airport consulting

Source: NEXTT

Digital Identity Management to Enhance the Passenger Experience at Future Airports

Summary of a Research Study

Hamburg, April 2019

by Torsten Hentschel & Nils Brüggemann, TH Airport Consulting

RWTH Aachen University cooperates with TH Airport Consulting

Research Study on DIM and Passenger Experience

Master Thesis by **Nils Brüggemann:**

- Business Administration and Engineering (Civil Engineering), RWTH Aachen University, Aachen
- Supervised by TH Airport Consulting

TH Airport Consulting

- **Independent Consultancy**: Passenger Experience, Airport Processes, Terminal Planning and Aviation Security
- **Pioneer in Passenger Experience**: ACI EUROPE Theme Leader Passenger Experience, Contributor to Guidelines for Passenger Services at European Airports
- Continuous work and research on the Passenger Experience

Problem statement

airport consulting

The aviation industry is under pressure due to:

- Growing passenger numbers
- Increased security threats
- Limited infrastructure capacities

Congestions at passenger touchpoints

- Increased security measures against threats require reliable passenger identification
- Inefficiencies along passenger journey (repetitive manual identity checks)
- Airports trial and implement DIM to improve Security, Operations and Passenger Experience

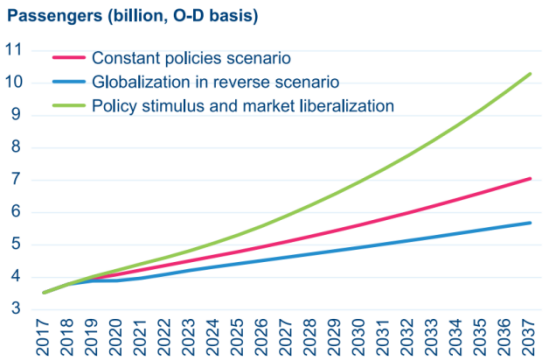
Innovative concepts for efficient passenger identification are being developed to:

- Meet passenger demand
- Ensure secure & efficient operation
- **Enhance Passenger Experience**

?

Can Passenger Experience really be enhanced with digital identity management (DIM)?

How should DIM be implemented?



Source: IATA

Vision of Digital Identity Management

All concepts follow the vision of:

- Dispensing with the obligation for passengers to repetitively authenticate at every touchpoint of the airport journey by presenting physical passports and boarding passes
- An identification using biometric facial recognition in order to verify and authenticate the passenger's identity
- A more secure and seamless travel journey through DIM

Source: Rockwell Collins

Digital identity management (DIM) as one approach

Digital identity management solutions “can break the traditional paradigm where security and passenger facilitation come at the expense of one another, allowing both to be enhanced simultaneously” (IATA 2018)

Different concepts:

IATA

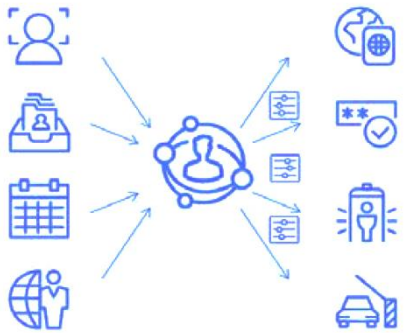
One ID

creating a single travel token

WEF*

The Known Traveller

establishing a known traveller status



Open ID Exchange

Identity as a service

using governmental identity databases

* WEF: World Economic Forum

Passenger processes using DIM

airport consulting

Changes within the traditional passenger processes:

- Establishment of digital travel token (one-time or before every flight)
- Avoiding showing passport or boarding pass at every airport touchpoint
- Seamless and paperless biometric passenger identification
- Possibility of digital and secure passenger identification

Single travel token:

- Biographic & biometric passenger data & flight information
- Identification and authorization just by biometric face recognition
- No passport & boarding pass

