International Civil Aviation Organization

DGP-WG/18-IP/5
27/09/18

WORKING PAPER

DANGEROUS GOODS PANEL (DGP) WORKING GROUP MEETING

Montreal, 1 to 5 October 2018

Agenda Item 3: Managing safety risks posed by the carriage of lithium batteries by air
3.4: Consider measures to mitigate safety risks posed by lithium batteries carried and/or used by passengers, crew and the operator (Job card DGP.005.01)

RISKS ASSOCIATED WITH THE CARRIAGE OF PORTABLE ELECTRONIC DEVICES (PEDS) IN CHECKED BAGGAGE

(Presented by the Secretary)

SUMMARY

This paper provides information on data collected from replies to State letter M16/1-18/2, concerning a survey on risks associated with the carriage of portable electronic devices (PEDs) in checked baggage.

1. INTRODUCTION

1.1 At the second meeting of the Cargo Safety Group (CSG/2), held in Paris 19-21 July 2017, it was concluded that combining PEDs with other dangerous goods could result in an explosion in a Class C cargo compartment (unrelated to gases emanating from the battery) before halon could be sufficiently discharged. The halon system in a Class C compartment, if working as certified, could control such resulting fires although explosive gases might still be present. However, it was noted that a Class D compartment might not control similar fires, as there is no halon system in this compartment.

1.2 The CSG/2 meeting made several recommendations, a number of which are below:

a) That ICCAIA and the International Air Transport Association (IATA) be requested to provide data on the number of aircraft with Class D cargo compartments, and that States be asked to provide data on the number of such aircraft registered in their States. Furthermore, it was agreed that the data collected be provided to the AIRP;

b) that ICCAIA, IATA and States be asked to provide:

i) data on the number of PEDs being transported; and

ii) information on all accidents and incidents involving PEDs; and that this be forwarded to the SMP, DGP, AIRP and FLTOPSP-CSSG.

1.3 Due to the request of CSG/2 for additional data, a questionnaire was sent through State Letter M16/1-18/2, dated 15 January 2018, seeking data needed to more precisely assess the safety risks (see Appendix A). By 27 June 2018, sixty replies were received from fifty-eight States, including twenty-one Council Member States, and two international organizations. A number of responses were found to be incomplete. Some replies indicated that specific data or estimates to provide adequate answers to the questionnaire were not available. Additionally, some States found it challenging to provide quantifiable data because they had not conducted such surveys on passengers regarding the number of PEDs they travel with. Follow-up enquiries were made by the Secretariat to clarify data that was submitted as part of the study; few responses were received.

2. SUMMARY OF REPLIES

2.1 Tables 1-4 below contain a summary of responses from States.

a) Table 1 below shows responses to questions 1 and 2: Sixty responses from fifty-eight States were received for this question.

Question 1: How many aircraft with Class D compartments or equivalent are registered in your State?

Question 2: How many of these are: a) Passenger only aircraft; b) Cargo only aircraft

Number of States		Number of aircraft with Class D cargo compartments
21	With aircraft with Class D cargo compartments or equivalent registered	736
	— In passenger only aircraft	443
	— In cargo only aircraft	48
	— Aircraft type not specified (i.e cargo only or pax only)	245
23	With no aircraft with Class D cargo compartments or equivalent registered	0

Table 1

Fourteen States responded that they either had no data or do not capture data on the type of cargo compartments in aircraft registered in their States.

b) Table 2 below shows responses to question 3: Fifty-seven responses from fifty-five States were received for this question.

Question 3:How many incidents involving PEDs have occurred or been reported?

— In the cabin
— In Checked luggage
— In the airport

Number of incidents involving PEDs	In the Cabin	In Checked bag	In Airports	Total
	332	117	586	1035

Table 2

c) Table 3 shows the tabulation for the average number of PEDs carried per passenger per flight, in the cabin and checked baggage based on questions 4-5 of the questionnaire. Fifty-nine responses from fifty-seven States were received for this questions**:**

Question 4. What is the average number of PEDs (larger than a mobile phone, including power banks) carried per passenger per flight?

Question 5. How many PEDs on average does a passenger have on/with them in the cabin? and

Question 6. How many PEDs on average are checked in by passengers?

	Number of States reporting 1-2 PEDs	Number of States reporting 3-4 PEDs	Number of States reporting 5-6 PEDs	Number of States reporting None
Qu 4: PEDs carried per passenger per flight	35	13	2	
Qu 5: PEDs carried in the cabin	24	12	1	
Qu 6: PEDs in checked baggage	24	4		12

Table 3

Six States responded that they had no data on the average number of PEDs carried by passengers.

d) Table 4 shows responses to question 7. Twenty-one States responded that PEDs are stored in an item of checked baggage with other dangerous goods e.g. aerosol, and Twenty-three States responded that PEDs are not stored in checked in baggage with other dangerous goods.

Question 7: How are PEDs stored in an item of checked baggage?

— With other dangerous goods, e.g. aerosol
— Not with other dangerous goods

Number of States	
21	PEDs are stored in an item of checked baggage with other dangerous goods, e.g. aerosol
23	PEDs are not stored in an item of checked baggage with other dangerous goods

Table 4

2.2 Responses to the State letter from IATA and ICCAIA are provided in Appendices B and D to this information paper respectively.

2.2.1 IATA, with ICAO's agreement, proposed the distribution and administration of two separate surveys: one to IATA member airlines and one to travellers for an effective data collection. After one month of polling, the survey received thirty-six responses from IATA member airlines. The IATA survey and its results are provided in Appendix B.

2.2.1.1 Upon analysis of the survey results, IATA began an awareness campaign for passengers travelling with electronic devices. The information provided in Appendix C has been published as part of this campaign (see Appendix C).

2.2.2 The response from ICCAIA is provided in Appendix D to this paper.

2.3 All information and data collected from States, IATA and ICCAIA is being forwarded to the CSG for their further consideration.

3. ACTION BY THE DGP-WG

3.1 The DGP-WG is invited to note the contents of this paper.

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APPENDIX A

QUESTIONNAIRE ON THE CARRIAGE OF PORTABLE ELECTRONIC DEVICES (PEDs)

ATTACHMENT to State letter M 16/1 – 18/2

QUESTIONNAIRE ON THE CARRIAGE OF PORTABLE ELECTRONIC DEVICES (PEDs)

State: _____

For the purpose of this data collection, please provide historical data from 2007 to date. If data older than 2007 is available, kindly provide that data separately. *Any supporting information on these incidents will be welcome for further analysis.*

1. How many aircraft with Class D compartments or equivalent are registered in your State?

2. How many of these are:
   - Passenger only aircraft
   - Cargo only aircraft

3. How many incidents involving PEDs have occurred or been reported ?
   - In the cabin
   - In Checked luggage
   - In the airport

In the absence of quantifiable data, estimates are acceptable for questions 4-6

4. What is the average number of PEDs (larger than a mobile phone, including power banks) carried per passenger per flight?
   - 1-2
   - 3-4
   - 5-6
   - More than 6
   - None

5. How many PEDs on average does a passenger have on/with them in the cabin ?
   - 1-2
   - 3-4
   - 5-6
   - More than 6
   - None

6. How many PEDs on average are checked in by passengers?
   - 1-2
   - 3-4
   - 5-6
   - More than 6
   - None

7. How are PEDs stored in an item of checked baggage?
   - With other dangerous goods e.g. aerosol
   - Not with other dangerous goods

— END —

APPENDIX B

IATA SURVEY AND ITS RESULTS

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Table of Contents

1.1 Background

In January of 2018, the ICAO Secretary General wrote to Alexandre de Juniac, requesting that IATA airline members complete an ICAO designed survey. A copy of the letter and the original questionnaire requested by ICAO is attached as **Appendix A**. The survey was designed to better understand the risks associated with the carriage of portable electronic devices (PEDs) and to seek data to more precisely determine the associated safety risks.

IATA Safety felt that the survey questions provided by ICAO were subjective and could not be answered accurately by airlines. In order to remedy this, IATA proposed the distribution and administration of two separate surveys - one to airlines and one to travelers, to gather data more effectively. IATA met with ICAO to propose this approach and ICAO agreed.

IATA Safety created and administered a survey that went out to member airlines, asking questions relating to the topic. This survey may be found as **Appendix B**. After one month of polling, the survey received 36 responses from IATA member airlines.

Due to various logistical and internal governance requirements, the survey to travelers was carried out by an external company (*Ketchum Global*) but asked the same questions as agreed with ICAO. The brief for this survey, which outlines the questions asked, may be found at **Appendix C**. This survey was carried out in March 2018 and received over 1,500 responses.

The specific questions raised by ICAO in the letter to Alexandre de Juniac were the subject of another paper, which has been presented to ICAO. That response may be reviewed in **Appendix F**.

The results of the two surveys outlined above are the subject of this paper.

1.2 Survey Design and Delivery

1.2.1 Airline Survey

IATA created a survey to airline members, using the online resource known as *Survey Monkey*. This was released on 1 March 2018, with a close-out date of 31 march 2018 and was sent to around 400 airlines, using the STEADES membership list. The survey consisted of questions relating to the carriage of PEDs, as follows:

- How many aircraft do you operate with class D cargo compartments?
- Does your airline permit passengers to carry Portable Electronic Devices powered by lithium batteries in checked baggage?
- What influenced the decision to prohibit passengers carrying portable electronic devices powered by lithium batteries from checked baggage?
- Which types of devices do you permit passengers to carry in checked baggage?
- How do you validate that passengers' carriage of PEDs and lithium batteries is in accordance with your policy?
- How many fire or smoke accidents/incidents attributed to PEDs have been reported in your airline?
- Please enter the approximate number of sectors flown per year

The survey had 36 respondents. The full results of this survey may be found at **Appendix D**.

1.2.2 Traveler Survey

The survey was commissioned by IATA and carried out by Ketchum Global Research & Analytics.

The research's main objectives were to enable IATA to provide ICAO with reliable data concerning the carriage of portable electronic devices and some other items which are subject to restrictions. This data included:

- What items are carried
- How they are carried
- How many items are carried, and
- How passengers inform themselves concerning regulations

The research was a 10-minute online survey, carried out between March 15th and 21st of 2018 and was targeted at a sample of general population consumers, 18 years of age or older who have traveled by plane in the last year. The sample included 250 business travelers and 250 leisure travelers per country, in the United States, the United Kingdom and Hong Kong.

There were a total of 1,536 respondents to this survey and the full results may be found at **Appendix E.**

Please note that the survey also covered some other issues of interest to IATA, so the information relating to this report may be found specifically on slides 4, 5 and 7 (introductory); slides 13-15 for US-specific results; slides 27-29 for UK-specific details; slides 38-40 for Hong Kong results and slides 48-53 for global findings.

1.3 Airline Survey Results

This survey was created by IATA utilizing the online resource, *Survey Monkey*. As recorded above, there were 36 respondents to the survey over the period 1st to 30th April 2018. A number of respondents either did not complete the survey or responded only to certain questions. From this, analysis was difficult and it is not possible to make assumptions about the data or extrapolate rates. However, certain commentary may be made, as follows.

