

# The Rise of the Smart Passenger I: Analysis of impact on Departing Passenger Flow in Airports

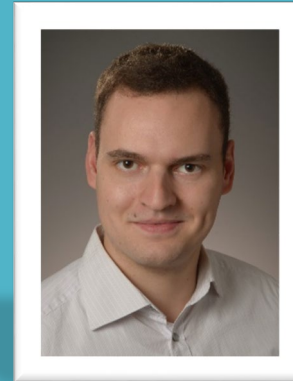
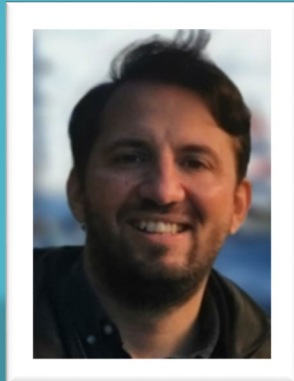
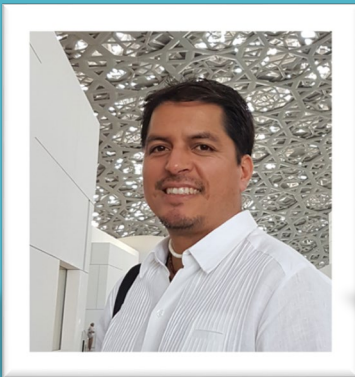
## Authors:

Miguel Mujica Mota. Aviation Academy, Amsterdam University of Applied Sciences

Paolo Scala. Amsterdam School of International Business, Amsterdam U.of Applied Sciences

Michael Schultz, Daniel Lubig, Mingchuan Luo, TU Dresden, Germany

Edgar Jimenez Perez , Centre for Air Transport Management, Cranfield University, UK



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Introduction

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Concept

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Case Studies

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Results and Future Work

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# Agenda

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# Pre-Covid Time

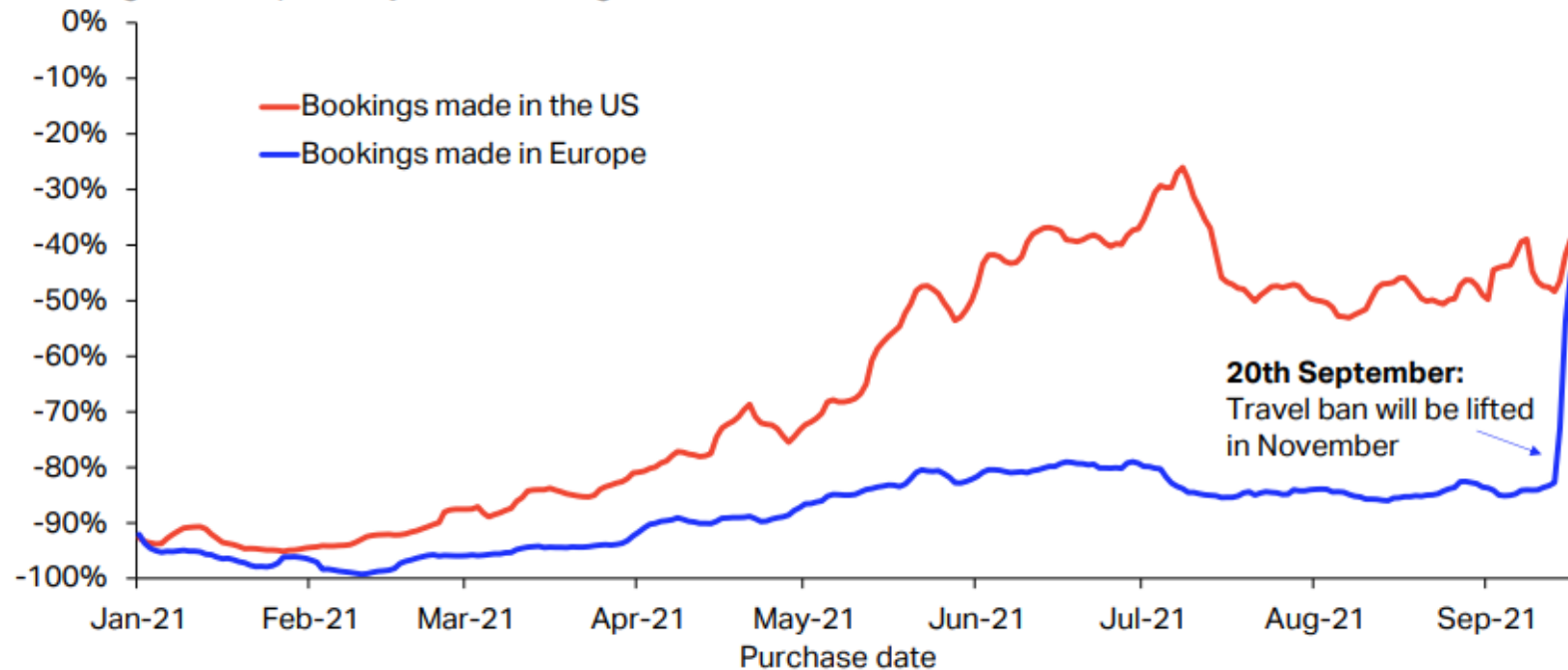
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# Covid 19 Impacts | Traffic Slowdown

There is a substantial pent-up demand for travel  
US-Europe reopening followed by surge in bookings

Bookings US-Europe, 7-day MA in % change vs 2019



Source: IATA Economics using data from DDS



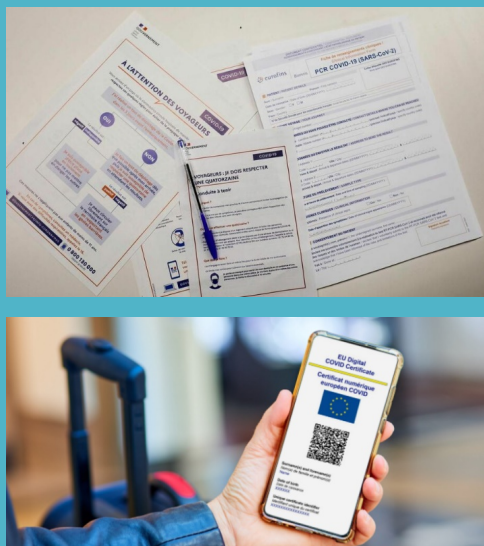
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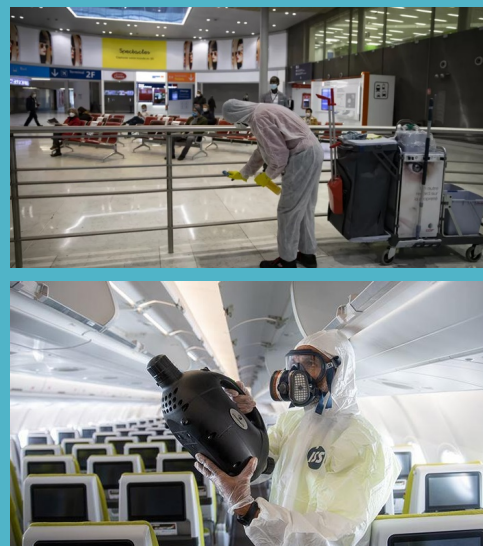
Social distancing



