

# Transforming the Airline Passenger Journey

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# Glossary

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API	Advance Passenger Information
GDS	Government Digital Service
GDPR	General Data Protection Regulation
GPG	Good Practice Guide
HMPO	Her Majesty's Passport Office
IAG	International Airlines Group
IATA	International Air Transport Association

# Executive Summary

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Airline passenger numbers continue to grow and it is estimated that across the globe these will double again over the next twenty years<sup>1</sup>. This growth<sup>2</sup> means airports must optimise infrastructure and airlines and government need to process passengers more efficiently and securely. The ever-changing face of airline travel creates challenges for all stakeholders, which can result in a poor experience for the passenger.

*Inadequate infrastructure negatively impacts the passenger experience in the form of flight delays, longer routes and inefficient schedules. Then there is the cost to economies of lost business opportunities, employment and social development. Remember aviation is a critical catalyst for economic and social development, supporting 63 million jobs and some \$2.7 trillion in economic impact.*<sup>4</sup>

**Alexandre de Juniac, IATA's Director General and CEO**

*"Innovation is being force fed into our industry. Either those within acknowledge that or those outside the industry will take it away"*

**Willie Walsh, CEO, IAG**

The airline industry, through IAG and with support from The Open Identity Exchange, has been exploring how innovation in identity processes could underpin passenger journey transformation. This exploration project focused on UK passengers and the Advance Passenger Information (API) process.

API<sup>5</sup> is provided by a passenger before they board a flight and is designed to reinforce information required at country borders. The information required for API includes details contained in a passenger's passport. This information is usually provided by the passenger by typing it into an airline website which acts as an intermediary. Around 50 per cent of passengers make errors when submitting passenger information to airlines before their flights<sup>6</sup>. This means the information must be manually corrected at the airport which has an impact on both airlines and on government.

IATA research has shown that airlines incur operational overheads and fines equating to an average of USD\$0.50 per passenger, which could be caused by incorrect API data being submitted by the passenger. Airlines try to mitigate this risk by storing the API data on behalf of the passenger in an account, but this in turn increases the airlines data security and infrastructure needs.

To address these challenges the airline industry recognises that innovation is needed<sup>3</sup>. Transformation through digital processes provides an opportunity<sup>4</sup> for all stakeholders in the supply chain. It could reduce operational costs and improve the customer experience, but it needs to do so without increasing risk.

## **IATA One Identity Vision**

*To create a streamlined friction free process that allows the individual to assert their identity, online or in person, to the required level, keeping personal data private and enables improvements of operational efficiency and security.*<sup>4</sup>

<sup>1</sup> <http://www.iata.org/pressroom/pr/Pages/2016-10-18-02.aspx>

<sup>2</sup> [https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard\\_Content/Data\\_and\\_analysis/Analysis\\_reports/Aviation\\_trends/AviationTrends\\_2016\\_Q2.pdf](https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard_Content/Data_and_analysis/Analysis_reports/Aviation_trends/AviationTrends_2016_Q2.pdf)

<sup>3</sup> <http://www.travolution.com/articles/102266/british-airways-boss-praises-impact-of-iags-hangar-51-incubator>

<sup>4</sup> <https://gds.blog.gov.uk/2015/10/23/how-digital-and-technology-transformation-saved-1-7bn-last-year/>

<sup>5</sup> [http://www.iata.org/iata/passenger-data-toolkit/assets/doc\\_library/02-api/API%20Guidelines%202014%20Main\\_%20Text\\_E.pdf](http://www.iata.org/iata/passenger-data-toolkit/assets/doc_library/02-api/API%20Guidelines%202014%20Main_%20Text_E.pdf)

<sup>6</sup> <http://www.futuretravelexperience.com/2017/04/iag-to-invest-in-two-start-ups-following-hangar-51-accelerator-programme/>

The aim of this project was to explore two methods which could result in an improvement in the API process:

Method 1 - Using an automated service to validate the API data from the passport information provided. Validation means to check the information being provided by the passenger is consistent with another source. In this method, the source for UK passengers is Her Majesty's Passport Office (HMPO) who are the authoritative source of the data.