1.3.1 Class D Cargo Compartments

Class D cargo compartments do not have automatic fire suppression or warning systems. ICAO intended to ascertain the number of aircraft in operation with class D cargo holds. The survey results show the following:

	Number of Class D compartments
In cargo only aircraft	7
In cargo and passenger aircraft	1258
In passenger only aircraft	377
Total	**1642**

Table 1: Class D compartments

The numbers reported are considered to be higher than expected and it is believed that the respondents did not understand the question. For example, one major North American carrier reported that they have 177 Class D cargo compartments in their fleet. It may be that respondents actually reported the number of aircraft in their fleets, as the numbers correspond and the question was worded ambiguously.

For information, here are the classes of cargo compartment requirements:

Required Design Standards	Description	Class C §25.857(c)	Class E §25.857(e)	Class B §25.857(b)	** Class D §25.857(d)
Fire/Fire Detection §25.858	- Detection within 1min (former TC 5min) - The system must be capable of detecting a fire … significantly below …structural integrity of the aeroplane is substantially decreased	x	x	x	-
Built-in Fire Extinguishers §25.851(b) / §25,855(h)	The capacity of … built-in fire extinguishing system must be adequate for any fire likely to occur … considering the volume of the compartment and the ventilation rate.	x	-	-	-
Smoke Penetration AC 25-9A / §25,855(h)	No hazardous quantity of smoke or extinguishing agent into occupied compartments. Smoke should be generated until the compartment is completely filled with smoke. Hand within 18 inches cannot be seen	x	x	x	x
Passive Protection §25,855(c)	Ceiling and sidewall liner panels have to be tested again 927°C for 5 min.	x	* -	-	x

Table 2: Requirements of cargo compartment classes

Also for information, in the aftermath of the ValuJet accident in 1996, the FAA issued an Airworthiness Directive (AD) mandating that all Class D compartments on passenger aircraft operated by US-registered operators be brought to Class C standard by 2001. Other jurisdictions also adopted the AD. The NSTSB issued three further

safety recommendations concerning class D compartments, requiring smoke detection and fire suppression systems for all class D compartments. In response, the FAA have not mandated these actions via AD.

On the subject of retrofitting European aircraft with Class D cargo compartments, EASA issued an NPA in 2013 (*Notice of Proposed Amendment 2013-23: Additional airworthiness specifications for operations: Fire hazard in Class D cargo compartments*), which concluded:

> *"…the option of mandating a retrofit was assessed. However, although a mandatory retrofit to upgrade the Class D cargo compartments to either Class C or E would have a limited safety benefit, the RIA shows that the subject risk is already declining, taking into account the effect of previous regulatory actions. On the other hand, the economic burden ensuing from retrofit is hence considered disproportionate in relation to the possible safety benefit. In conclusion, the 'no regulatory change' option is recommended and no draft rules are proposed by this NPA."*

Given the potential confusion surrounding this question, it is not possible or carry out any analysis on the likely numbers of Class D compartments in operation. However, given the mandates by the aviation authorities described above, it may be argued that Class D cargo compartments are not a threat as far as the carriage of PEDs.

1.3.2 Passengers Carrying PEDs in Checked Baggage

Airlines were asked if they allowed passengers to carry lithium battery powered PEDs in checked baggage. The majority of respondents (73%) said that they did, in accordance with regulations, as follows:

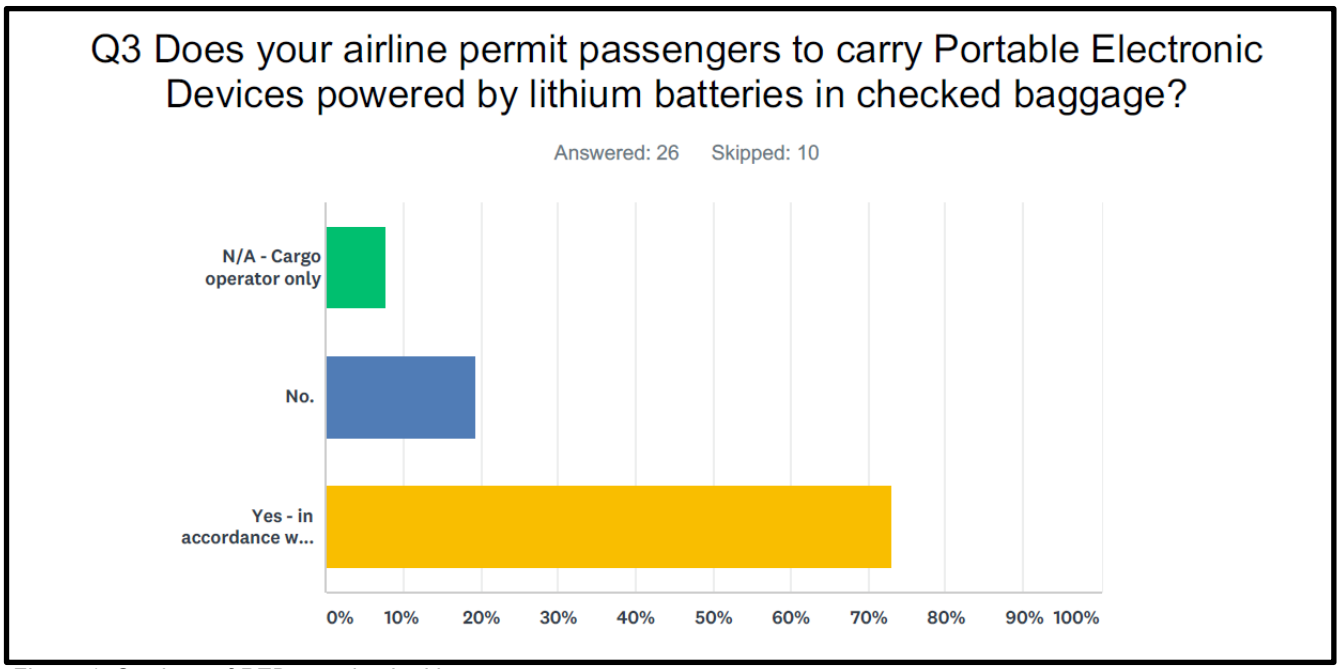


Figure 1: Carriage of PEDs as checked baggage

This shows that the airlines generally accept the carriage of PEDs in checked baggage, with just under 20% reporting that do not permit carriage of PEDs in checked baggage. The next question asked what influenced their decision to adopt this policy.

1.3.3 Decision to Prohibit PEDs in Checked Baggage

For the respondents that prohibited the carriage of PEDs in checked baggage, the question was asked 'what prompted that decision?' It might be expected that an experience of an incident would be the main driver, but this was not found to be the case, as can be seen from the following table.

ANSWER CHOICES	RESPONSES
Dangerous Goods regulations	60.00%
IATA Guidance Materials	20.00%
Company Risk Assessment	0.00%
Experience of incident of fire/smoke attributed to PED containing lithium battery	20.00%
Other (please specify)	0.00%

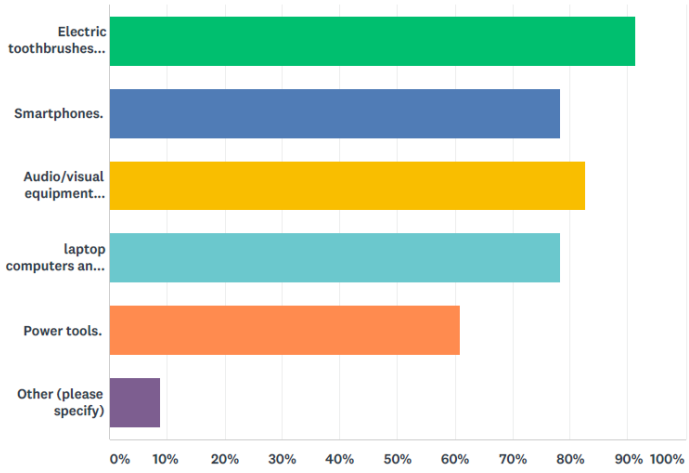
Table 3: Decision on carriage of PEDs as checked baggage

As can be seen, the majority were prohibiting carriage in checked baggage as a result of reading and understanding the regulations (DGR). This means that they were prohibiting the carriage of items such as power banks and spare batteries.

Only a small number of respondents prohibited the carriage as a result of experience of an incident of fire or smoke. In fact, given that only 20% of responses to the previous question prohibited carriage and only 20% of those did so as result of an incident, this means that only 1 airline prohibited carriage as the result of an incident. Please refer to Question 4 of Appendix D for details.

1.3.4 Devices Permitted in Checked Baggage

There was a fairly even spread over the types of equipment that airlines allowed in checked baggage, as follows:



ANSWER CHOICES	RESPONSES	
Electric toothbrushes, razors, trimmers etc.	91.30%	21
Smartphones.	78.26%	18
Audio/visual equipment including cameras, video recorders, music playing devices.	82.61%	19
laptop computers and tablets.	78.26%	18
Power tools.	60.87%	14
Other (please specify)	8.70%	2
Total Respondents: 23		

Figure 2: Types of PEDs allowed as checked baggage

The two reports that listed “other” for items allowed in checked baggage, were all items that were permissible in accordance with IATA Dangerous Goods Regulations. The low number of reported incidents does not support a conclusion that the types of devices currently allowed by regulation are causing any issues.

1.3.5 Validation of Carriage in Accordance with Policy

Airlines were asked how they validate that passengers' carriage of PEDs and lithium batteries is in accordance with their policy. That is, how do they ensure that passengers are following the rules or procedures? The answers were as follows:

ANSWER CHOICES	RESPONSES	
Information is provided on our website.	76.47%	13
Questions requiring confirmation are asked on online check-in.	70.59%	12
Check-in staff question passengers at check-in/bag drop.	94.12%	16
Total Respondents: 17		

Table 4: Passenger advisories

As can be seen from the response rates, airlines are not relying upon a single method but are generally reinforcing the message via multiple streams. It might be argued that questioning passengers at check-in is too late, but it may also act as a reminder to passengers, as it is typically not the only method used.

1.3.6 Incidents Involving PEDs

The remaining questions of the survey looked at the raw number of incidents, with the last question requesting sector information. Taken together, it was possible to calculate some rates of incidents.

During the five years in question (2013-2017), and across the 36 airlines polled, there were 29 reports of incidents involving PEDs. These were made up of twenty-six incidents in the cabin, two in the airport environment, and one incident reported in checked baggage, as follows:

	Cabin	Airport	Checked bag	Totals
2017	17	1	0	18
2016	4	0	0	4
2015	4	1	0	5
2014	1	0	1	2
2013	0	0	0	0
Totals	26	2	1	29

Table 5: Number of incidents

However, only 17 respondents answered this question with 19 declining to answer. It is unknown if the respondents skipped the question due to having no incidents or for other reasons. In addition to this, some respondents answered this question but failed to provide sector data. Conversely, some provided sector data but did not record numbers of incidents. Therefore, it was necessary to go into individual responses to gather information on those that reported incidents.

