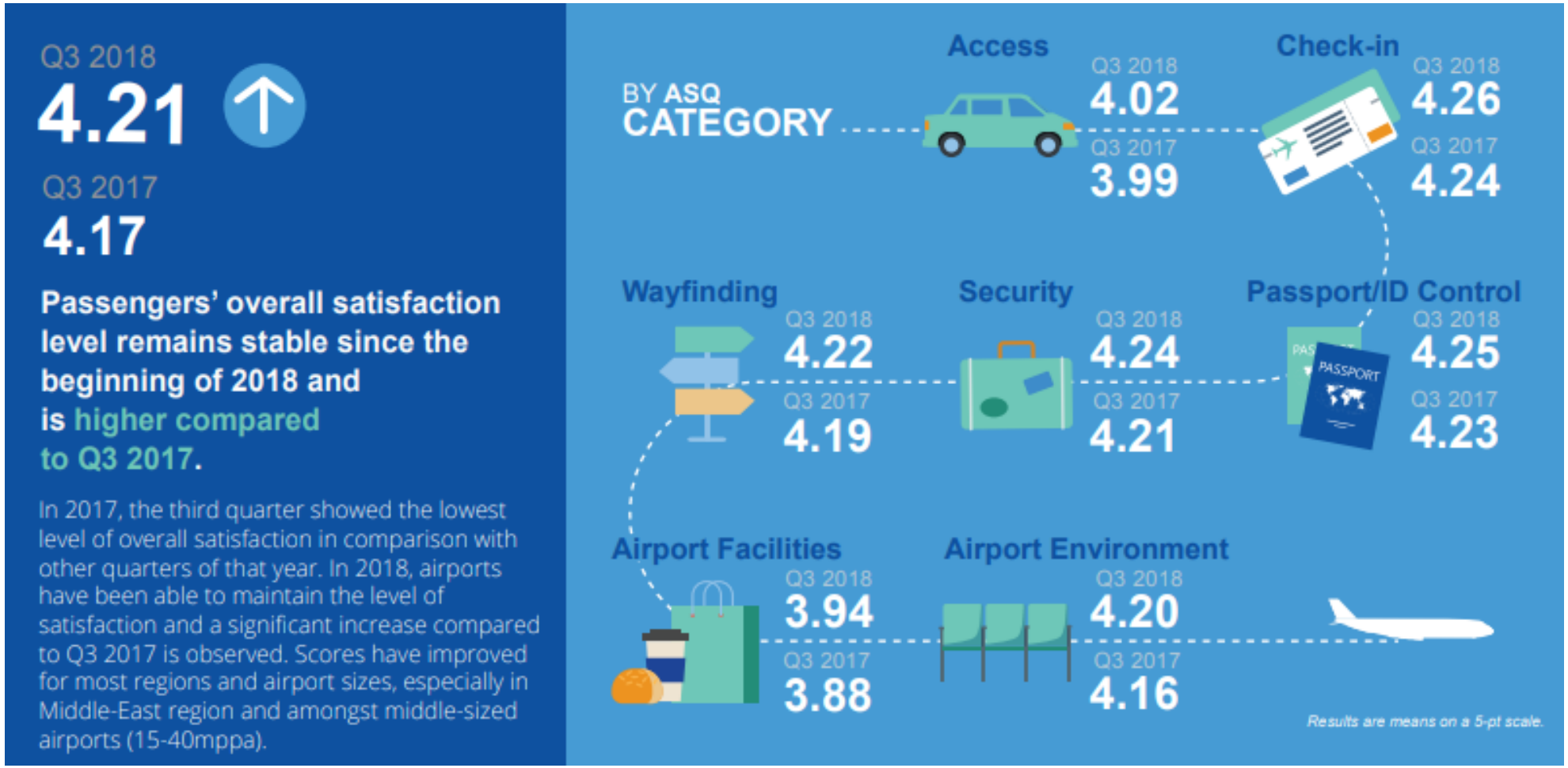


← *future trends and technologies*

Selected technologies (conditions):

- Self-service boarding
- Beacons
- Augmented reality
- Chatbots
- Food ordering

AIRPORT SERVICE QUALITY (ASQ) ACI



Source: ACI (2018)

QUALITATIVE COMPARATIVE ANALYSIS

HOW TO PERFORM QCA?