Source: SITA

Passenger Experience

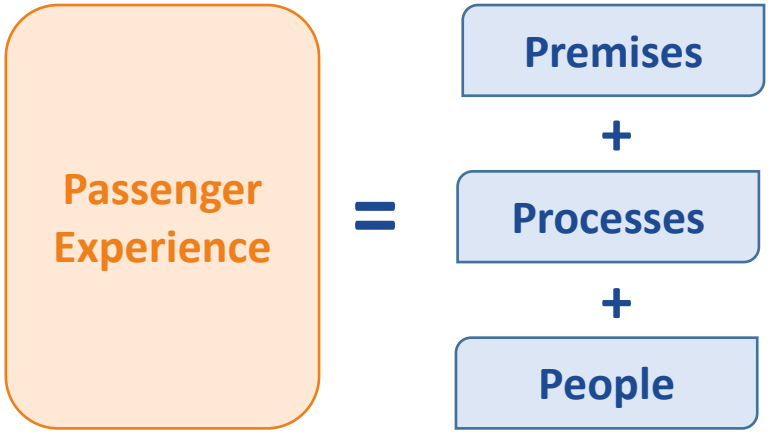
airport consulting

Satisfied passengers …

- spend more time and money at the airport
- recommend the airport to others and share their positive experience via social media
- are loyal and likely to come back

Hence the Passenger Experience is a main factor for airports to differentiate in a competing environment

3P Approach



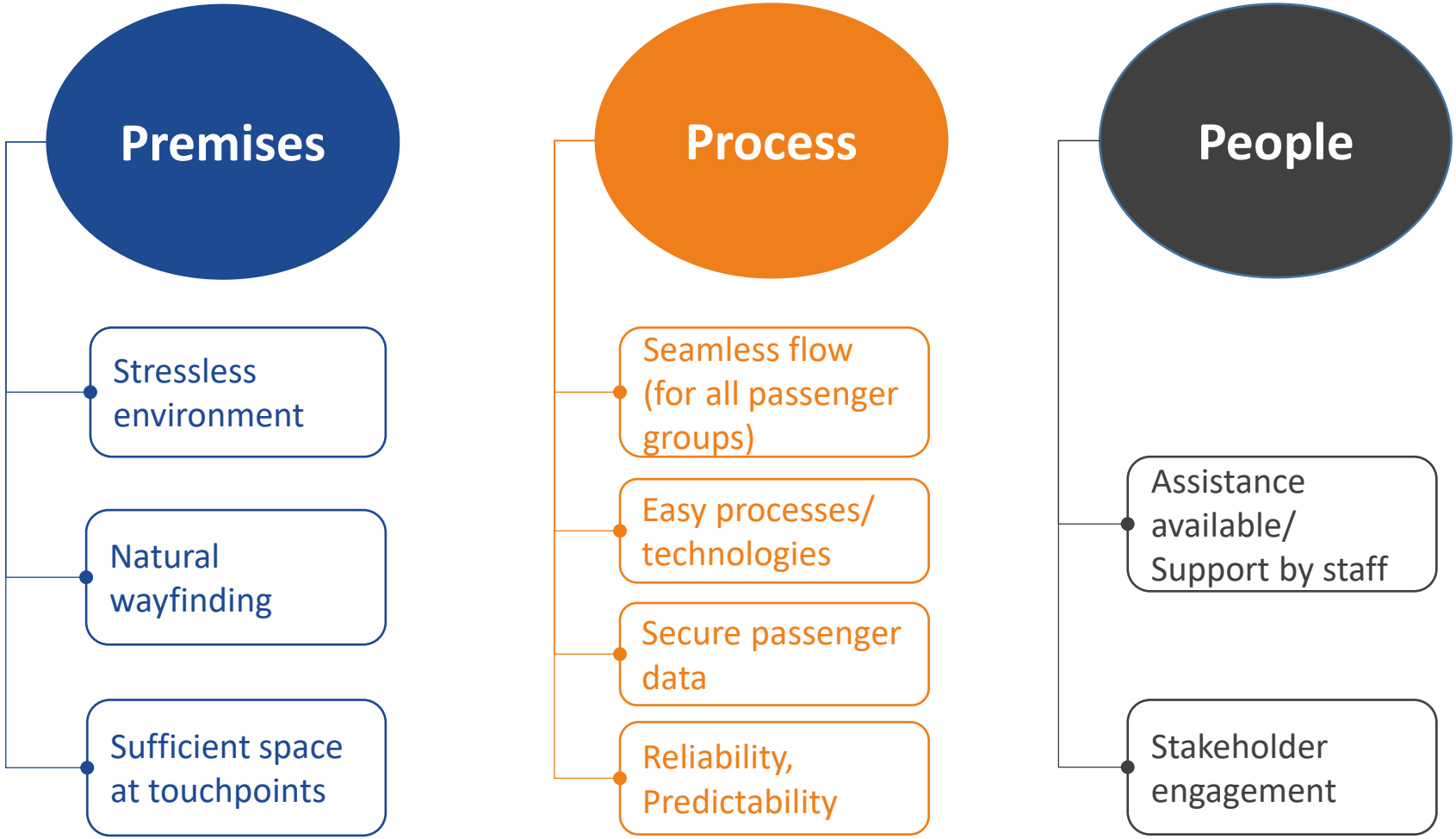
The design of the **premises** needs to be functional, but also needs to appeal to the passenger and provide good ambience.