As the highest number of total incidents were recorded in 2017 and there was also a higher rate of reporting on sector data, it was decided to review this year. Looking at the 2017 data, we see that there were 18 incidents occurring with 1.05 M sectors flown, as follows:

Airline	Cabin incidents	Checked bag incidents	Airport incidents	Sectors
A	-	-	-	7,045
B	2	-	1	21,000
C	-	-	-	32,850
D	-	-	-	8,000
E	-	-	-	5,000
F	-	-	-	21,901
G	1	-	-	42,000
H	4	-	-	180,587
I	-	-	-	90,272
J	-	-	-	1,611
K	-	-	-	110,000
L	1	-	-	85,947
M	-	-	-	32,997
N	-	-	-	105,000
O	5	-	-	151,424
P	-	-	-	1,100
R	4	-	-	162,683
Totals	**17**	**-**	**1**	**1,059,417**

Table 6: Reported occurrences with PEDs during 2017, with sector information

There were no incidents reported in checked baggage for this year, so there is no corresponding event rate. However, there was one reported incident in the airport environment. That is, one incident in 1,059,417 sectors flown or a rate of 9.4391538×10^{-7}. As can be seen, most events happened in the cabin environment, where mitigations are well controlled by existing procedures. For further commentary and event rates on this subject, please refer to the analysis in Appendix F, which make use of other data sources.

1.3.7 Conclusions of Airline Survey

Overall, this survey indicates that airlines are well aware of the requirements, are alerting and informing their customers and are generally experiencing low rates of incidents pertaining to PEDs, with just one event in checked baggage in the five year period. The next section reviews responses by the traveling public, to explore their experience of the regulations and their habits with regard to PEDs.

1.4 Traveler Survey Results

As reported above, this was an online survey, targeted at a sample of general population, 18 years of age or older who have traveled by plane in the last year. The sample included 250 business travelers and 250 leisure travelers, in each of the United States, the United Kingdom and Hong Kong. Business travelers are defined as those who travel for business by plane most often and who have done so in the past year. Likewise, leisure travelers are defined as those who travel for leisure by plane most often and who have done so in the past year.

1.4.1 Passenger Awareness

Across all three regions, the majority of travelers believed that they are well-informed about the regulations. However, in all three regions, about one third of travelers were still packing spare batteries and power banks in checked luggage, indicating that they are not as well-informed as they believe ***or*** that they intentionally disregard regulations.

The sources of passenger knowledge relating to restrictions were identified as follows:

Airline websites	41%
Online kiosk/check-in	33%
Traditional media	26%
Social media	18%

This demonstrates that airlines are communicating effectively and travelers see the airline as a reliable source of information, however 33% of travelers rely on check-in for their information. This could mean that by the time the traveler gets to the check-in, their bags are already packed and it is inconvenient to remove illicit items and dispose of them at the airport. In addition, PEDs are generally high value and travelers may not want to lose them. This might have an impact on the numbers of travelers who do not comply with regulations and is an area for attention.

Globally, social media (at 18%) and traveler's company/employer (14%) are the least used sources of information. These are areas for potential improvement in both awareness and compliance. Many companies employ third-party travel agents to handle business travel. An outreach campaign to such agents could yield significant improvements.

1.4.2 Carry-on vs. Checked Baggage

Globally, there are significant differences between what travelers carry in the cabin and as checked baggage. However, the travelers polled are just as likely to pack spare batteries in their carry-on as their checked baggage, indicating that education is still needed on rules banning spare batteries and power banks in checked baggage.

Global Total n=1,526	**Packed in Checked Baggage**	**Packed in Carry-On**
Electronic grooming devices	54%	34%
Bottles of perfume	50%	33%
Aerosol cans of deodorant, hairspray, etc.	50%	30%
Audio/visual equipment	38%	57%
Power banks	36%	49%
Spare batteries	35%	37%
Smartphone	32%	84%
Tablet	32%	54%
Laptop	32%	53%
Bottles of alcohol (spirits)	23%	21%

Figure 3: Percentage of travelers carrying items - checked vs. carry-on

An outreach and awareness campaign could improve the level of awareness and, hopefully, a consequent improvement in compliance.

1.4.3 Items in Checked Baggage

When looking at the types of items being carried in checked baggage, there are similarities across the globe. Focusing in on power banks and spare batteries) however, there are differences between leisure and business travelers, as the latter group is significantly more likely to pack these items in their checked baggage.

As noted above, about one-third of travelers in each jurisdiction surveyed, pack power banks in their checked baggage. Looking specifically at power banks and spare batteries, we see the following:

	Global total	U.S.			U.K.			Hong Kong		
		Total	Leisure	Business	Total	Leisure	Business	Total	Leisure	Business
Power banks	36%	32%	18%	46%	37%	27%	46%	38%	32%	45%
Spare batteries	25%	33%	22%	45%	35%	28%	42%	37%	28%	45%

Table 7: Percentage of travelers who carry one or more of each item in their checked baggage

The data shows a trend that business travelers across the board tend to carry items in contravention of known restrictions and this is particularly noticeable in the US. It is worthy of note that spare batteries and power banks are the items most associated with fire/smoke events, so this is of concern. Therefore, and as stated above, an awareness campaign aimed, at the general travelling public and travel agents, may help to improve these figures.

With regard to packing power banks and spare batteries in checked baggage, the numbers were fairly uniform across classes and across the three regions under review, as we can see from the following table.

	Global total	U.S.			U.K.			Hong Kong		
		Total	Leisure	Business	Total	Leisure	Business	Total	Leisure	Business
Power banks	2	2	2	2	2	2	1	2	2	2
Spare batteries	2	3	2	3	2	2	2	2	2	2

Table 8: Average number of devices travelers pack in their checked baggage

The analysis of the available information shows a large number of passengers not conforming to existing requirements, indicating a potential need for some form of intervention However, it must also be noted that the reported incident rate remains low.

1.4.4 Carriage Alongside Other Items

The survey showed that the majority of passengers carry at least one lithium battery-powered item in checked baggage (at 74%) and in their carry-on bags (at 96%).

Many also carry lithium battery powered items alongside alcohol, aerosol and/or perfume in their checked baggage (57%) and carry-on (44%). Business travelers tend to be more likely to follow this behavior than leisure travelers. Once again, we have to take cognizance of the low numbers of incidents.

The chart on the next page breaks this down by region, class of traveler and check baggage vs. carry-on.

	Global total	U.S.			U.K.			Hong Kong		
		Total	Leisure	Business	Total	Leisure	Business	Total	Leisure	Business
Checked baggage										
Carry at least one LI battery powered item in checked baggage	74%	71%	60%	83%	78%	75%	82%	73%	64%	81%
Carry at least one LI battery powered item in checked baggage AND at least one alcohol/aerosol/perfume in checked baggage	57%	53%	42%	65%	66%	63%	69%	51%	40%	63%
Carry-on baggage										
Carry at least one LI battery powered item in carry-on baggage	96%	95%	93%	96%	97%	95%	98%	97%	97%	96%
Carry at least one LI battery powered item in checked baggage AND at least one alcohol/aerosol/perfume in carry-on baggage	44%	45%	34%	57%	50%	42%	58%	36%	27%	45%

Table 9: Percentage of travelers carrying items: region, class of traveler and checked baggage vs. carry-on

1.4.5 Conclusions of Traveler Survey

Across three regions, the majority of travelers believed that they are well-informed about the regulations. However, in all three regions assessed, about one third of travelers were still packing spare batteries and power banks in checked luggage, indicating that they are not as well-informed as they believe ***or*** that they intentionally disregard regulations. A higher percentage of business travelers pack spare batteries and power banks in checked baggage and this is reflected across the three regions under review.

The global total for power banks carried in checked baggage is 36% and the average number carried is 2. If it is assumed that this is a representative sample, there may be a large number of power banks in checked baggage at any one time. Individual operators should assess this potential hazard as part of their Safety Risk Assessment process and implement enhancements as necessary.

A third of travelers polled, rely on the check-in process for information on restrictions. This could have an impact on compliance, due to inconvenience and/or fear of loss of property. Improved communication to travelers earlier in the booking process could induce an improvement in compliance percentages.

1.5 Overall Conclusions

The analysis shows that airlines are well aware of the requirements, are alerting and informing their customers and are experiencing very few incidents pertaining to PEDs in checked baggage. However, the traveler survey shows that 33% of travelers rely on the check-in process for information on restrictions. The perceived inconvenience and/or fear of loss of property may impact compliance rates.

Across all three regions, the majority of travelers believed that they are well-informed about the regulations. However, in all three regions, about one third of travelers were still packing spare batteries and power banks in checked luggage, indicating that they are not as well-informed as they believe or that they intentionally disregard regulations. A higher percentage of business travelers pack spare batteries and power banks in checked baggage and this is reflected across the three regions.

The global total for passengers packing power banks in checked baggage is 36% and the average number carried is 2. If it is assumed that this is a representative sample, there may be a large number of power banks in checked baggage at any one time. Individual operators should assess this potential hazard as part of their Safety Risk Assessment process and implement enhancements as necessary.

1.6 Findings

- The subject of Class D compartments requires no further action. According to EASA, mandatory retrofit to upgrade the Class D cargo compartments to either Class C or E would have a limited safety benefit, as the risk is already declining, taking into account the effect of previous regulatory actions.
- Spare batteries and power banks are still being carried in checked baggage. These should only be carried in the cabin in accordance with IATA Dangerous Goods Regulations 2.3.5.9 (c).
- Business travelers tend to pack more power banks and spare batteries in checked baggage versus leisure travelers.
- There was one event related to PEDs in checked baggage, reported in 2014.

1.7 Recommendations

- Improved communication to travelers earlier in the booking process could induce an improvement in compliance percentages.
- IATA Safety, with support from Corporate Communications, to launch an awareness and education campaign (in progress).
- Individual operators should assess the potentially high number of power banks and spare batteries in checked baggage, as part of their Safety Risk Assessment process.
- An information and outreach to the public on the safe carriage of lithium batteries (completed and attached as Appendix G and as part of the awareness campaign mentioned above.)
- Many companies employ third-party travel agents to handle business travel. An outreach campaign reinforcing regulations and asking agents to inform their clients, might yield improvements.
- IATA Safety to continue to monitor the situation and participate in all relevant ICAO working groups (ongoing).

1.8 List of Appendices

1.8.1 Appendix A: ICAO letter

1.8.2 Appendix B: PED survey – airlines

1.8.3 Appendix C: traveler survey questions

1.8.4 Appendix D: IATA Airline survey results

1.8.5 Appendix E: Traveler Survey Results

1.8.6 Appendix F Response to ICAO survey FINAL

1.8.7 Appendix G Lithium Battery Passenger info

Appendix A: ICAO letter

International Civil Aviation Organization | Organisation de l'aviation civile internationale | Organización de Aviación Civil Internacional | Международная организация гражданской авиации | منظمة الطيران المدني الدولي | 国际民用航空组织

THE SECRETARY GENERAL

Ref.: E 4/1 — CSS70808

Mr. Alexandre de Juniac
Director General and CEO
International Air Transport Association
800 Square Victoria Street
Montréal, Québec
H4Z 1M1
Email: dejuniaca@iata.org

JAN 2 6 2018

Dear Mr. de Juniac,

I wish to inform you on the work underway to address risks associated with the carriage of portable electronic devices (PEDs) and to seek data to more precisely determine the safety risks.