Additional health documentation verifications



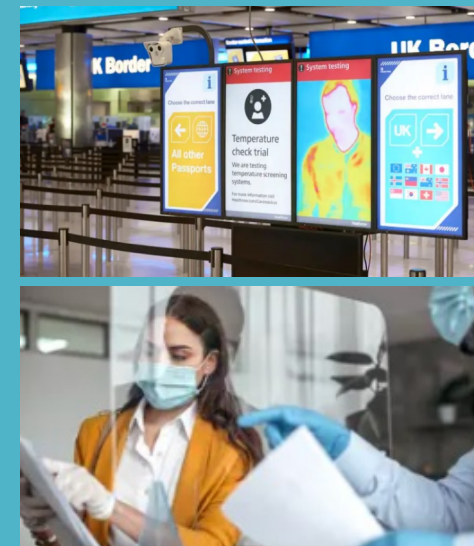
Reinforced cleaning procedures



Testing centers



Temperature checks



# Terminal Operations During the Pandemic

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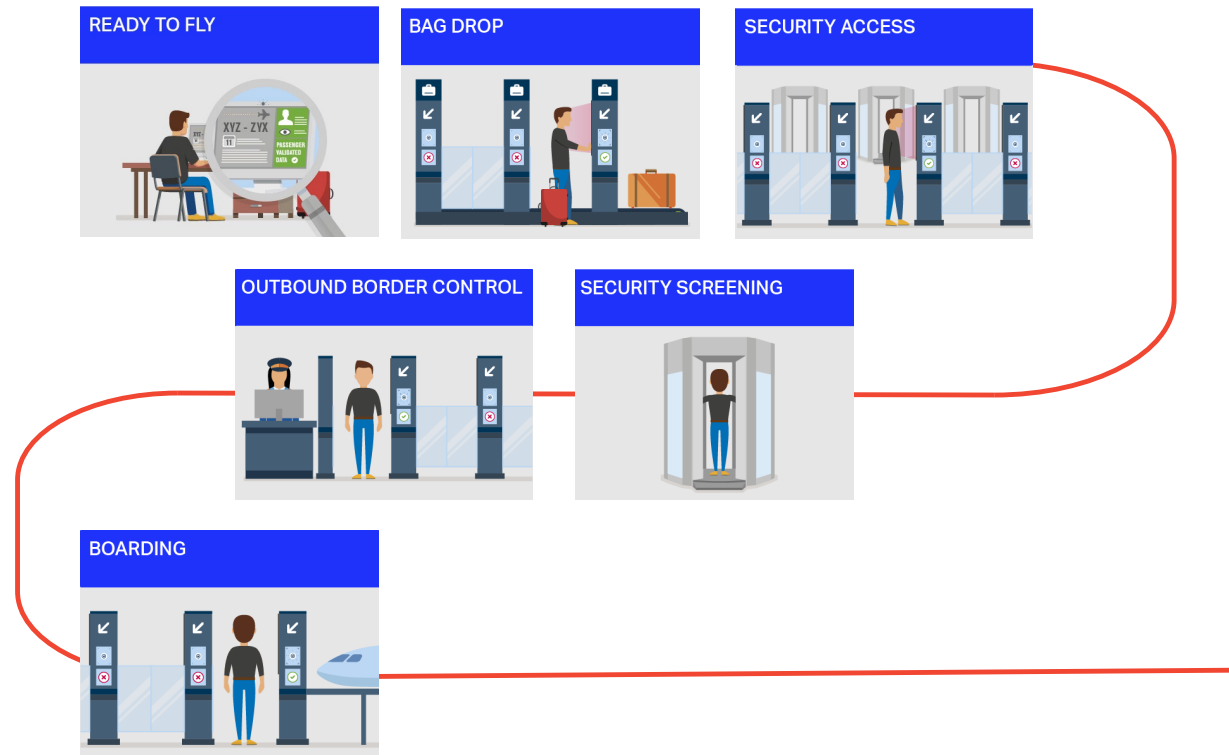




# The 'Smart' Passenger

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# The 'Smart' Passenger

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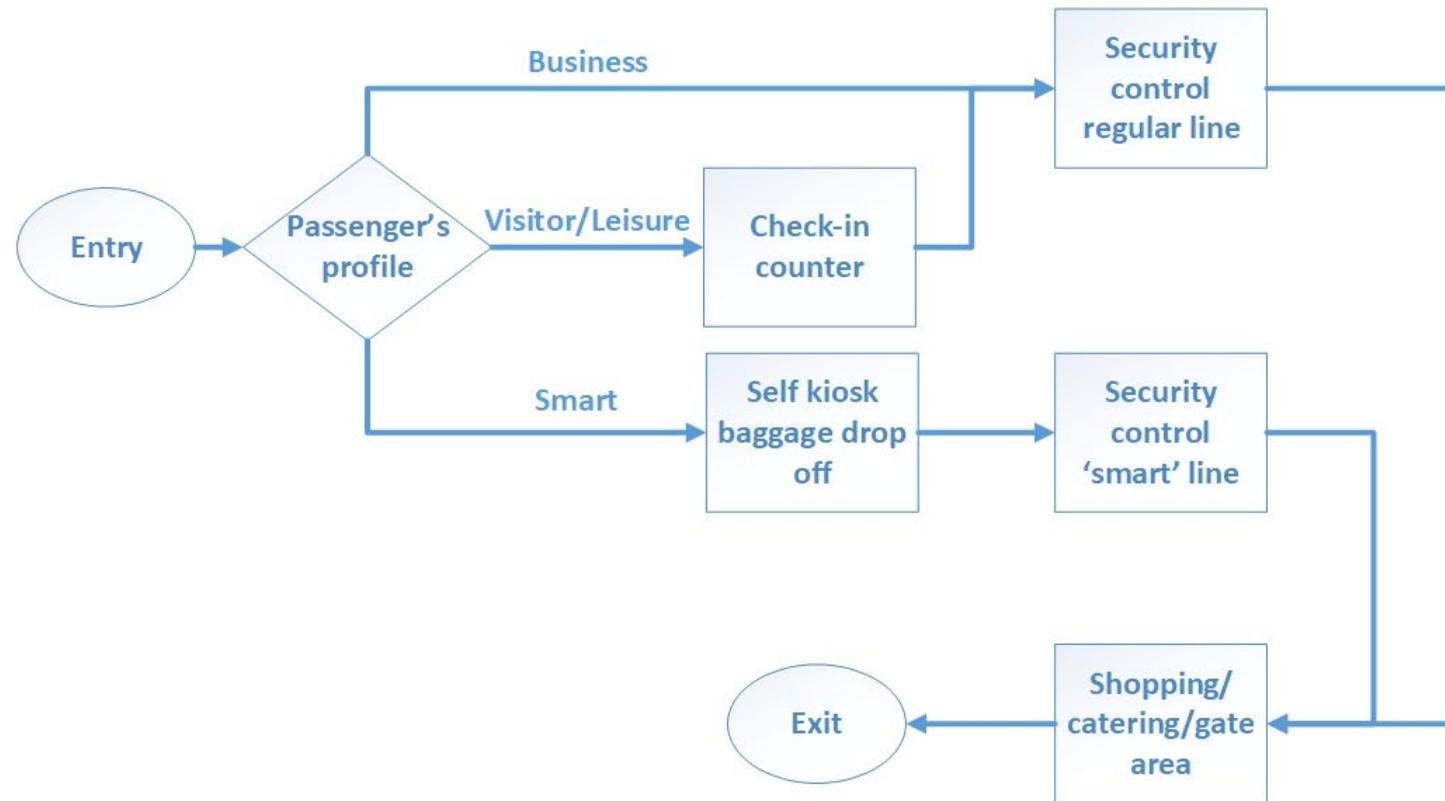