Method 2 - Using verified digital identity to provision the API data from source. Verification goes beyond validation. Verification aims to ensure that the identity requesting the information is the person to whom that information belongs. In this instance, a GOV.UK Verify digital identity was synthesized, this assures the identity to a Level 2 assurance (LoA2)<sup>7</sup> as set out in the Good Practice Guides.

The project found that both methods could potentially offer improvements in the API data asserted by the passenger. In theory using a digital identity could have wider benefits due to the higher degree of identity assurance it provides. Improvements in API data offer potential operational saving for airlines and could also mean a reduction in fines. For government, it means valuable resources can be better targeted elsewhere.

Government could also benefit from the reuse of digital identity in the private sector through economies of scale, as the annual cost of a verified user reduces as identity transaction volumes increase.

User research showed passengers perceived that both speed and security could be potential benefits of using a digital identity versus the API process today. However, benefits for passengers were not as clear cut as those for airlines and government.

To have maximum impact, any potential improvement in process would ideally be available to all UK passengers. The project found there were differences in the potential coverage of the UK population for each method, meaning neither offers a complete solution to the challenge. Therefore, the findings from this project indicate that introducing *both* digital identity and passport validation could bring an improvement in the API process for the most UK based passengers.

Whilst this project demonstrates areas of positive impact on the current API process, a follow-on project is recommended to develop an understanding of the potential approaches outlined. The next project could focus on what is needed to make this happen, such as the target operating model, proposed technical approach and the cost of implementation and operation. This will allow a return on investment for time and resources to be better understood.

Further passenger research is also recommended. The passport validation service requires testing with potential passengers and for digital identity there needs to be a better understanding of the benefits for passengers. Based on the user feedback from this project, focus should be placed on the potential to speed up the process for the passenger through the whole end to end journey. Analysing ways to reduce customer journey time at the destination airport (and local airport), as well as in areas such as priority boarding could be considered. The wider ancillary benefits of digital identity for passengers could also be explored, such as improved ways to access other services at the airport. Further research into user understanding of what data was being shared with whom is also required.

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<sup>7</sup> <https://www.ncsc.gov.uk/guidance/identity-proofing-and-verification-individual-gpg-45>

# Background

## Advance Passenger Information

Regular travelers will be familiar with the Advance Passenger Information System (or API and APIS as it is also known). Advance passenger information is provided by or for a passenger before they board a flight, and is designed to reinforce information required at country borders. The information supplied is processed and received by the government of the country the passenger is visiting, including any transit country. The information provides border agencies in each country with all the information for 'pre-arrival' and 'pre-departure' of passengers and crew members from an airline.

Providing API is a mandatory requirement. Passengers are asked to provide this information at the time of booking. If the passenger chooses not to provide the data at time of booking, they are prompted for the information usually via email or text ahead of the flight date. When filling out the API, passengers are asked to use the information contained on their passport. This usually means they need to refer to the passport itself. When submitting the data, a passenger is asked to assert that it is correct.

API Requirements for Passports	
✓	Document type
✓	Document issuing country
✓	Passport number
✓	Surname
✓	Given names
✓	Nationality
✓	Date of birth
✓	Gender
✓	Expiry date
✗	[For US travelers only] Address of the first night spent in the US



Fig 1: Comparison of Information Contained on a Passport and the API Requirements

## Challenges with the Current Process

There are a number of challenges with the current process.

Firstly, that the information is often mis-keyed, upon analysis it is estimated that around 50 per cent of passengers make errors when submitting passenger information to airlines before their flights<sup>8</sup>, these errors then must be manually corrected at the airport.

<sup>8</sup> <http://www.futuretravelexperience.com/2017/04/iag-to-invest-in-two-start-ups-following-hangar-51-accelerator-programme/>

The main area that passengers provide incorrect information is supplying the name by which passengers go by on a day to day basis instead of the name shown on their passport. Variants such as Robert to Bob and Timothy to Tim, create issues with the API data.

In addition, the “self-assertion” of the passport details means that at the time that the information is sent to the airline, it is only validated by the passenger before submitting, as opposed to an authoritative source, such as HM Passport Office.