The Council of the International Civil Aviation Organization (ICAO), at the first meeting of its 211th Session, agreed to the establishment of a temporary multidisciplinary Cargo Safety Group (CSG). The group was established to examine the concern that measures imposed in March 2017 by some Member States, to prohibit the carriage of PEDs in the cabin to address a security threat, would have a consequential impact on safety. Accordingly, the CSG was tasked with evaluating the risk. Electronic bulletins on the subject were sent on 31 March 2017 (EB 2017/23) and 22 June 2017 (EB 2017/37).

An introductory meeting of the CSG (CSG/1) was held in Montréal from 1 to 2 June 2017 to establish terms of reference and a work programme. The second meeting of the CSG (CSG/2) met in Paris, France from 19 to 21 July 2017. The reports of the meetings can be downloaded from https://www.icao.int/safety/cargosafety/Pages/default.aspx.

CSG/2 was tasked with evaluating existing aircraft capabilities, identifying the safety hazards posed by the carriage of PEDs in checked baggage and assessing the associated safety risks. Taking into account studies by the United States Federal Aviation Administration (FAA) and the European Aviation Safety Agency (EASA), CSG/2 concluded that:

a) there would be a potential ten-fold increase in the risk of cargo fires if PEDs were relocated from the cabin to aircraft cargo compartments; and

b) combining PEDs with other dangerous goods in a Class C compartment could result in an explosion before halon could be sufficiently discharged; no protection would be provided in a Class D compartment for a similar event.

999 Robert-Bourassa Boulevard
Montréal, Quebec
Canada H3C 5H7
Tel.: 514-954-8041
Fax: 514-954-6077
Email: icaohq@icao.int
www.icao.int

Further information can be found in notices issued by the FAA (https://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info/all_infos/media/2017/InFO17008.pdf) and EASA (https://ad.easa.europa.eu/ad/2017-04). States have been encouraged to advise operators to take this information into account when conducting safety risk assessments related to the carriage of PEDs.

It was recognized at CSG/2 that additional data was needed to more precisely determine the safety risks. Accordingly, the meeting recommended that ICAO request States, the International Air Transport Association (IATA) and the International Coordinating Council of Aerospace Industries Associations (ICCAIA) to provide pertinent data. A questionnaire is attached to this letter to facilitate collection of the data. ICAO is simultaneously consulting with States and ICCAIA on data as well.

Please be assured that the completed questionnaire will be kept strictly confidential and only consolidated results will be analysed. As a high response level is essential, I would kindly request that IATA complete the questionnaire as completely as possible, and return it to css@icao.int by 15 April 2018.

Yours sincerely,

Fang Liu

Enclosure:
Questionnaire on the carriage
of portable electronic devices (PEDs)

cc: Senior Vice President, Airport, Passenger,
Cargo and Security, IATA
Director, ICAO Relations, IATA

ATTACHMENT

QUESTIONNAIRE ON THE CARRIAGE OF PORTABLE ELECTRONIC DEVICES (PEDs)

For the purpose of this data collection, please provide historical data from 2007 to date. If data older than 2007 is available, kindly provide that data separately.

1. How many aircraft with Class D compartments or equivalent are currently in operation?

2. How many of these are:
   - Passenger and Cargo aircraft
   - Passenger only aircraft
   - Cargo only aircraft

In the absence of quantifiable data, estimates are acceptable for questions 3-6

3. How many incidents involving PEDs have occurred or been reported ?
   - In the cabin
   - In Checked luggage
   - In the airport

4. What is the average number of PEDs (larger than a mobile phone, including power banks) carried per passenger per flight?
   - 1-2
   - 3-4
   - 5-6
   - More than 6
   - None

5. How many PEDs on average does a passenger have on/with them in the cabin??
   - 1-2
   - 3-4
   - 5-6
   - More than 6
   - None

6. How many PEDs on average are checked in by passengers?
   - 1-2
   - 3-4
   - 5-6
   - More than 6
   - None

7. How are PEDs stored in a checked baggage?
   - With other dangerous goods e.g. aerosol
   - Not with other dangerous goods

— END —

Appendix B: PED survey – airlines

Portable Electronic Devices in Passenger Baggage - AIrlines

* 1. Please confirm your name, airline and email address.

Name

Company

Email Address

2. How many of the following aircraft do you operate with class D cargo compartments?

Cargo only aircraft.

Cargo and passenger aircraft.

Passenger only aircraft.

3. Does your airline permit passengers to carry Portable Electronic Devices powered by lithium batteries in checked baggage?

- N/A - Cargo operator only
- No.
- Yes - in accordance with Dangerous Goods regulations.

Portable Electronic Devices in Passenger Baggage - AIrlines

4. What influenced the decision to prohibit passengers carrying portable electronic devices powered by lithium batteries from checked baggage?

5. Which of the following types of devices do you permit passengers to carry in checked baggage? *(Select all that apply)*

- [ ] Electric toothbrushes, razors, trimmers etc.
- [ ] Smartphones.
- [ ] Audio/visual equipment including cameras, video recorders, music playing devices.
- [ ] laptop computers and tablets.
- [ ] Power tools.

Portable Electronic Devices in Passenger Baggage - AIrlines

6. How do you validate that passengers' carriage of PEDs and lithium batteries is in accordance with your policy? *(Select all that apply)*

- [ ] Information is provided on our website.
- [ ] Questions requiring confirmation are asked on online check-in.
- [ ] Check-in staff question passengers at check-in/bag drop.

7. How many accidents/incidents involving PEDs have been reported in your airline?*(Please provide any available data)*

	In the cabin.	In checked baggage on board.	In the airport environment.
2017			
2016			
2015			
2014			
2013			

* 8. Please enter the approximate number of sectors flown per year. *(Please enter numerical values only. If not known, please enter 0)*

2017	
2016	
2015	
2014	
2013	

Appendix C: traveler survey questions

Traveler's Poll: Questionnaire DRAFT
March 2018

OVERVIEW

Ketchum Global Research & Analytics, on behalf of IATA, will conduct a survey to understand what kinds of devices people travel with, and to understand how aware they are of restrictions on what they carry.

The research's main objectives are to:

- Glean media-worthy data on consumers' feelings and perceptions around air travel restrictions
- Support IATA's report to ICAO

METHODOLOGY

To capture consumer attitudes and preferences around air travel restrictions, KGRA will commission a brief online survey among the general U.S. U.K. and Hong Kong populations.

A third-party vendor will conduct a five-question online survey among a nationally representative sample of general population consumers, 18 years of age or older in the United States, who have traveled by plane in the last year. The sample will include 500 business travelers and 500 leisure travelers.

QUESTIONNAIRE

Screeners

1. **Please select which of the following best describes the type of travel you do. Select one.**
    a) Business
    b) Leisure
    c) I don't travel [TERMINATE]

2. **When was the last time you traveled on an airplane [IF Q1=a] for business/ [IF Q1=b] for leisure? Select one.**
    a) In the last month
    b) In the last 6 months
    c) In the last year
    d) More one year ago [TERMINATE]

[IF Q1=A, QUALIFY AS BUSINESS TRAVELER; IF Q1=B, QUALIFY AS LEISURE TRAVELER]

3. **How many of the following electronic devices would you normally take with you when flying? Items left blank will be counted as none.**
    1. In checked baggage only
    2. In carry-on baggage only
    3. In both, checked and carry-on baggage

a) Laptop
b) Tablet
c) Smartphone
d) Electronic grooming devices (i.e. electric toothbrushes, razors, trimmers, etc.)
e) Audio/visual equipment (i.e. cameras, video recorders, music playing devices, etc.)
f) Spare batteries
g) Power banks
h) Aerosol cans of deodorant, hairspray, etc.
i) Perfume
j) Bottles of alcohol (spirits)

[TERMINATE IF Q3(1-3)=0/none for all]

Survey Questions

1. **How familiar are you with the airline restrictions/requirements for each of the following items?**
    1. Not familiar at all
    2. Somewhat familiar
    3. Very familiar
        a. Laptop
        b. Tablet
        c. Smartphone
        d. Electronic grooming devices (i.e. electric toothbrushes, razors, trimmers, etc.)
        e. Audio/visual equipment (i.e. cameras, video recorders, music playing devices, etc.)
        f. Lithium batteries
        g. Power banks
        h. Aerosol cans of deodorant, hairspray, etc.
        i. Perfume
        j. Bottles of alcohol (spirits)
        k. None of the above [EXCLUSIVE]

2. [ASK IF Q1f=2-3] **How were you made aware of the airline restrictions/requirements related to lithium batteries? I found out….**
    1. When I purchased the ticket
    2. Through the airline website
    3. Through the airline online kiosk/ check-in
    4. Through a media/news story/article
    5. On a social media channel (e.g. Twitter)
    6. From a family member/friend
    7. Through my company
    8. Other, specific

Appendix D: IATA Airline survey results

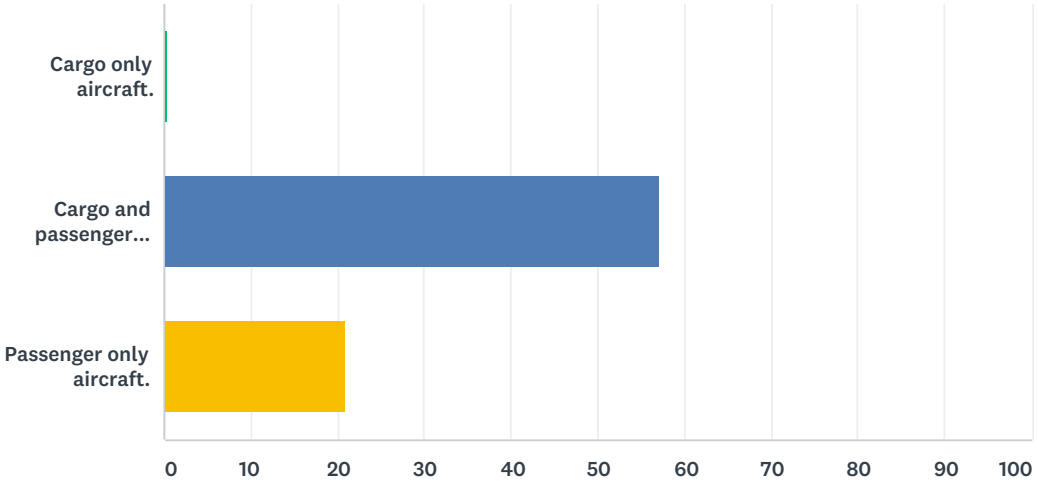
Q1 Please confirm your name, airline and email address.

Answered: 36 Skipped: 0

ANSWER CHOICES	RESPONSES	
Name	100.00%	36
Company	100.00%	36
Address	0.00%	0
Address 2	0.00%	0
City/Town	0.00%	0
State/Province	0.00%	0
ZIP/Postal Code	0.00%	0
Country	0.00%	0
Email Address	100.00%	36
Phone Number	0.00%	0

Q2 How many of the following aircraft do you operate with class D cargo compartments?