The **processes** at the airport must run smoothly, avoiding unnecessary steps along the way and be predictable without major negative surprises.

Service is always provided by **people** to other people.

Objectives of DIM to enhance Passenger Experience

airport consulting



Research Methodology

airport consulting

Analysis of the impacts of digital identity management on the Passenger Experience

Theoretical Research

Scientific research on DIM and Passenger Experience

Definition of Hypotheses (H1- H9)

(Possible effects of DIM on Passenger Experience)

All hypotheses (mainly H3-H9) were evaluated by

Waiting and process time (H1+H2) were evaluated by

Expert Interviews

- International Experts from:
  - Airports,
  - Airlines,
  - Governments,
  - Aviation organizations
  - Technology providers

Terminal Simulation

- Generic terminal model
- Simulation of processes with and without DIM
- Effects of DIM on departure journey times

Recommendations on Implementation of DIM

Hypotheses of benefits of DIM

airport consulting

9 hypotheses of the impact of the key drivers on the passenger experience:

H1 DIM reduces waiting times	**H2** DIM reduces process times	**H3** DIM reduces number of processes
H4 DIM reduces process complexity	**H5** Assistance must be available	**H6** DIM must be reliable & contingency plans are needed
H7 DIM reduces stress levels	**H8** Data security can be guaranteed	**H9** All relevant stakeholders have to be involved

* The hypotheses in green boxes are confirmed in the thesis, while those in yellow boxes could not be directly confirmed.

Expert interviews and terminal simulation

The results of the thesis are based on 2 approaches: Expert Interview and Terminal Simulation

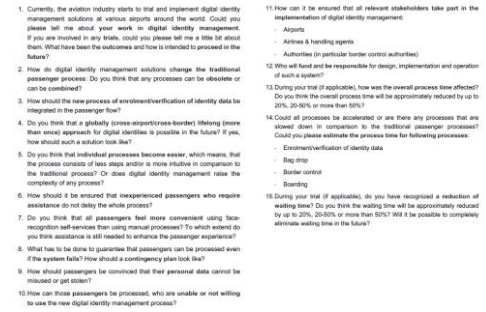
Expert Interviews

8 Interviews à 60 min

Interview Structure

- your work within digital identity management
- changes in the passenger process and the ease of the end-to-end process
- data security and the incorporation of all relevant stakeholder
- your personal opinion on the effects on process and waiting time.