The risk that incorrect data has been submitted as part of the API process means that both airlines and border agencies must complete a series of additional processes and checks to ensure the data is correct before the person boards the plane. These additional processes and checks cost both the airline and government time, money and resources.

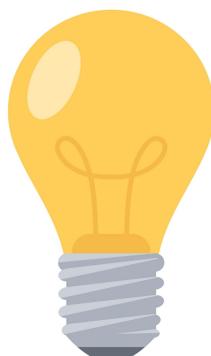
Improving the accuracy of the API that is presented by the passenger *before* they arrive at the airport could allow potential cost savings and efficiencies to be made.

# Scope

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## Hypotheses

1. That a passport validation service could be used during the process for the validation of API data.



2. That a verified digital identity could be used during the API process for the provision of validated passport attributes.

3. That use of a digital identity or passport validation provides additional benefits (to airlines, government and passengers) over the existing API process.

The project explored two ways to address the challenges set out in this paper. It also sought to understand the overall benefits of a change to the existing process for all stakeholders.

1. Using passport validation to validate the API
  - Outline of how this service could work in the context of an airline
  - Benefits and challenges of this approach
2. Using a digital identity to provision the API
  - Outline of how this service could work in the context of an airline
  - Passenger testing with wireframes. One journey where a passenger had to register for a digital identity, one where they were asked to imagine they already had a digital identity. This digital identity was then used for the provision of passport data to fulfil the API process
  - Passengers' perceptions and understanding of this approach, including feelings of ease of use
  - Benefits and challenges of this potential approach
3. Overall stakeholder benefits of a potential change in approach to the current process:
  - Airlines
  - Government
  - Passengers

# Method 1: Passport Validation

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## Description

DVA (Data Validation Application) is an online service by which users can verify whether the details on a UK passport match those held by HM Passport Office. The service can be accessed through an API, which allows users to verify passports by calling out from their own systems. This system gives a 'match/no-match' outcome but no further information to ensure privacy and security are maintained. Currently DVA is only available to public sector users but HM Passport Office are investigating working with specific sections of the private sector to improve public protection and reduce identity theft.

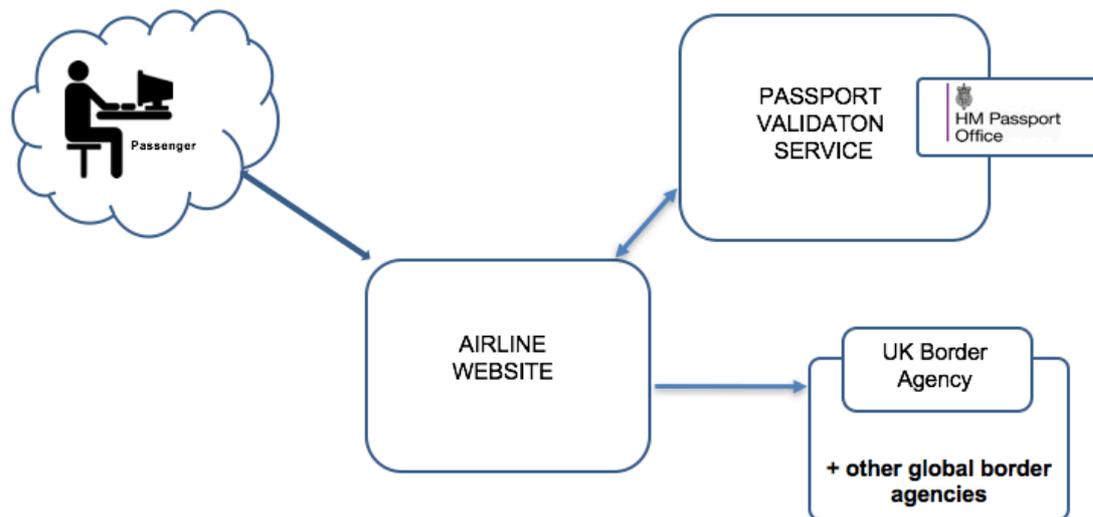


Fig 2: High Level Architecture for Passport Validation Service

## Benefits

Description	Benefits	Stakeholder/s
Indicates if the data was correct at the point the API was asserted.	Earlier validation of the API. Improvement in some of the errors in the API.	Airlines and government
Allows for third parties to complete the process e.g. groups and business bookings.	No change in process for third parties. Less confusion.	Passenger
Both adults and children could use this method.	Available to 100% of UK citizens who have a passport	Passengers, airlines and government.