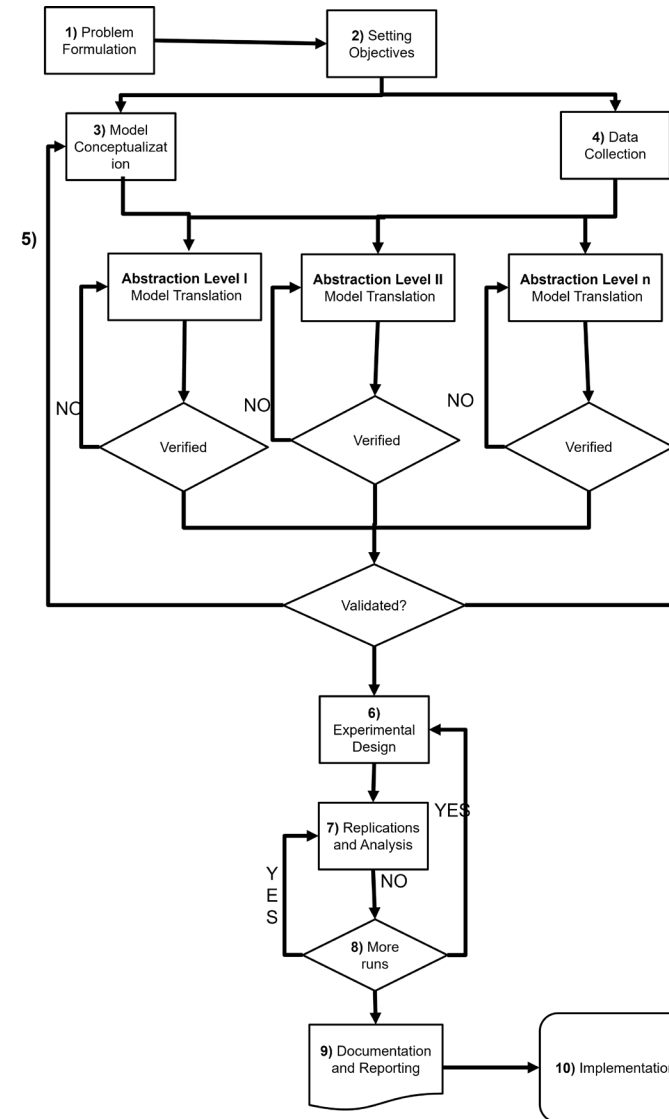
TABLE I. PASSENGERS PROFILE CHARACTERISTICS

| Passenger profile | Groups    | Walking speed (m/s) | Bags to check in | Items for security screening | Propensity to shop/eat |
|-------------------|-----------|---------------------|------------------|------------------------------|------------------------|
| Business          | no        | 1.5                 | 0                | 1                            | low                    |
| Visitor           | yes (1-2) | 1                   | 1-2              | 1                            | low                    |
| Leisure           | yes (1-4) | 1                   | 1-4              | 1                            | low                    |
| Smart             | no        | 1.5                 | 1-2              | 0                            | high                   |

## Departure passengers' itinerary



# Methodology



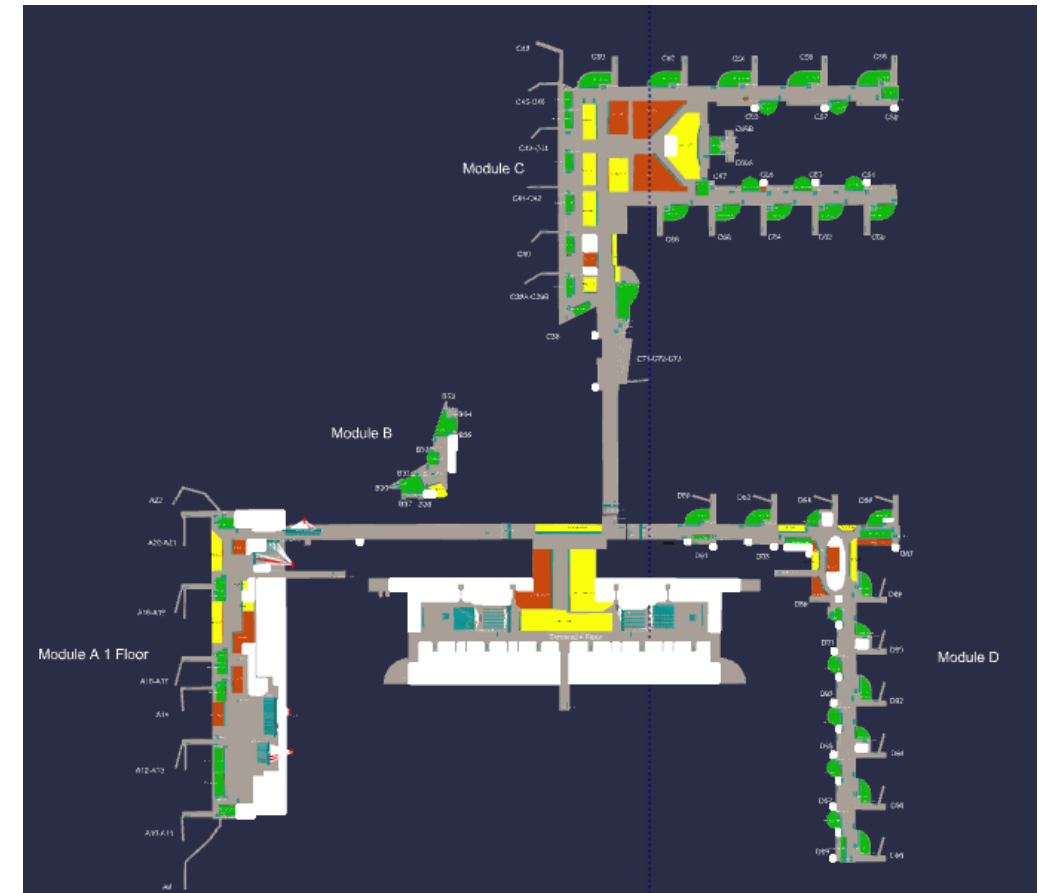
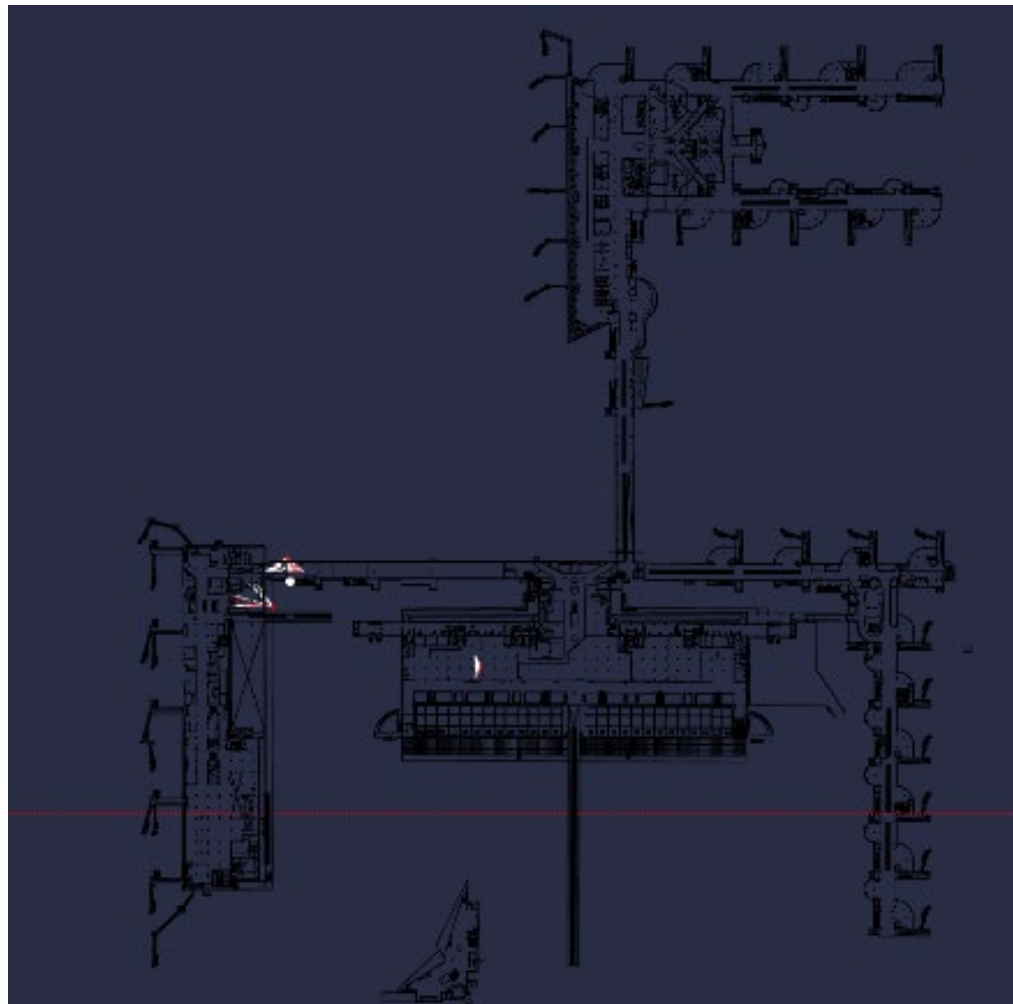