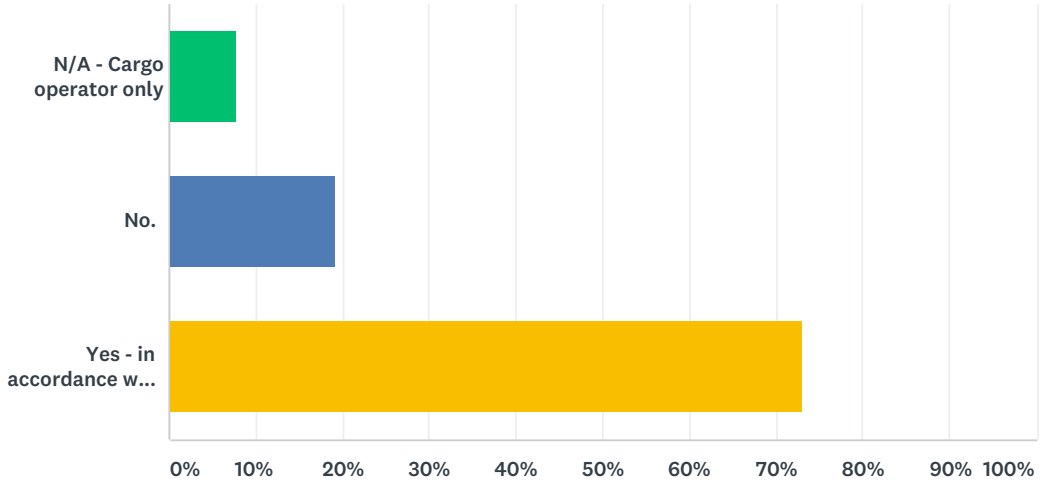
Answered: 26 Skipped: 10



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
Cargo only aircraft.	0	7	15
Cargo and passenger aircraft.	57	1,258	22
Passenger only aircraft.	21	377	18
Total Respondents: 26			

Q3 Does your airline permit passengers to carry Portable Electronic Devices powered by lithium batteries in checked baggage?

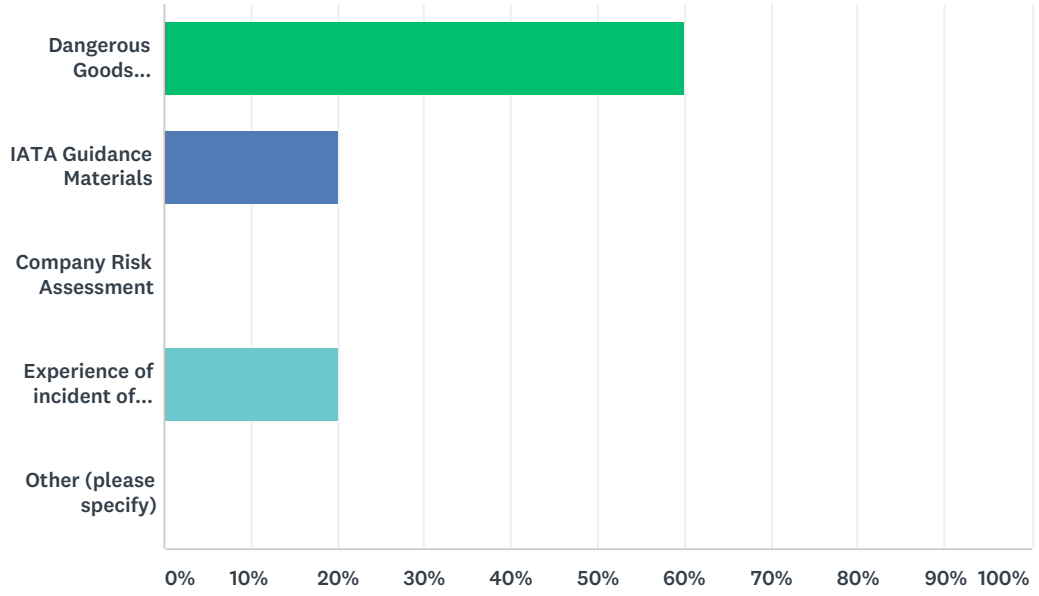
Answered: 26 Skipped: 10



ANSWER CHOICES	RESPONSES	
N/A - Cargo operator only	7.69%	2
No.	19.23%	5
Yes - in accordance with Dangerous Goods regulations.	73.08%	19
TOTAL		26

Q4 What influenced the decision to prohibit passengers carrying portable electronic devices powered by lithium batteries from checked baggage?

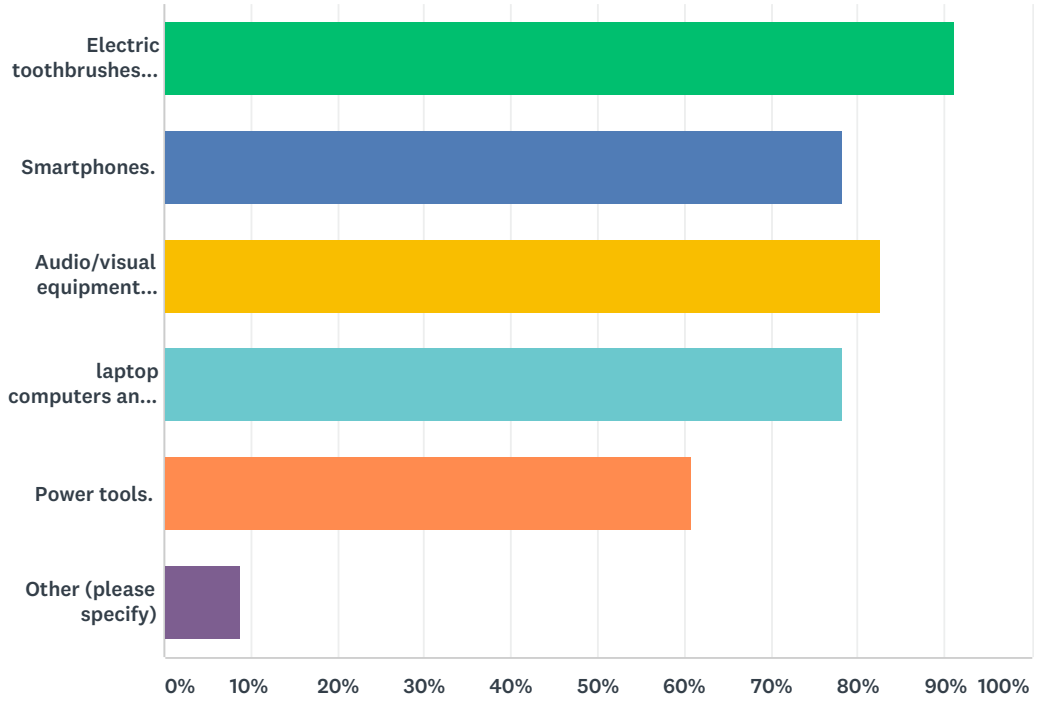
Answered: 5 Skipped: 31



ANSWER CHOICES	RESPONSES	
Dangerous Goods regulations	60.00%	3
IATA Guidance Materials	20.00%	1
Company Risk Assessment	0.00%	0
Experience of incident of fire/smoke attributed to PED containing lithium battery	20.00%	1
Other (please specify)	0.00%	0
TOTAL		5

Q5 Which of the following types of devices do you permit passengers to carry in checked baggage? (Select all that apply)

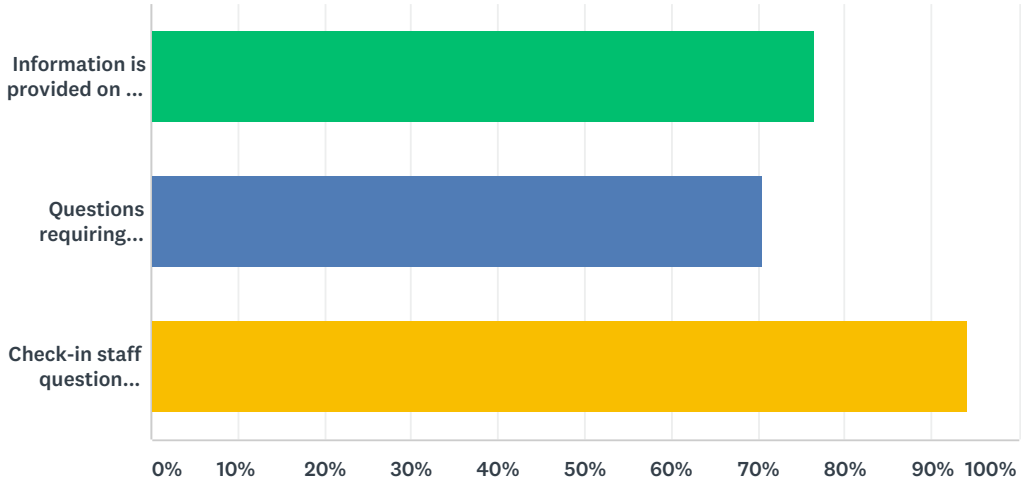
Answered: 23 Skipped: 13



ANSWER CHOICES	RESPONSES	
Electric toothbrushes, razors, trimmers etc.	91.30%	21
Smartphones.	78.26%	18
Audio/visual equipment including cameras, video recorders, music playing devices.	82.61%	19
laptop computers and tablets.	78.26%	18
Power tools.	60.87%	14
Other (please specify)	8.70%	2
Total Respondents: 23		

Q6 How do you validate that passengers' carriage of PEDs and lithium batteries is in accordance with your policy? (Select all that apply)