- **Necessity analysis**
  - Consistency measures if a certain condition is necessary for the outcome to occur (threshold is 0,90)
- **Sufficiency analysis**
  - Consistency measures the percentage of cases with a specific combination of conditions that leads to a certain outcome

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HIGH OVERALL SATISFACTION

Conditions/solution terms	Presence of outcome: high overall satisfaction Solution 1	Presence of outcome: high overall satisfaction Solution 2
Self-boarding	●	•
Augmented reality	●	
Chatbot		
Beacons		•
Food Ordering	○	•
Individual consistency	1,00	1,00
Coverage raw	0,38	0,50
Coverage (unique)	0,38	0,50
Number of cases	3	4
Overall Consistency/Coverage	1,00/0,38	1,00/0,50

Large circle: core conditions – Small circle: peripheral condition
Black circle: presence of condition – White circle: absence of condition

First solution:

- 38% of the cases with 'high overall satisfaction' have this successful combination

Second solution:

- 50% of the cases with 'high overall satisfaction' have the second successful combination

- Self-boarding appears in both solutions
- Augmented reality, beacons and food ordering
- Chatbot does not appear in any solution

LOWER OVERALL SATISFACTION

Conditions/solution terms	Absence of outcome: lower overall satisfaction Solution 1	Absence of outcome: lower overall satisfaction Solution 2
Self-boarding		
Augmented reality	●	○
Chatbot	●	○
Beacons		○
Food Ordering	●	
Individual consistency	1,00	1,00
Coverage raw	0,73	0,45
Coverage (unique)	0	0
Number of cases	8	5
Overall Consistency/Coverage	1,00/0,73	1,00/0,45

Large circle: core conditions – Small circle: peripheral condition
Black circle: presence of condition – White circle: absence of condition

First solution:
- 73% of the cases with 'lower overall satisfaction' have this combination

Second solution:
- 45% of the cases with 'lower overall satisfaction' have the second combination

- Solutions not independent
- Core and peripheral solution
- Self-boarding not in solutions

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HIGHLIGHTS AND FURTHER RESEARCH

- Airport business models developed over time with increasing focus on customer satisfaction
- Different combinations of technologies influence the overall satisfaction positively or negatively
- None of the technologies analysed is necessary to achieve a certain outcome (‘high overall satisfaction’ or ‘lower overall satisfaction’)
- Results match the findings in the literature
- Further research
  - Analyse link between technologies and passenger satisfaction by passenger type or age groups
  - Broaden dataset (cases) for analysis
  - Analyse link with data of different years

What technology will influence passenger satisfaction most in the future?

Poll locked. Responses not accepted.

Sources

- ACI (2018), ASQ Barometer Q3 2018, online retrieved on 04/12/2018 from https://aci.aero/wp-content/uploads/2018/10/ACI-ASQ_Barometer_Q3-2018-VF.pdf
- Bogicevic, V., Bujisic, M., Bilgihan, A., Yang, W., Cobanoglu, C., & , . (2017). The impact of traveler-focused airport technology on traveler satisfaction. Technological Forecasting & Social Change, 351-361.
- Echevarne, R. (2013, January 23). Customer Service Seminar: Wayfinding. Online retrieved from ACI North America: https://www.aci-na.org/sites/default/files/wayfinding_presentation_-_echevarne.pdf
- Graham, A. (2014). Airport Service Quality. In A. Graham, Managing Airports an international perspective (pp. 173-187). London: Routledge.
- Sinibaldi, V. (2016, May 4). *Airport 3:0: How smart technologies are transforming air travel*. Online retrieved from CityMetric: https://www.citymetric.com/transport/airport-30-how-smart-technologies-are-transforming-air-travel-2008