# Case Studies: PMI



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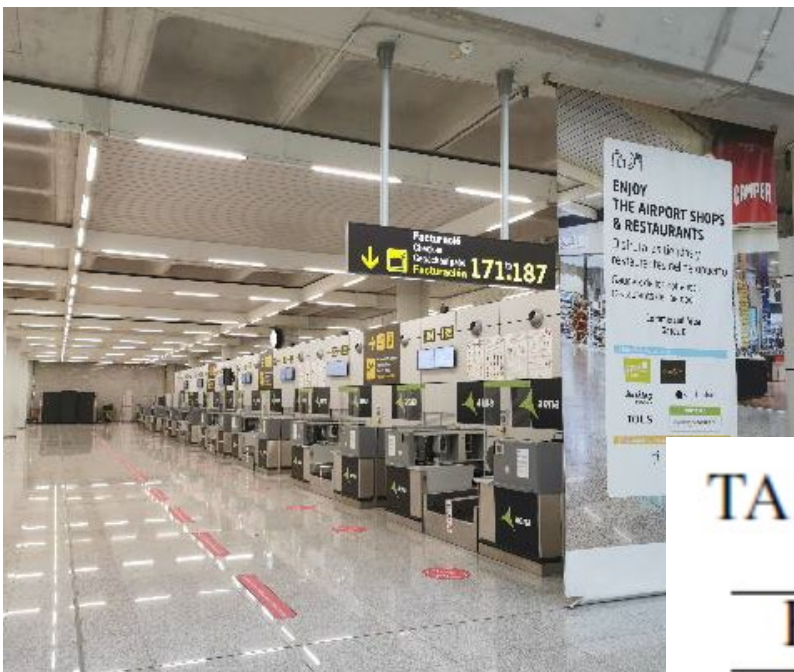


TABLE V. CASE STUDY 1 FACILITIES

| Facility              | Amount |
|-----------------------|--------|
| Check-in counters     | 204    |
| Boarding pass readers | 40     |
| Security lines        | 19     |
| Gates                 | 75     |

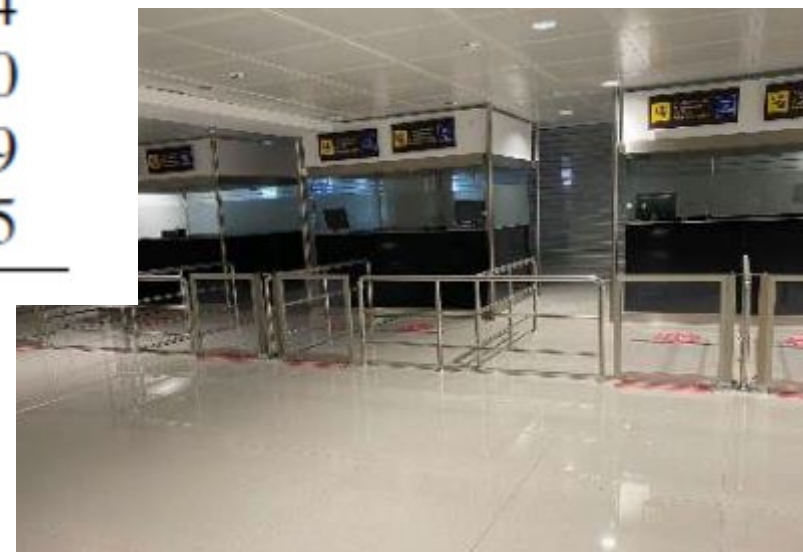
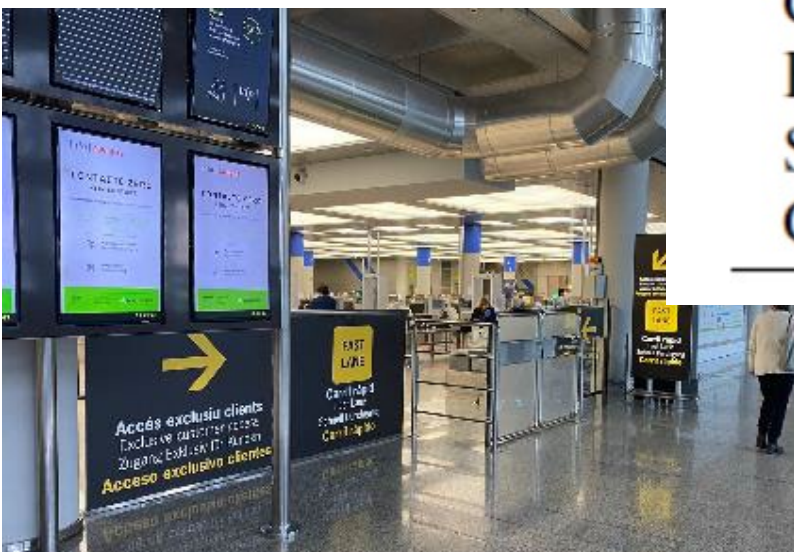