Questionaire

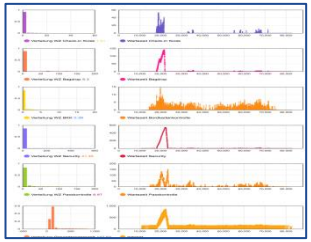


1. Currently, the aviation industry starts to trial and implement digital identity management solutions at various airports around the world. Could you please tell me about your work in digital identity management. If you are involved in any trials, could you please tell me a little bit about them. What have been the outcomes and how is intended to proceed in the future?
2. How do digital identity management solutions change the traditional passenger process: Do you think that any processes can be obsolete or can be combined?
3. How should the new process of enrolment/verification of identity data be integrated in the passenger flow?
4. Do you think that a globally (cross-airport/cross-border) lifelong (more than once) approach for digital identities is possible in the future? If yes, how should such a solution look like?
5. Do you think that individual processes become easier, which means, that the process consists of less steps and/or is more intuitive in comparison to the traditional process? Or does digital identity management raise the complexity of any process?
6. How should it be ensured that inexperienced passengers who require assistance do not delay the whole process?
7. Do you think that all passengers feel more convenient using face-recognition self-services than using manual processes? To which extend do you think assistance is still needed to enhance the passenger experience?
8. What has to be done to guarantee that passengers can be processed even if the system fails? How should a contingency plan look like?
9. How should passengers be convinced that their personal data cannot be misused or get stolen?
10. How can those passengers be processed, who are unable or not willing to use the new digital identity management process?
11. How can it be ensured that all relevant stakeholders take part in the implementation of digital identity management:
    - Airports
    - Airlines & handling agents
    - Authorities (in particular border control authorities)
12. Who will fund and be responsible for design, implementation and operation of such a system?
13. During your trial (if applicable), how was the overall process time affected? Do you think the overall process time will be approximately reduced by up to 20%, 20-50% or more than 50%?
14. Could all processes be accelerated or are there any processes that are slowed down in comparison to the traditional passenger processes? Could you please estimate the process time for following processes:
    - Enrolment/verification of identity data
    - Bag drop
    - Border control
    - Boarding
15. During your trial (if applicable), do you have recognized a reduction of waiting time? Do you think the waiting time will be approximately reduced by up to 20%, 20-50% or more than 50%? Will it be possible to completely eliminate waiting time in the future?

Result of the
Expert Interview

Terminal Simulation

Tool: Anylogic (Discrete event model)



ANOVA	Total process time			
	Initial model	Scenario a	Scenario b	Scenario c
Mean in [s]	1250.35	969.61	919.73	906.54
F	52.46323088			
p-value	1.76815E-18			

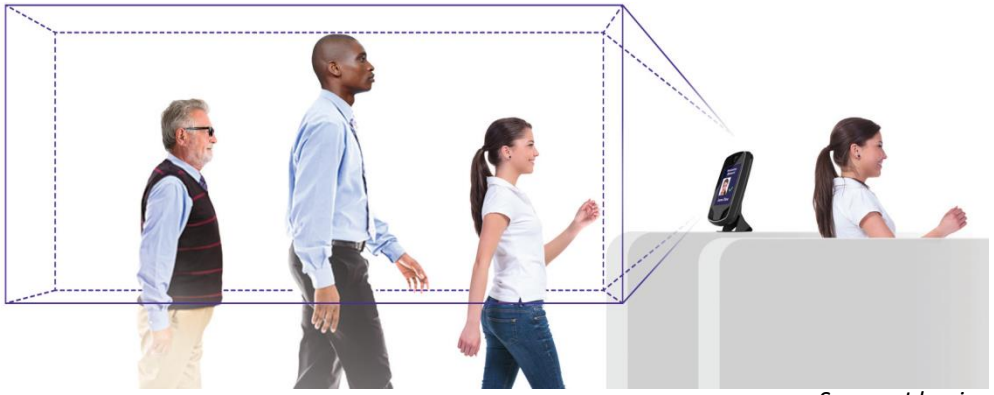
process time and waiting time
can be reduced in all simulated scenarios

Highlights of the research analysis

airport consulting

Process & waiting time:

- Digital identity management can be an opportunity to reduce waiting times and the overall journey time, but whether digital identity management leads to shorter waiting times is not a question of technology alone, but a consequence of economic decisions
- The extra process of establishing a token needs to be compensated along the journey
- The more processes are involved the more time can be reduced
- Process accelerations can only be achieved if besides a change of the identification technology further a change in data exchange and work flow management takes place



Source: Idemia

ANOVA	Total process time			
	Initial model	Scenario a	Scenario b	Scenario c
Mean in [s]	1250.35	969.61	919.73	906.54
F	52.46323088			
p-value	1.76815E-18			

Highlights of the research analysis

airport consulting

Number of different processes:

- Digital identity management allows combination of processes like boarding & border control or airside access & border control
- But this is not an automatic output of the implementation of digital identity management, rather such combinations require the collaboration of different stakeholders
- The registration for a digital identity should be one-time and permanently valid

Source: SITA

Highlights of the research analysis

Process Complexity:

- Passengers using biometric processes have a better passenger experience than those using traditional manual processes (SITA, 2017).
- Digital identity management and the use of biometric passenger recognition should have a positive impact on the simplicity and convenience of the processes and thus could reduce the complexity of the identification processes.
- However, digital identification needs to be easy for all passengers (incl. elderly travellers)