## Challenges

Description	Challenges	Stakeholder/s
<p>The information would initially be keyed by the passenger before validation. Therefore, the issue with mis-keying information would still exist. The passenger will be provided with an option to correct their information but, assuming some method to override is included, some may decide not to do this.</p> <p>There are a few ways in which this could be mitigated:</p> <ol style="list-style-type: none"> <li>1. Optical Character Recognition or OCR, is a technology that enables conversion of different types of documents, such as passports captured by a digital camera into editable and searchable data.</li> <li>2. Reading of the biometric microchip in the passport through a smart</li> </ol>	<p>Some mistyping errors would still potentially exist. Optical character recognition software has error rates<sup>9</sup>. Additionally, it does not give any assurance around the validity of data entered or the identity of the individual.</p> <p>This method applies only to UK passport holders.</p> <p>Operational costs would not be fully optimised.</p>	Airlines and government

<sup>9</sup> <https://pdfs.semanticscholar.org/f093/fl46aba7ec70564e10a32d28513c09a1e049.pdf>

phone N.B. this is only available for Android phones.		
Consent for the passenger's data to be checked will need consideration	A way for passengers to "opt in" would likely be required at some point during the process	Passengers, airlines and government
The method covers UK citizens only. There are passengers that are UK residents but not UK citizens who would potentially fly frequently from the UK, but not be able to have their details validated.	Coverage of UK population is not 100% of the passport owning population.	Passengers, airlines and government.

## Method 2: Digital Identity with Attributes

### Description

Digital identity with attribute exchange is defined as “the online, real-time exchange of data specific to the transaction in hand, with the verified user present and with their full knowledge and permission”. It is important to establish the customer’s identity online if they are going to give permission for information about themselves to be shared. This envisaged using a digital identity, in the example model below GOV.UK Verify provides the digital identity and associated identity assurance.

For example, an airline might, with the customer’s permission, ask for the advance passenger information to be provided from the passport attributes. The question would be asked online, in real time, with an immediate response.

This “conversation” would be brokered by an attribute exchange hub, a generic hub that could connect any service provider to any attribute provider to establish entitlement to any service. Service providers and attribute providers might come from the private and public sectors.

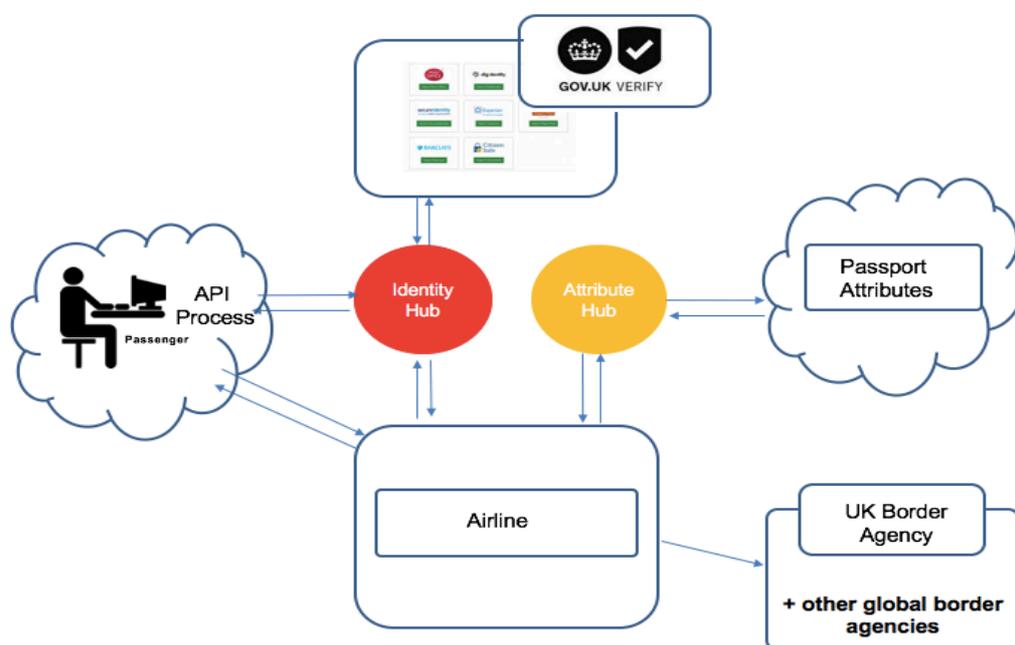


Fig 3: High Level Architecture for Digital Identity and Passport Attribute Provision