TABLE III. SCENARIOS EXPERIMENTED

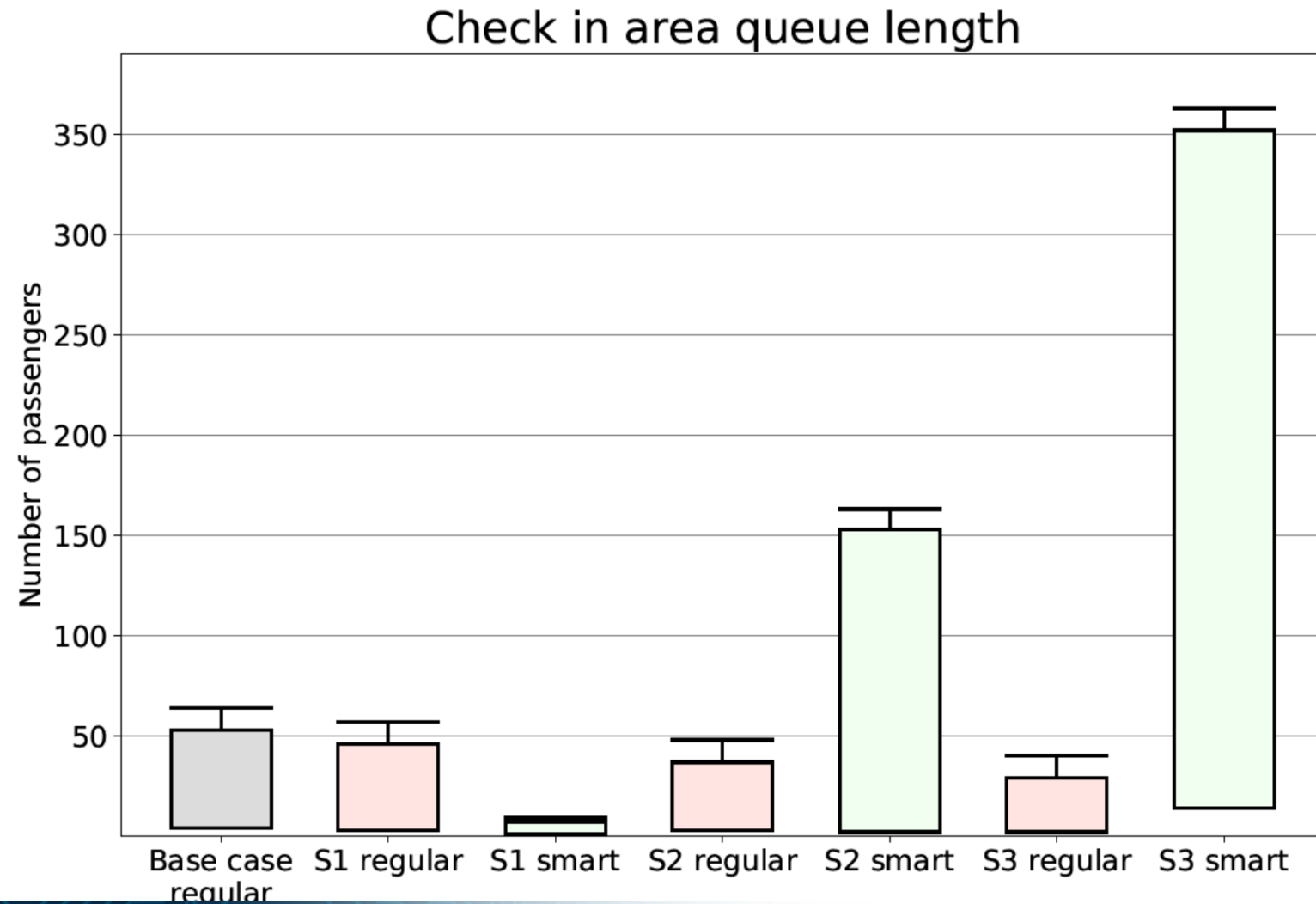
| Scenario        | Share of <i>smart passengers</i> |
|-----------------|----------------------------------|
| Base case       | 0%                               |
| Scenario 1 (S1) | 10%                              |
| Scenario 2 (S2) | 20%                              |
| Scenario 3 (S3) | 30%                              |

TABLE IV. CASE STUDY 1 PASSENGER PROFILES

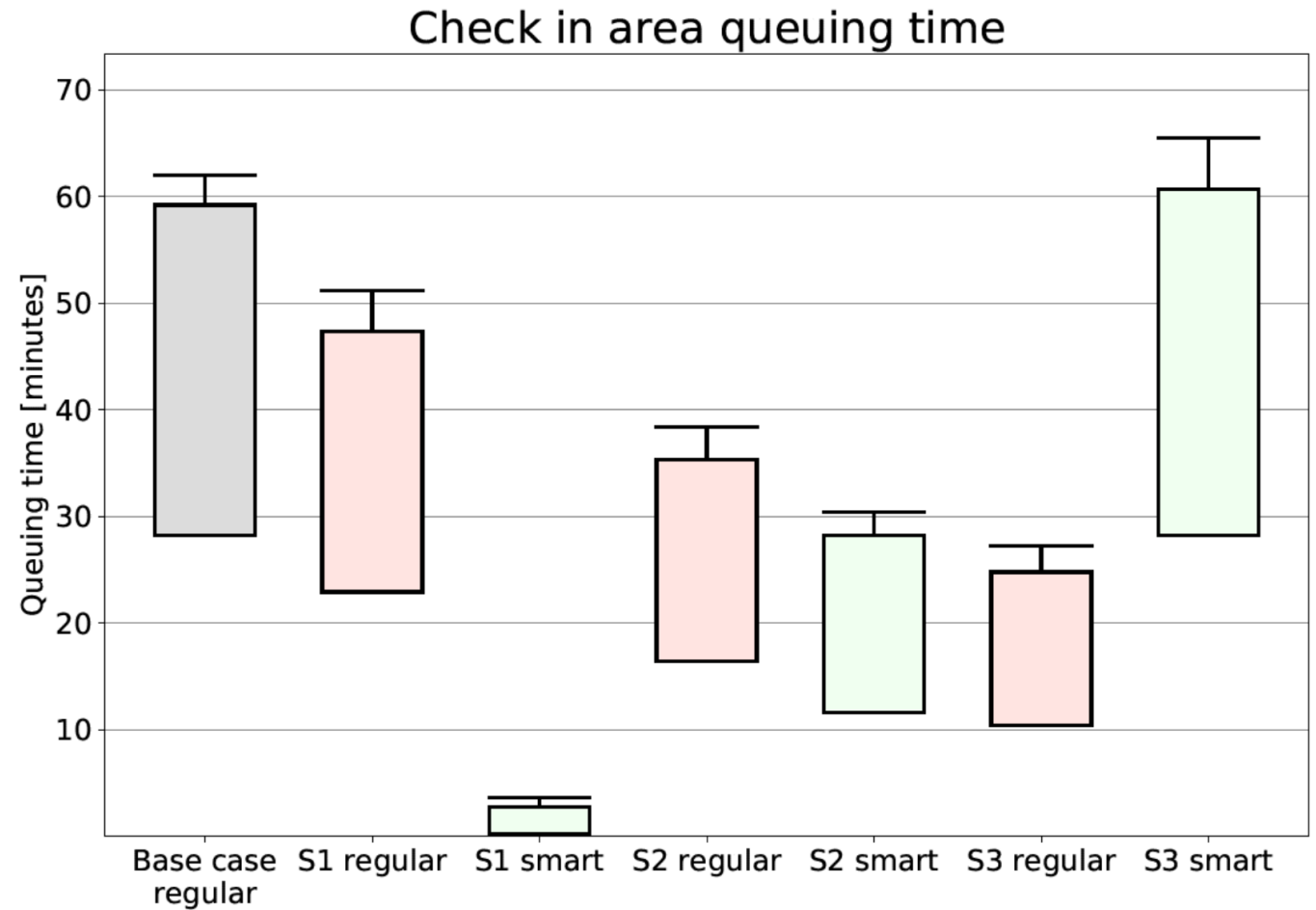
| Passenger profile | Base case | S1  | S2  | S3  |
|-------------------|-----------|-----|-----|-----|
| Business          | 10%       | 9%  | 8%  | 7%  |
| Visitor           | 15%       | 13% | 12% | 10% |
| Leisure           | 75%       | 68% | 60% | 53% |
| Smart             | 0%        | 10% | 20% | 30% |