Source: ACI

Source: IER

Source: Vision-Box

Highlights of the research analysis

Required assistance:

- Human assistance is required in case of “no reads” and disruptions
- Some passengers may be helpless or overwhelmed by the use of digital identity management and the associated introduction of automated self-service processes and, therefore, require support. -> “Self-service does not mean no service!”
- Human assistance is required to prevent the passenger experience from being harmed

Source: ACI EUROPE

Highlights of the research analysis

airport consulting

Reliability of DIM:

- Processes need to be as reliable as possible for a good passenger experience
- Passengers need to be ensured by suitable methods that the process runs reliably in daily operations and that back-up processes are in place in the event of possible system failures
- As soon as DIM becomes a regular daily process and the capacity of the manual alternative process is subsequently reduced, detailed contingency plans must be in place

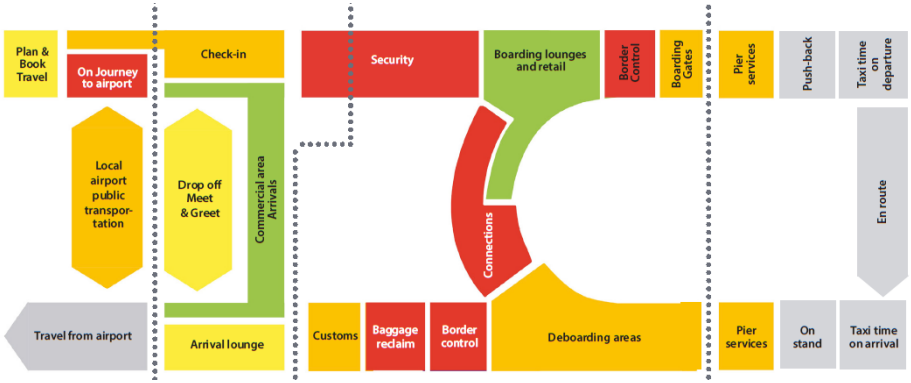
Source: Vision-Box

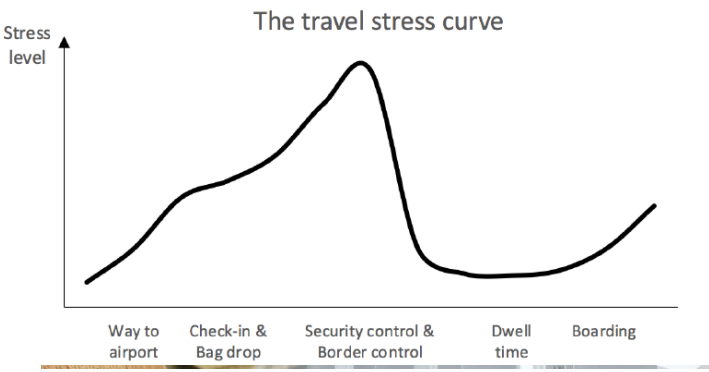

Source: SITA

Highlights of the research analysis

Stress level:

- A key aspect of the passenger experience is the stress experienced by passengers during their journey. Successful initiatives addressing the most stressful situations will have the highest positive impact on passengers
- The introduction of DIM may have a positive effect on the perceived stress level and thus the passenger experience should be enhanced.
- Less waiting and process time and a reduced process complexity leads to a lower stress level