Answered: 17 Skipped: 19

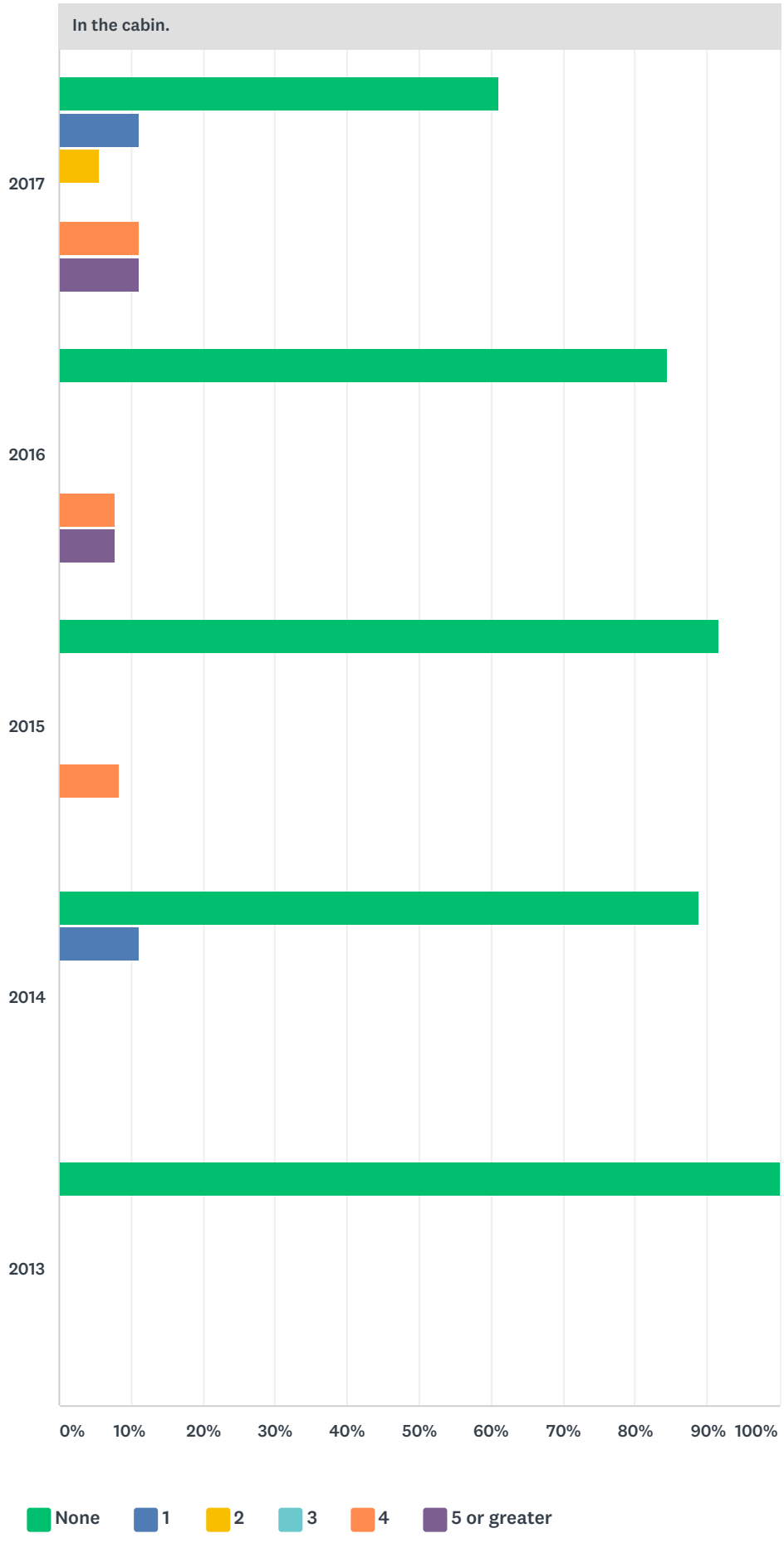


ANSWER CHOICES	RESPONSES	
Information is provided on our website.	76.47%	13
Questions requiring confirmation are asked on online check-in.	70.59%	12
Check-in staff question passengers at check-in/bag drop.	94.12%	16
Total Respondents: 17		

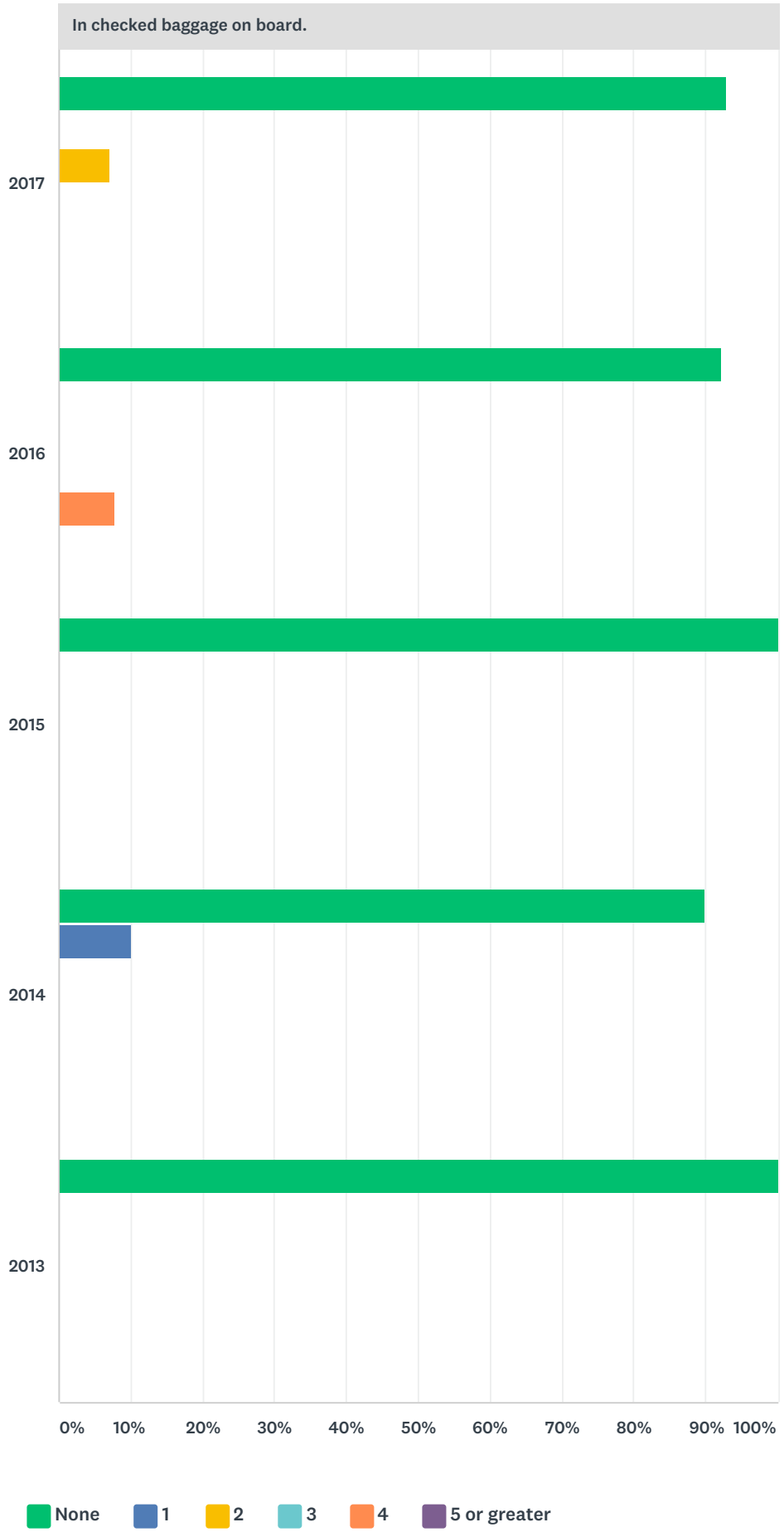
Q7 How many fire or smoke accidents/incidents attributed to PEDs have been reported in your airline? (Please provide any available data)

Answered: 19 Skipped: 17

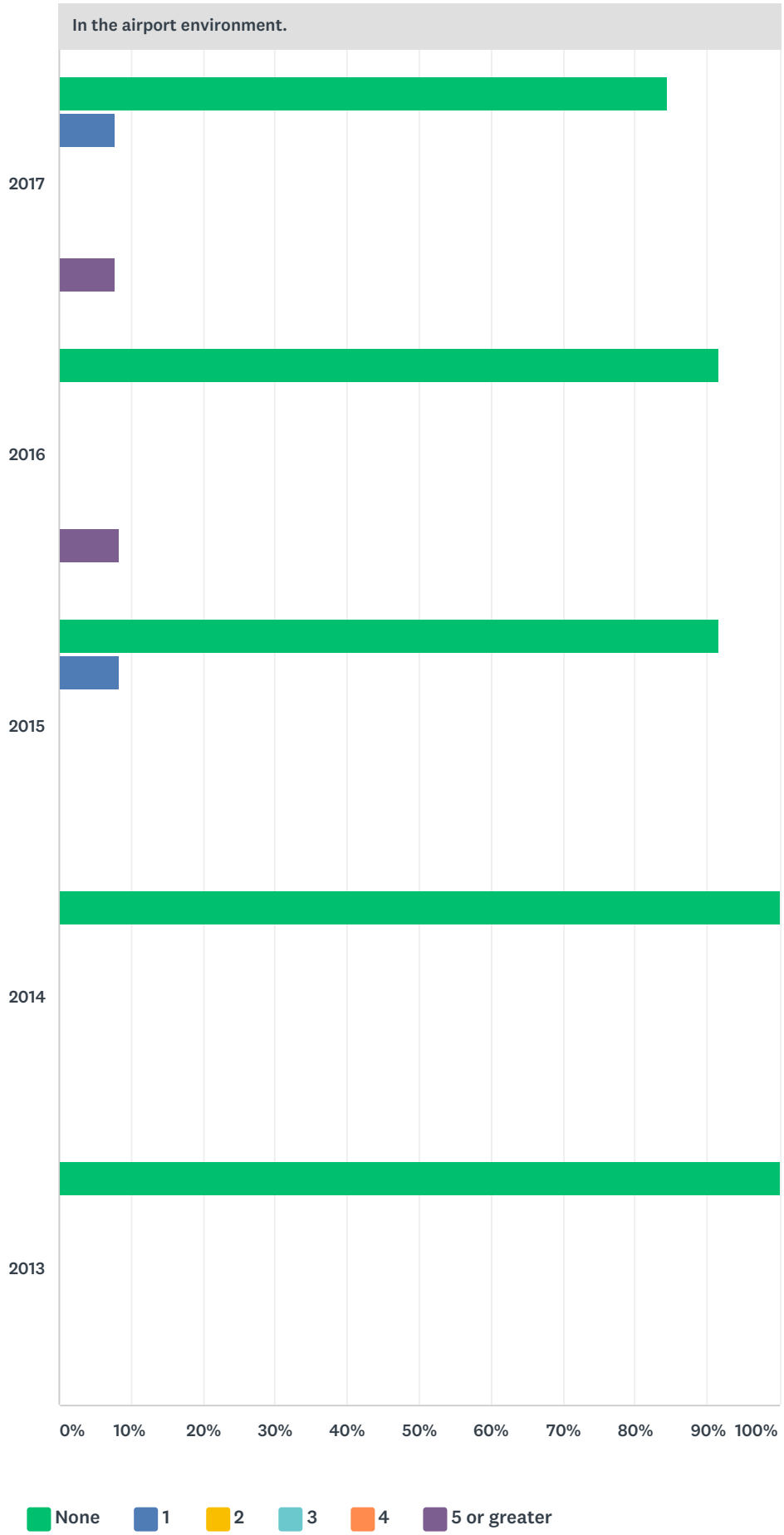
Portable Electronic Devices in Passenger Baggage - Airlines