# Experimental Design

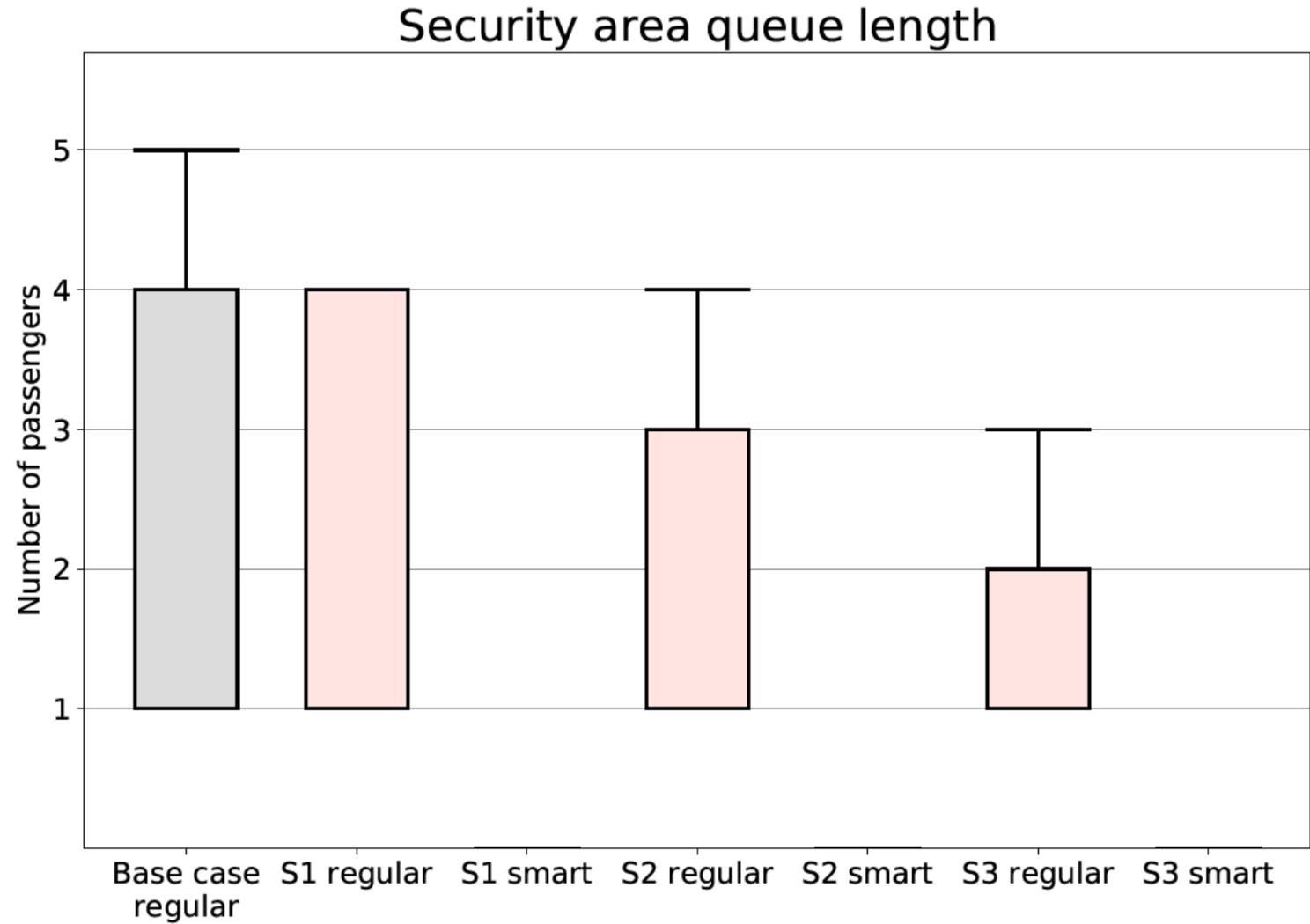
# Results PMI (Queue Length)



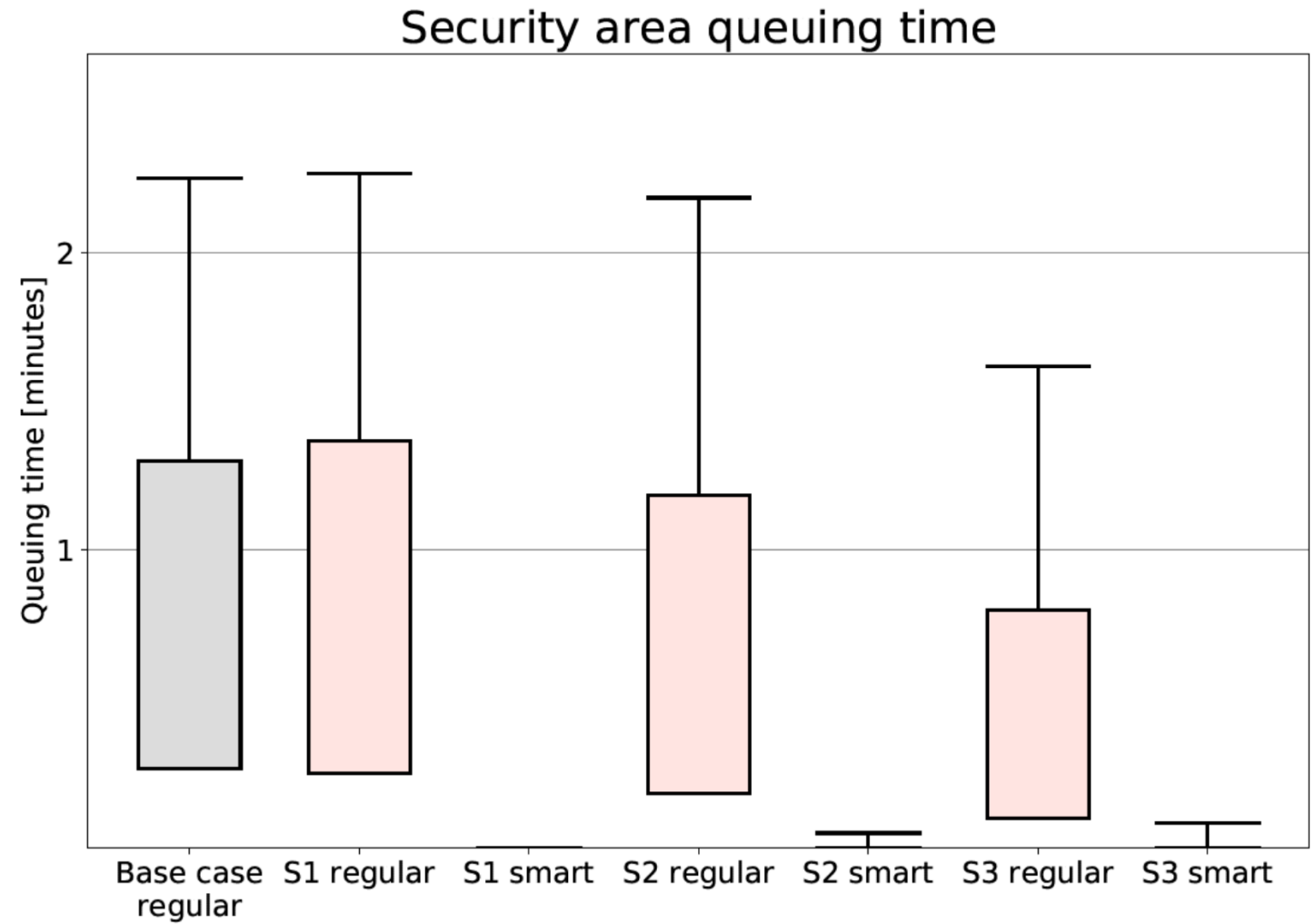
# Results PMI (Queuing Time)