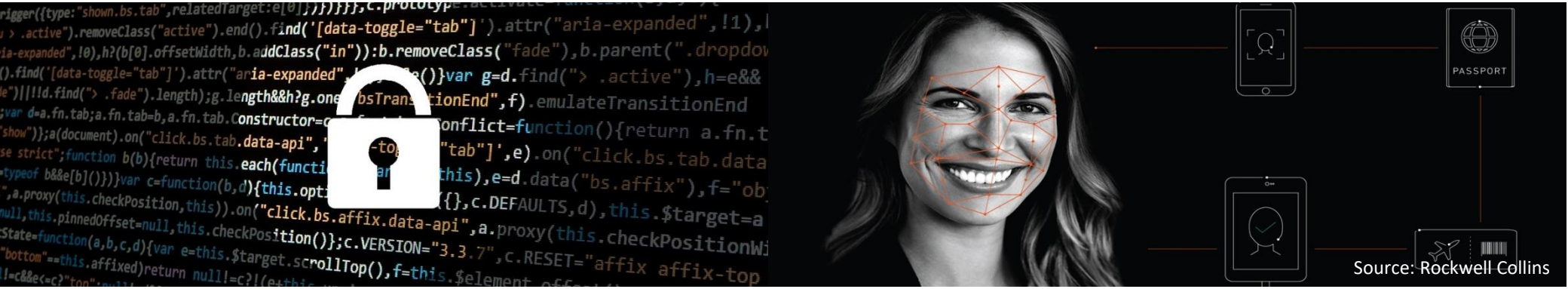
Source: ACI EUROPE

Highlights of the research analysis

airport consulting

Data security & privacy:

- It is important to gain the passenger's trust and to deal transparently with data handling and protection. The passenger should be clearly and transparently informed about data handling and protection in order to increase willingness to voluntarily participate in the digital identity management process.
- The parties involved should inform the passenger transparently about the storage of the data and the necessity of sharing personal data between the stakeholders.



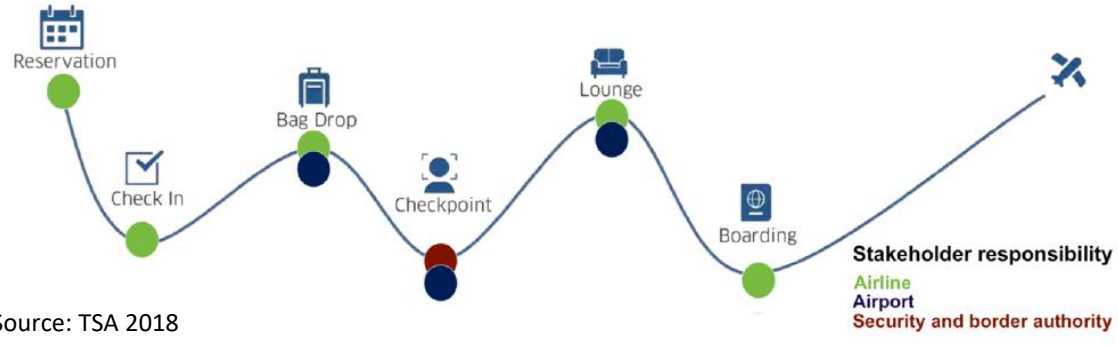
Source: Rockwell Collins

Highlights of the research analysis

airport consulting

Stakeholder engagement:

- Only if all relevant stakeholder participate in the process of implementation and use of digital identity management can the benefits be achieved and can the vision of an end-to-end seamless journey using DIM be fulfilled.
- If all stakeholders agree on a joint solution for passenger identification and the sharing of passenger data, i.e. creating a trusted framework between stakeholders, the repetitive identification with physical documents could be eliminated.



Source: TSA 2018

Source: WEF

Case study: Aruba Happy Flow

airport consulting

Involved Stakeholders:

- Airport, Authorities, Airline (KLM)

Biometric enrolment:

- Check-in kiosk (passport, boarding pass, face scan)

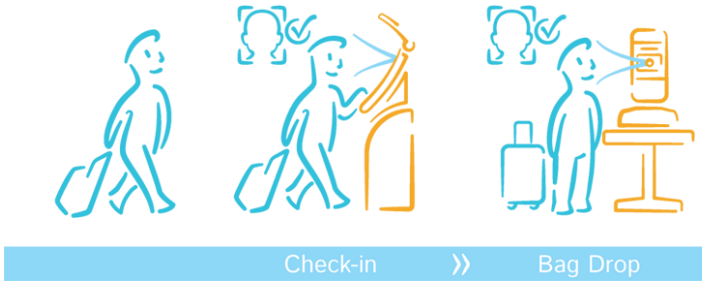
Included Processes:

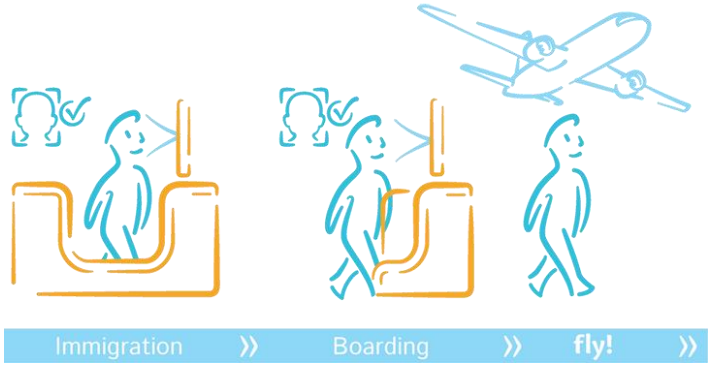
- Bag-drop, border control, boarding

Benefits:

- Combination of airside access and border control
- Better and earlier information about the passengers arriving at the airport
- The passenger enjoys being in control and moving through the process easy and fast

Aruba HappyFlow
secure, quick, easy.





Source: Aruba Happy Flow

Case study: Digi Yatra

airport consulting

Involved Stakeholders:

- Airport, Government of India, Airlines

Biometric enrolment:

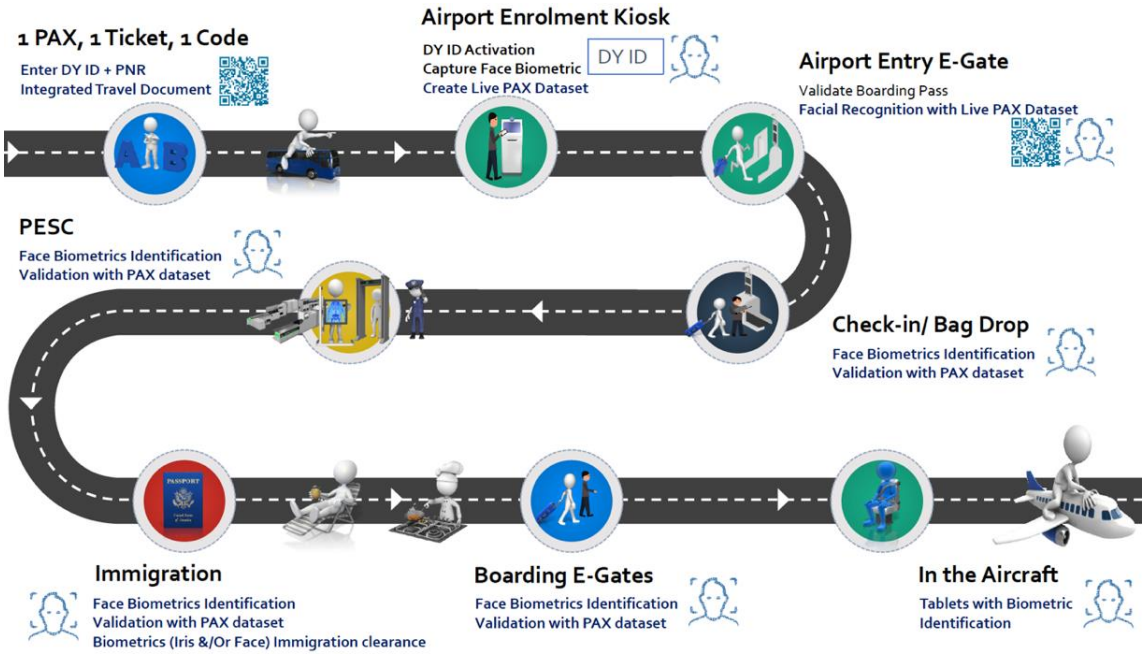
- Indian Identity Aadhaar (nationwide central database), kiosk or online

Included Processes:

- End-to-end passenger journey

Benefits:

- Nationwide solution for all Indian airports
- Digital identity is stored centrally and passengers have to register only once
- Minimum human intervention & less queuing time