## Benefits

Description	Benefit	Stakeholder/s
Validation and verification of an identity. This method provides assurance around an identity to a defined open standard, Good Practice Guide 45 <sup>10</sup> which includes validation of an identity to multiple authoritative sources, plus verification that the individual owns that identity.	Higher assurance of the identity of an individual before they reach the airport.	Airlines and government
The service would allow data from the authoritative source to be used in the API process. This would likely reduce more of the current issues with mistyping and self-asserted information because users will not be required to type any information.	Increased operational benefits	Airlines and government
On the basis that a passenger is reusing a digital identity as opposed to signing up for a new one, the API process could be completed “on the go” without the user needing to have their passport information to hand.	Increased passenger opportunity to complete API process. The API process could also be completed earlier as the passenger wouldn’t need to wait to have their passport checked. A streamlined convenient process.	Government and passenger
The project pilots a means of use which could increase use of GOV.UK Verify digital identities.	Reduced cost of digital identity through economies of scale	Government
GOV.UK Verify can be used by foreign nationals living in the UK as well as UK citizens.	Potentially this method is available to all UK residents (not just UK citizens). Increased inclusion	Government and airlines

<sup>10</sup> <https://www.ncsc.gov.uk/guidance/identity-proofing-and-verification-individual-gpg-45>

## Challenges

Description	Challenge	Stakeholder/s
Only 1.24 million of the adult population in the UK have a GOV.UK verify digital identity. There are approximately 52 million adults in the UK. <sup>11</sup> Therefore this method is being used by approximately 2% of the population currently.	Limited number of UK citizens with a GOV.UK Verify digital identity. There are limitations in the viability of this method. Until it reaches more people, airlines are unlikely to use this.	Government
How the infrastructure to run this service would be set up and who would pay for it needs definition, to understand the return on investment model based on the potential operational cost savings.	Commercial model of implementation is not yet defined.	Airlines
It is not clear if there was an issue with the service or the underlying data, who would carry the liability.	Liability model not yet defined.	Airlines and government
Users tested did not see the benefit of signing up for a Verify account as part of the process.	Value for the passenger.	Passenger
The GOV.UK Verify digital identity does not allow for anyone else other than the individual with the account to use the account (without giving away secure credentials).	Gaps in the ability of the digital identity to satisfy this use case as API is often filled out by a third party.	Airlines and passenger
The GOV.UK Verify digital identity is available for adults only.	Gaps in the ability of the digital identity to satisfy this use case	Airlines and passenger

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<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/articles/overviewoftheukpopulation/previousReleases>

# User Research

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## Context

To test part of the hypothesis, qualitative research methods were employed. 20 participants were recruited to each partake in a one hour lab based 1-1 researcher led session using a discussion guide with standardised questions. After finishing an initial group of 10 sessions, the stakeholders met to discuss results, some small modifications were made to the prototype and script before moving on to the next group of 10. All participants had taken a flight within the last 12 months and were familiar with the API process.

There were two journeys tested:

1. Users had to sign up for digital identity.
2. Users had to imagine they were reusing an existing digital identity.

## Key insights

Based on the feedback we can conclude from the user research that people felt comfortable with using a digital identity to provision their API.

Some appreciated the extra layer of security they felt the digital identity added, and some participants also liked re-using an existing digital identity to provision the API as felt this would be a streamlined, convenient process, even when their passport was not to hand. However, based on this research, it does not seem that this use case would be enough to motivate users to sign up for a digital identity. It was a more natural fit for people to imagine re-using a digital identity in this scenario than creating a new one. Some people also had concerns that they wouldn't be able to remember their digital identity account login details. This is due to the limited number of transactions they thought that they would be using it for because it was government issued, and for government transactions.