# Results PMI (Security Queue Length)



# Results PMI (Security Queuing Time)



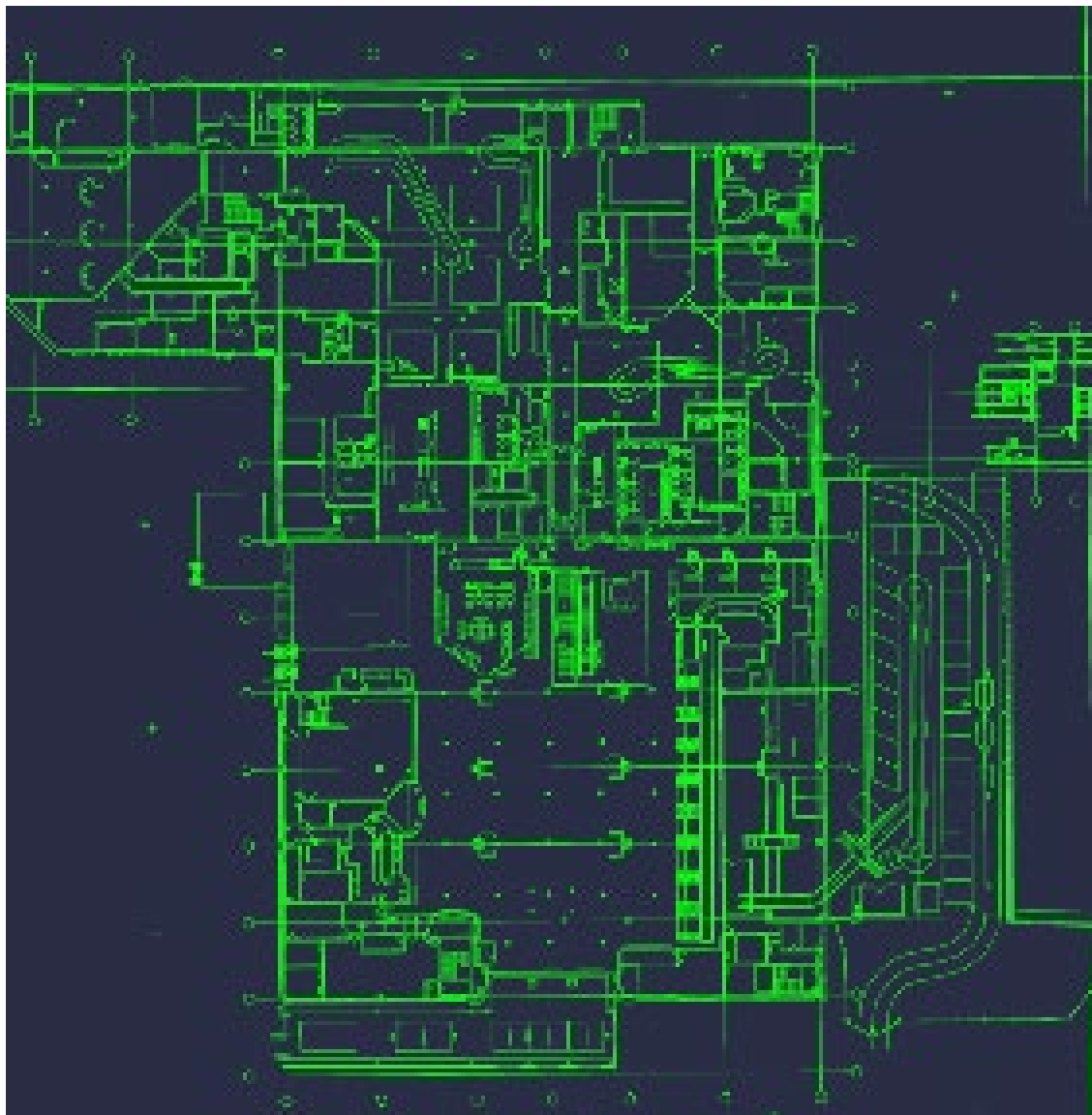


# Case Studies: LCY



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TABLE VIII. CASE STUDY 2 FACILITIES

| Facility              | Amount |
|-----------------------|--------|
| Check-in counters     | 19     |
| Boarding pass readers | 8      |
| Security lines        | 6      |
| Gates                 | 15     |