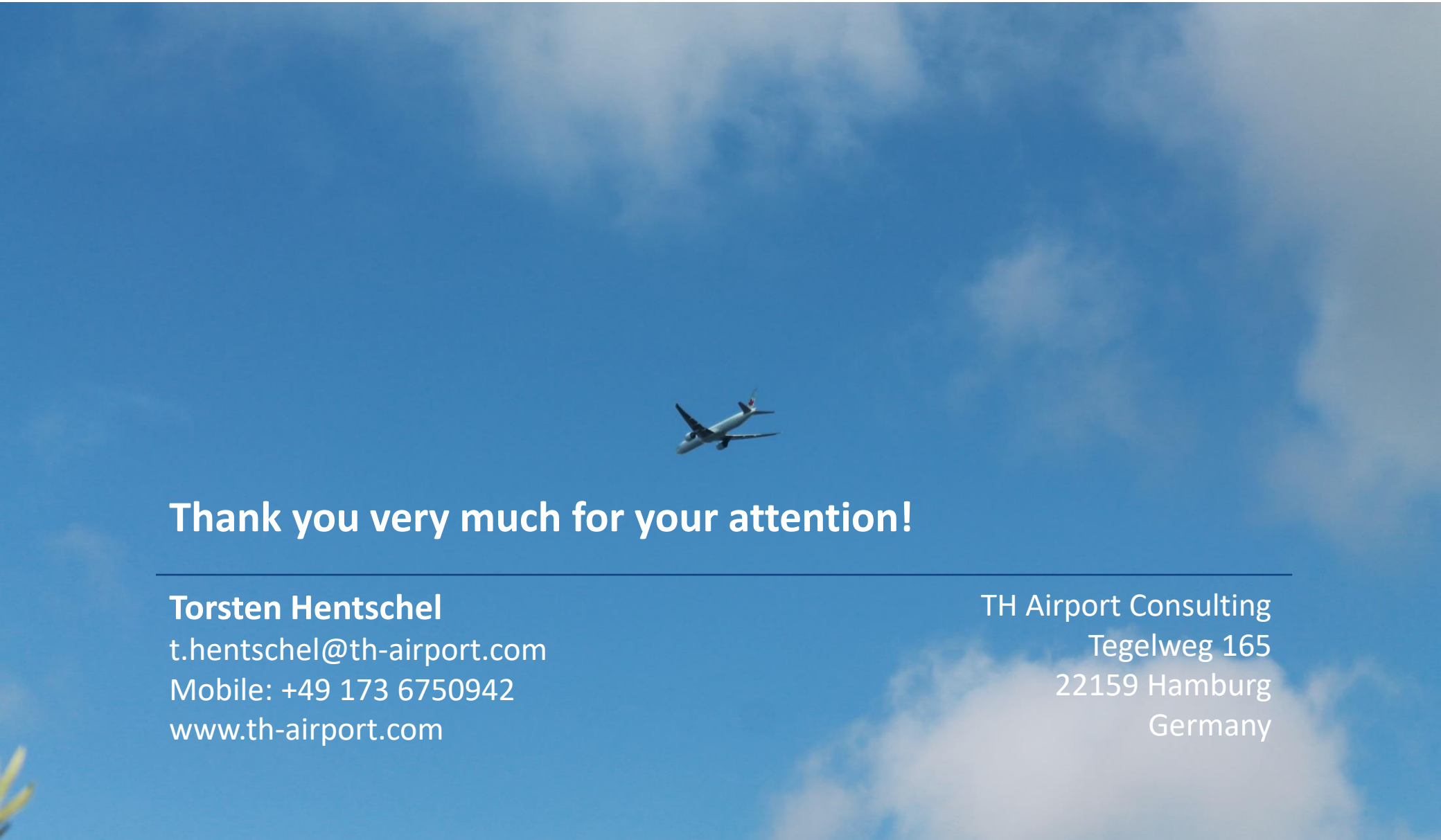
Sources: Government of India, BIAL Bangaluru Airport

Recommendations

Conclusions and Recommendations

- DIM has the potential to enhance the passenger experience if all stakeholders are open to innovation and change and actively shape the implementation of these changes within the future passenger processes
- DIM needs to be implemented for as many process steps as possible to unfold its full potential and to enable passengers to leave passport and boarding pass in their pockets
- The aspects of data security, privacy and process reliability are of particular importance: Passengers must be convinced that processes run secure and reliably in daily operations

Source: WEF



Thank you very much for your attention!

Torsten Hentschel
t.hentschel@th-airport.com
Mobile: +49 173 6750942
www.th-airport.com

TH Airport Consulting
Tegelweg 165
22159 Hamburg
Germany