Portable Electronic Devices in Passenger Baggage - Airlines



Portable Electronic Devices in Passenger Baggage - Airlines



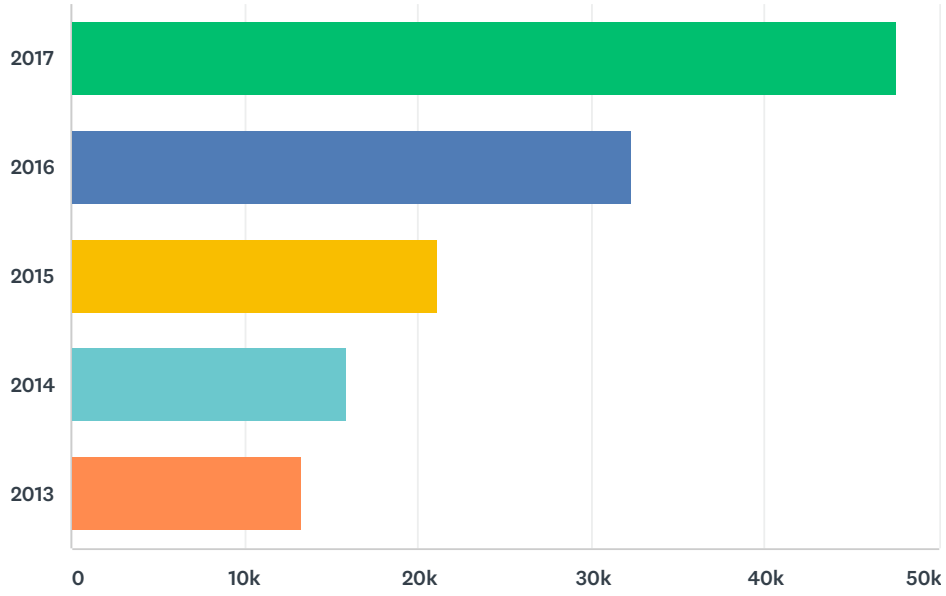
In the cabin.							
	NONE	**1**	**2**	**3**	**4**	**5 OR GREATER**	**TOTAL**
2017	61.11% 11	11.11% 2	5.56% 1	0.00% 0	11.11% 2	11.11% 2	18
2016	84.62% 11	0.00% 0	0.00% 0	0.00% 0	7.69% 1	7.69% 1	13
2015	91.67% 11	0.00% 0	0.00% 0	0.00% 0	8.33% 1	0.00% 0	12
2014	88.89% 8	11.11% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	9
2013	100.00% 9	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	9

In checked baggage on board.							
	NONE	**1**	**2**	**3**	**4**	**5 OR GREATER**	**TOTAL**
2017	92.86% 13	0.00% 0	7.14% 1	0.00% 0	0.00% 0	0.00% 0	14
2016	92.31% 12	0.00% 0	0.00% 0	0.00% 0	7.69% 1	0.00% 0	13
2015	100.00% 11	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	11
2014	90.00% 9	10.00% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	10
2013	100.00% 10	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	10

In the airport environment.							
	NONE	**1**	**2**	**3**	**4**	**5 OR GREATER**	**TOTAL**
2017	84.62% 11	7.69% 1	0.00% 0	0.00% 0	0.00% 0	7.69% 1	13
2016	91.67% 11	0.00% 0	0.00% 0	0.00% 0	0.00% 0	8.33% 1	12
2015	91.67% 11	8.33% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	12
2014	100.00% 9	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	9
2013	100.00% 9	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	9

Q8 Please enter the approximate number of sectors flown per year. (Please enter numerical values only. If not known, please enter 0)

Answered: 19 Skipped: 17



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
2017	47,585	904,124	19
2016	32,352	614,681	19
2015	21,155	401,953	19
2014	15,852	301,192	19
2013	13,308	252,858	19
Total Respondents: 19			

Appendix E: Traveler Survey Results

Travelers Poll 2018

Prepared by Ketchum Global Research & Analytics
March 2018

Table of contents

Research Overview

Overview and Objective

- **Overview**
  - Ketchum Global Research & Analytics, on behalf of IATA, conducted a survey to understand what kinds of devices people travel with, and to understand their awareness and perceptions on new airline restrictions, regulations, and policies.

- **The research's main objectives were to**
  - Enable IATA to provide regulators (through ICAO) with reliable data for consideration in decision making on regulations concerning the carriage of portable electronic devices and some other items which are subject to restrictions. This data includes
    - What items are carried
    - How they are carried
    - How much/many items are carried, and
    - How passengers inform themselves on relevant regulations
  - Provide IATA with data to understand traveler perceptions of key issues on which IATA advocates.
  - Provide IATA with basic data on how much travelers know about IATA.

Methodology

- To capture consumer attitudes and preferences around air travel restrictions, KGRA commissioned a brief online survey among air travelers in the U.S., U.K. and Hong Kong.

- Research Now fielded a 10-minute online survey from March 15-21, 2018 among a sample of general population consumers, 18 years of age or older who have traveled by plane in the last year.

- The sample included 250 business travelers and 250 leisure travelers per country.
    - **Business travelers** are defined as citizens of the respective country who travel for business by plane most often and who have done so in the past year
    - **Business Travelers** are defined as citizens of the respective country who travel for leisure by plane most often and who have done so in the past year

- At a 95% confidence level, the margin of error is +/-3.0 percentage point on the global level and +/- 4.4 percentage points at the total country level. The margin of error per sub sample (business and leisure travelers) is +/- 6.9 percentage points.

Executive Summary

Global key findings – Airline regulations

Across the U.S., U.K. and Hong Kong, the majority of recent fliers believe they are familiar with airline restrictions related to various items, including batteries.

However, across all countries, about one-third are still packing spare batteries in their checked baggage, indicating fliers may not be as knowledgeable as they think.

Airlines and traditional media are fliers' top sources to learn about battery restrictions – increase outreach in these channels to improve awareness.

- Across all countries, airline websites (41%) are the number one source to learn about lithium battery restrictions, followed by airline's online kiosk/check-in (33%) and traditional media (26%).
- Social media (18%) and travelers' companies/employers (14%) rank at the bottom, especially for leisure travelers.

Confidence in airlines' plans to tackle carbon emissions is high but resting on a shaky foundation.

- About eight-in-ten (78%) travelers are confident in airlines' plans to tackle carbon emission.
- However, of those, only 18% are very confident, suggesting an opportunity to further convince and educate travelers who are only somewhat confident (60%).
- This phenomenon is true across all countries and traveler sub-groups.

Global key findings – Security

Trust in sharing personal/biometric information with government authorities and airlines is high.

- Across all countries, travelers are willing to share their personal information with government authorities and airlines.
- U.K. travelers are more likely than the three-country average to trust sharing their information.
- Leisure and business travelers largely align, although leisure travelers (76%) are more likely than business travelers (70%) to provide government authorities with personal biometric data.

A majority of travelers describe their last airport security post experience as going smoothly.

- While about six-in-ten (62%) global travelers found their last airport security post experience positive, there is a relatively large segment (30%) who found their experience neither smooth nor unacceptable.
- Hong Kong travelers are most likely to fall in the passives category (40%), compared to U.S. (25%) and U.K. (24%) travelers.

Global key findings – Brand awareness

A majority of travelers are familiar with IATA.

- Across all countries, about two-thirds (63%) know a lot, some or a little about IATA.
  - Hong Kong travelers (71%) are most likely to know at least a little about the organization, compared to U.S. (55%) and U.K. travelers (64%).
  - Across the three countries, business (76%) travelers are more likely than leisure travelers (51%) to be at least a little familiar with IATA, suggesting a need to increase communications to leisure fliers.

However, only about 10% know a lot about IATA.

- It is often the case for most organizations that increasing knowledge of what the organization does and stands for will improve reputation and support.

Key findings – U.S.-only: Role of airports

Business travelers and leisure travelers are divided on whether ownership of airports should be shifted to become a for-profit and private company.

- Most business travelers (53%) support a shift to for-profit airports, while most leisure travelers (43%) oppose it.
- However, about a quarter (24%) or Americans don't care, suggesting a large passive audience that provides an opportunity to be educated and engaged.
    - Leisure travelers (31%) are about twice as likely as business travelers (16%) to not care.

Both traveler groups agree that an airport should first and foremost serve the local community.

- About two-thirds of leisure (69%) and business (60%) travelers say an airport's primary role is to serve the local community.
- However, once again, business travelers (34%) are also more likely than leisure travelers (17%) to say an airport's primary role is to generate a profit.
- About one-in-ten Americans don't have an opinion (10%), leisure travelers (15%) even more so than business travelers (6%).

U.S.-specific Findings

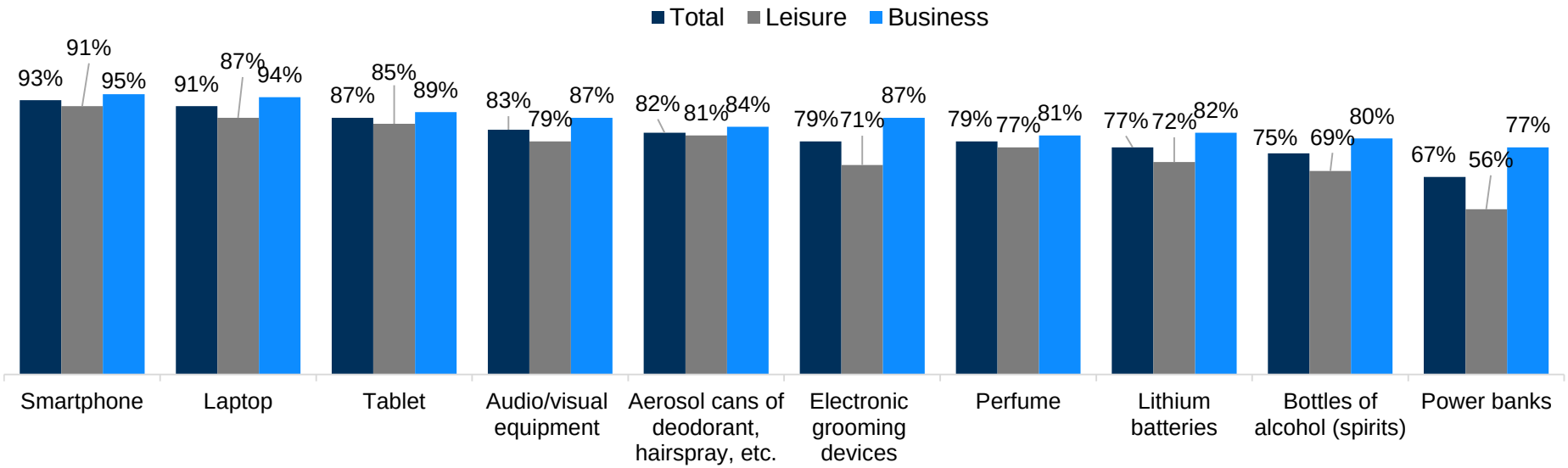
Airline Regulations

U.S.-specific Findings

Most fliers in the U.S. feel familiar with travel restrictions/requirements

- About nine-in-ten travelers say they know about restrictions related to smartphones (93%), laptops (91%) and tablets (87%). Significantly fewer, but still a lot, know about regulations of lithium batteries (77%) and power banks (67%).
- In most cases, business travelers know more than those who travel for leisure.