# Experimental Design LCY

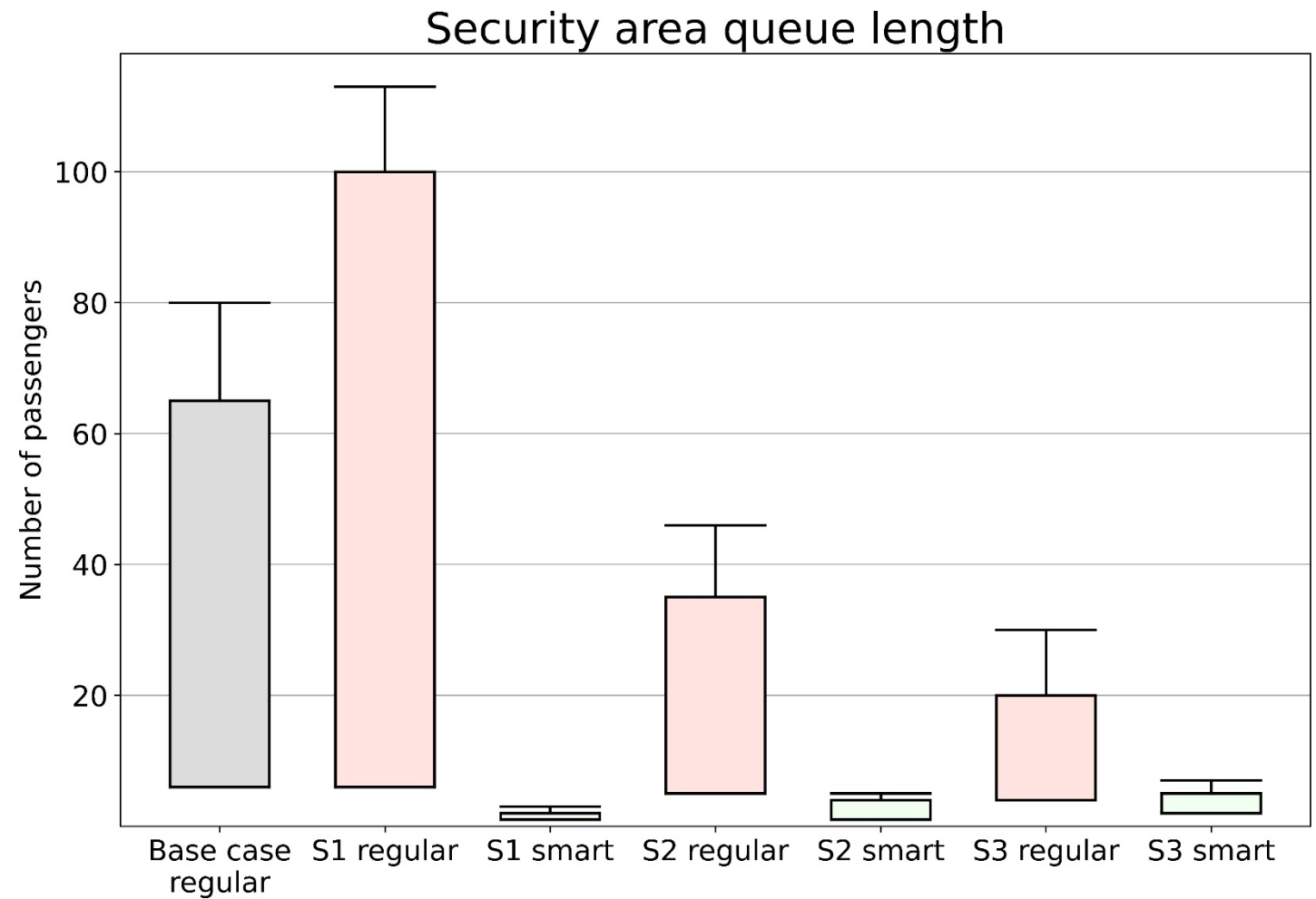
TABLE III. SCENARIOS EXPERIMENTED

| Scenario        | Share of <i>smart passengers</i> |
|-----------------|----------------------------------|
| Base case       | 0%                               |
| Scenario 1 (S1) | 10%                              |
| Scenario 2 (S2) | 20%                              |
| Scenario 3 (S3) | 30%                              |

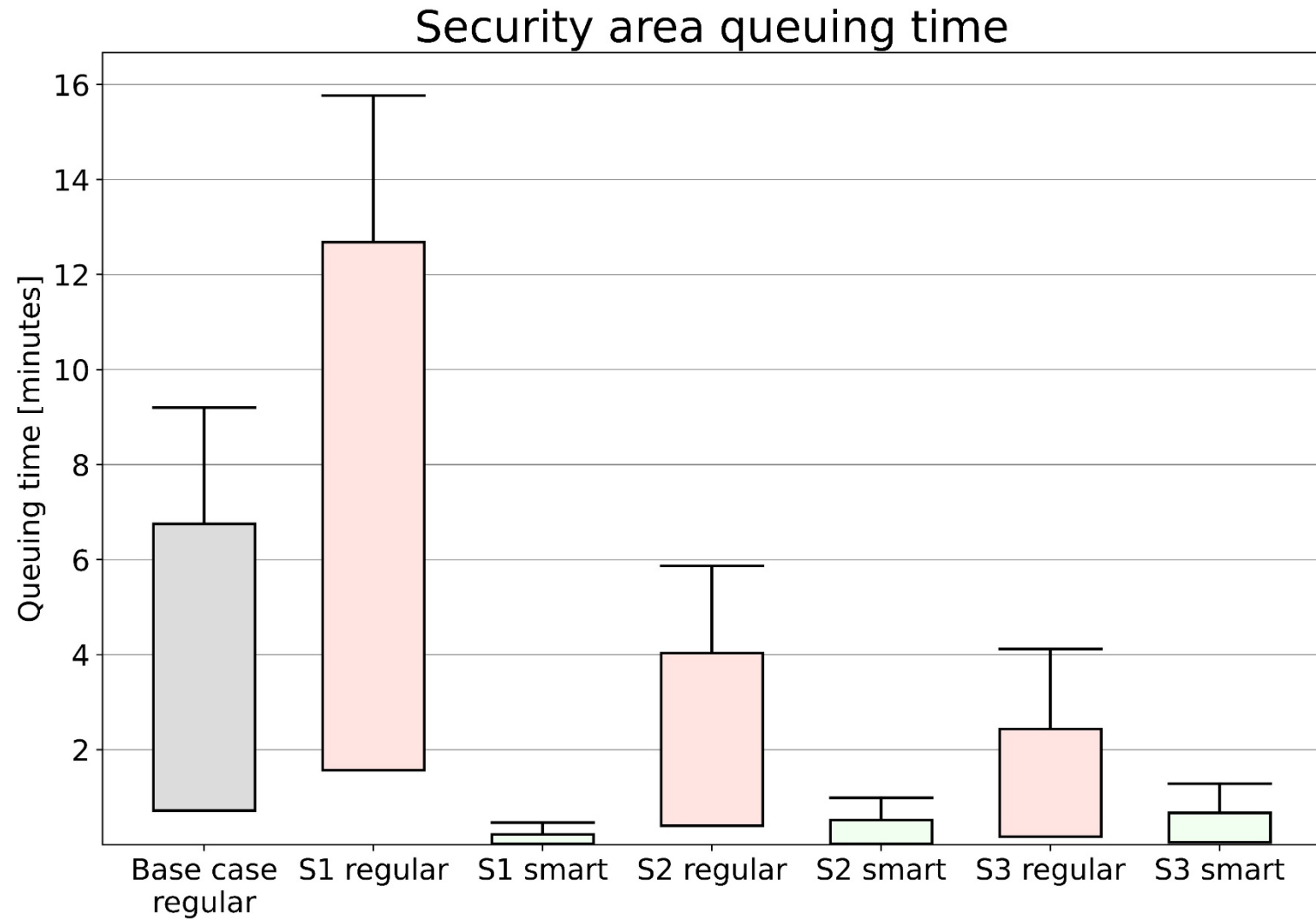
TABLE VII. CASE STUDY 2 PASSENGER PROFILES

| Passenger profile | base case | S1  | S2  | S3  |
|-------------------|-----------|-----|-----|-----|
| Business          | 57%       | 52% | 47% | 42% |
| Visitor           | 0%        | 0%  | 0%  | 0%  |
| Leisure           | 43%       | 38% | 33% | 28% |
| Smart             | 0%        | 10% | 20% | 30% |

# Results LCY (Queue Length)



# Results LCY (Queuing Time)



# Conclusions

- The ‘Smart Passenger’ can bring benefits to him/her and to the capacity of the system as the mean and dispersion reveals.
- The system needs to re-engineer and adapt itself to gain the benefits and make the travel more efficient for all the users.
- It is suggested to incentivise the *smart* technology for unlocking available capacity.
- Off-airport activities and new business can appear with the Rise of the “Smart Passenger”



- Sensitivity analysis for the turning points for managing the resources.
- An ANOVA would help us identify what elements play a bigger role in the variability to increase more the capacity.
- Other concepts like Virtual queuing, shared resources or pre-ordered services can be evaluated in the AIRPORT models.
- Process-based re-design of systems can be proposed
- The impact in the 4 hr door to door can be investigated

## Future work and Related one

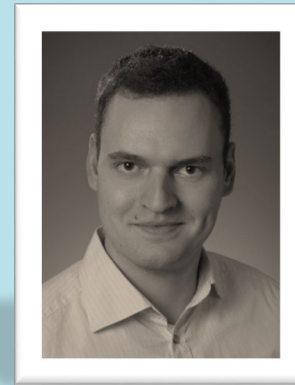
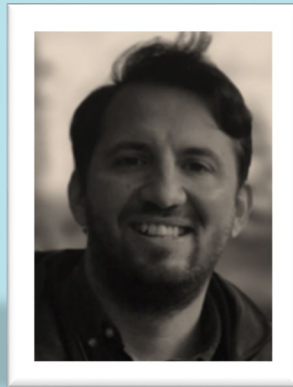
MujicaMota, M; Scala, P; Murrieta-Mendoza, A; Orozco, A; DiBernardi, A; 2021, “Analysis of Security Lines Policies for Improving Capacity in Airports: Case Mexico City”, Case Studies on Transport Policy, Elsevier, Accepted for Special Issue

<https://www.imhotep-h2020.eu/>

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Contact: [M.Mujica.Mota@hva.nl](mailto:M.Mujica.Mota@hva.nl)

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