There were also several points noted by participants that would need to be considered if moving forward:

1. Awareness – only one participant had heard of GOV.UK Verify digital identity
2. Certified Companies - There was some confusion among a small number of participants about the fact that you needed to go to different websites (the airline, GOV.UK, and the certified identity provider) to complete the task.
3. Third Party Delegation - Many participants, especially those travelling in groups or who are frequent business travelers mentioned that often someone else is tasked with booking their flights, and sometimes with checking them in. Participants were unclear as to how they would be able to use a third party's digital identity as well as their own.
4. Data Sharing – There was some confusion about what data was being shared and with whom. This confusion raised concerns with some participants.

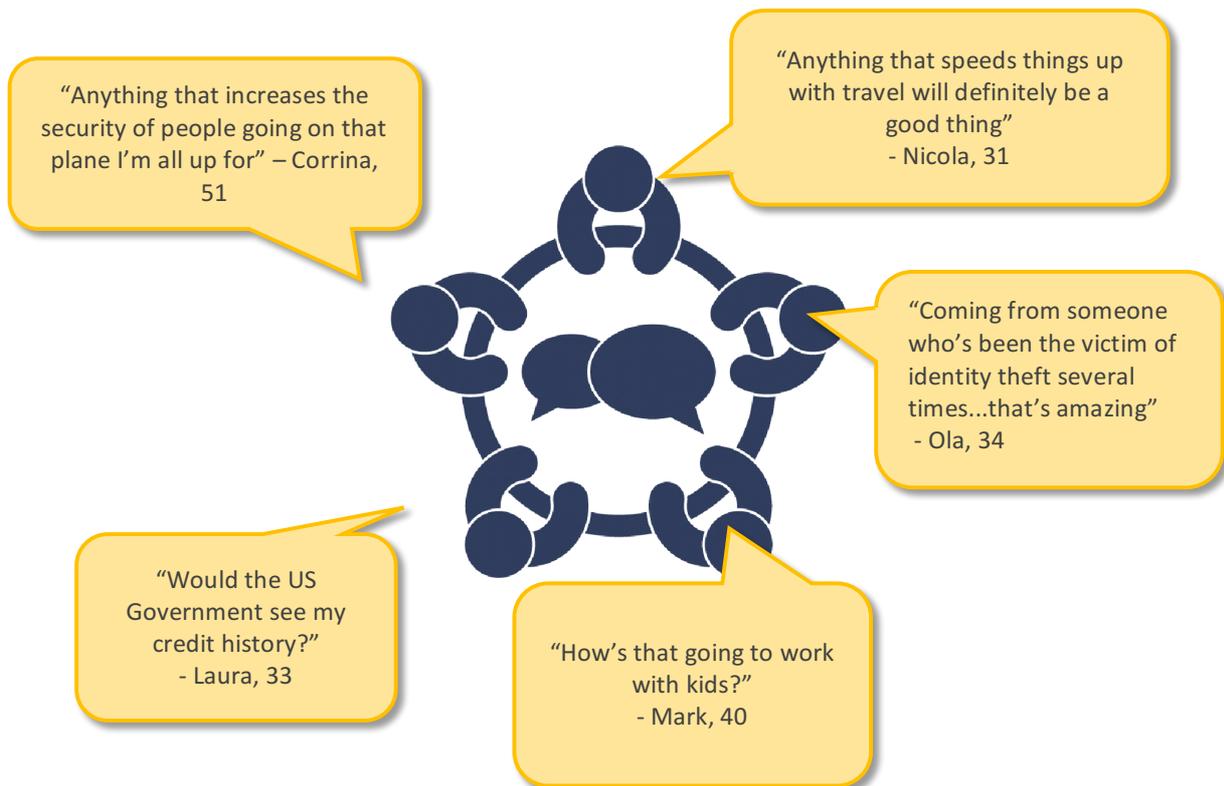


Fig 4: Comments from Respondents

### Passenger Frustrations

Participants noted the following frustrations with airline travel. This provides an area of focus when considering the potential motivators for improvements in the overall journey. The overriding theme of the frustrations was the speed of the process and what was perceived as unnecessary waiting times throughout the end to end journey.

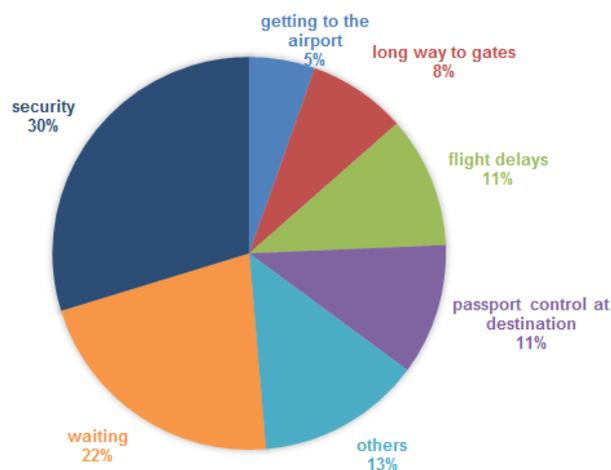


Fig 5: Respondents Frustrations with Airline Travel

## Conclusions

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The project found that there are ways to improve the current API process. The methods investigated indicate there could be benefits for government which include reduced cost and risk.

For airlines, this is the first step to addressing some of the additional operational overheads and potential fines incurred, these savings could be significant and should be explored further.

Passengers felt that digital identity would provide a more streamlined and convenient process versus the API process today. There was a perceived additional level of security when using the digital identity in the process. Users would be happy to reuse an existing digital identity if they had one, but would not necessarily be motivated to take the time to sign up for a digital identity unless there were other clear benefits. Speed was the clear frustration that passengers cited as part of their travel journey, so this gives a good indication of where further research should start.

Overall the benefits were less clear for passengers than for airlines and government and do need further investigation. The user feedback completed on the project indicated that if digital identity were to be considered there is a need for user education. Particularly in relation to user privacy and control over their data, as some participants felt confused about what might, or might not be happening with their data.

To have maximum impact, any potential improvement in process would ideally be available to all UK residents. The project found there were differences in the potential coverage of the UK population for each method, meaning neither offers a complete solution to the challenge. A potential solution to this could be to consider using both methods alongside each other.

There are also some gaps which need to be understood. For digital identity, the liability and commercial models need definition and for the passport validation service user testing is required. Overall, further investigation into the business case as well as target operating models are needed.

# Recommendations for Next Steps

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Below are the recommendations for next steps:

1. Develop detailed business case (for airlines and government) and target operating models
  - Understand in more detail the cost of implementation, operation and the potential returns
  - Commercial and liability models
  - Technical requirements
  - Operational model
  
2. Complete further user research
  - User research into the passport validation journey
  - Further exploration of the benefits to passengers of a digital identity – can this speed up the journey? Could passengers use this to access other airport services more easily and quickly? What might motivate a passenger to sign up for a digital identity vs use an existing one?
  
3. Trials:
  - Scope and complete trials

## Looking to the Future

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“My dream journey through the airport would offer security processes that are both effective and convenient, constant communication that makes me aware of changes to my journey or opportunities nearby, and a more efficient way of identifying myself to the airline, security staff and border management”

Alexandre de Juniac, IATA’s Director General and CEO

It is envisaged that evolving global standards, increasing coordination of stakeholders, trust frameworks and the ever-increasing speed of technology change in identity, could provide the building blocks for improvements in future airline travel.

For example, this project examines a new way in which API data could be provisioned. There could be scope in the future for the data to be provisioned, with the users consent and to satisfy regulatory requirements and government needs, without the data going to the airline as an intermediary. This would further reduce risk for the passenger and the airline and align better with privacy standards such as GDPR.

Increasing alignment and interoperability of global identity standards could mean the method proposed in this project may define a new way for global digital identities to be leveraged, to satisfy the airline travel use case. This would allow not only UK passengers to benefit from new methods, but passengers from other countries as well.

Additionally, the development of a trust framework between airlines could mean reduced cost and risk across the industry with wider benefits for all stakeholders.

The benefits outlined in this paper mark just the start of a new identity journey for the airline industry.