How familiar are you with restrictions/requirements for carrying each of the following items when traveling by plane?
(Those very/somewhat familiar)



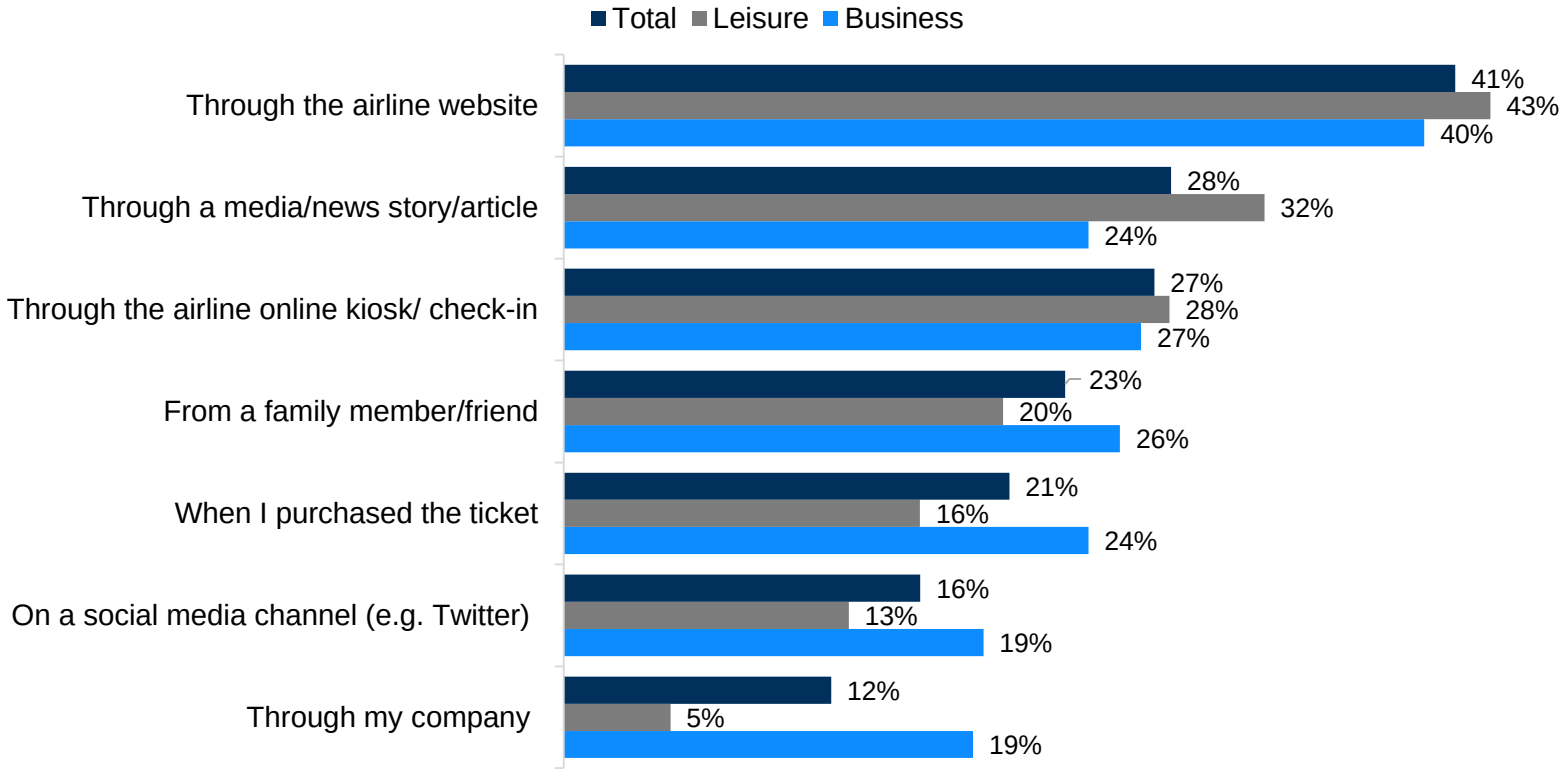
Q1. How familiar are you with restrictions/requirements for carrying each of the following items when traveling by plane? (Base: total n=506; Business Travelers n=252, Leisure Travelers n=254)

Ketchum Global Research & Analytics

Top sources for learning about the battery rules include airline websites, media and check-in kiosk

- Of the 77% of travelers overall who say they are familiar to lithium battery restrictions, most found out through airlines and traditional media.
- About one-in-five business travelers (19%) learned about it through their company, suggesting that B2B communications can be an important and effective tool to inform business travelers.

How were you made aware of the airline restrictions/requirements *related to lithium batteries*? I found out….
(Among those who say they are very/somewhat familiar with Lithium batteries)



Q2. We see you are familiar with Lithium batteries, how were you made aware of the airline restrictions/requirements related to lithium batteries? I found out…. (Base: those who are somewhat/very familiar with Lithium batteries: total n=388; Business Travelers n=206, Leisure Travelers n=182)

Ketchum Global Research & Analytics

Yet, one-third are still carrying batteries in their checked baggage

- This is even higher among business travelers (45%), indicating fliers are not as familiar with the latest restrictions as they think they are.

Travelers who carry one or more of each item in their *checked baggage*

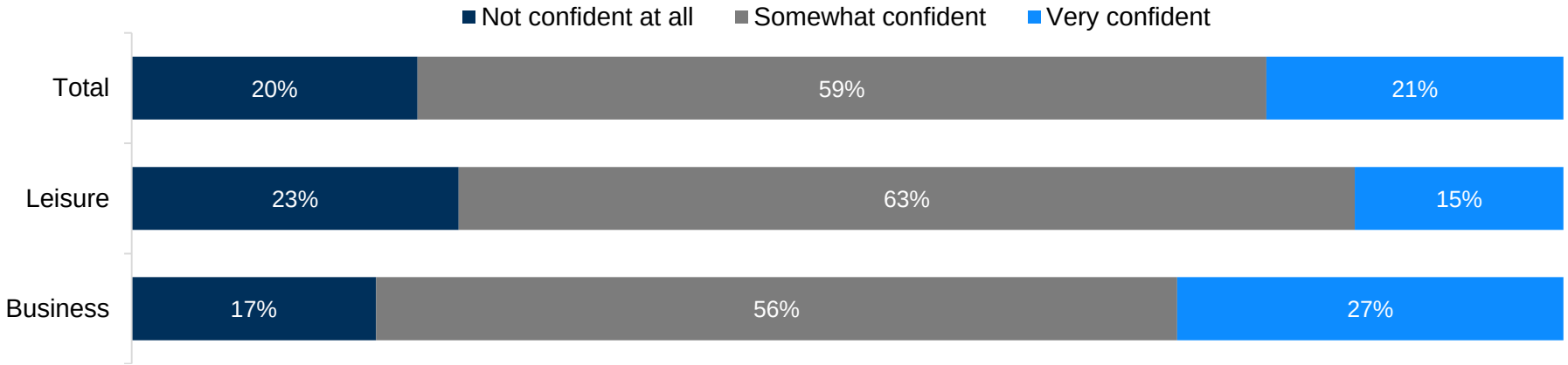
	U.S.		
	Total	**Leisure Travelers**	**Business Travelers**
	n=506	n=254	n=252
Electronic grooming devices	52%	40%	63%
Bottles of perfume	49%	42%	55%
Aerosol cans of deodorant, hairspray, etc.	46%	38%	54%
Audio/visual equipment	39%	26%	52%
Power banks	32%	18%	46%
Spare batteries	**33%**	**22%**	**45%**
Smartphone	33%	19%	47%
Tablet	32%	20%	44%
Laptop	36%	17%	54%
Bottles of alcohol (spirits)	20%	13%	27%

S3. How many of the following items would you normally take with you when flying? Items left blank will be counted as none. (U.S. business travelers n=252, U.S. leisure travelers n=254)

Confidence in tackling carbon emissions is strong, but still room for improvement

- However most are only “somewhat” confident, suggesting an opportunity to sway these travelers. Additionally, one in five are not confident at all.
- Business travelers are almost twice as likely as leisure travelers to believe in airlines’ plans, making them a potential spokesperson on the topic for a wider audience.

How confident are you that airlines have strong plans in place to tackle carbon emissions?



Q3. How confident are you that airlines have strong plans in place to tackle carbon emissions?: total n=506; Business Travelers n=252, Leisure Travelers n=254)

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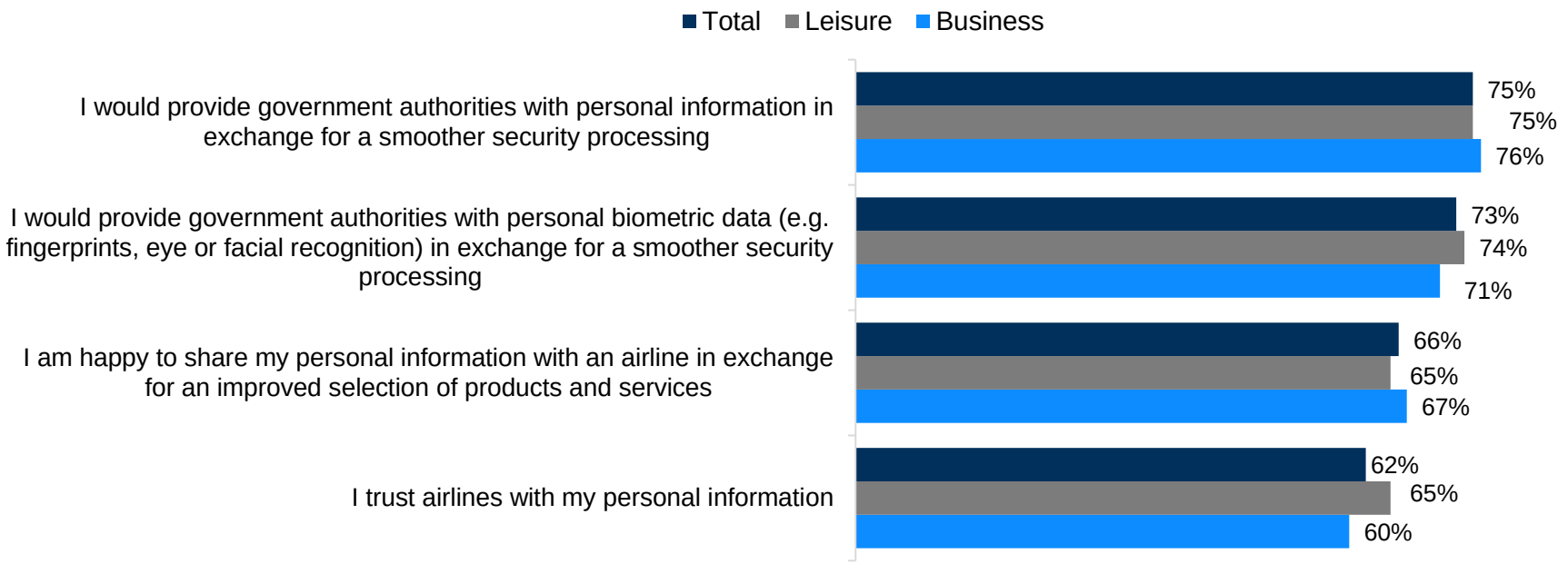
Security

U.S.-specific Findings

High trust in airlines and government authorities

- A majority of travelers are willing to share their personal and biometric information with airlines and government authorities, with no differences between leisure and business travelers.

How much do you agree or disagree with each of the following statements?
(Somewhat/strongly agree)



Q4. How much do you agree or disagree with each of the following statements?
(Base: total n=506; Business Travelers n=252, Leisure Travelers n=254)

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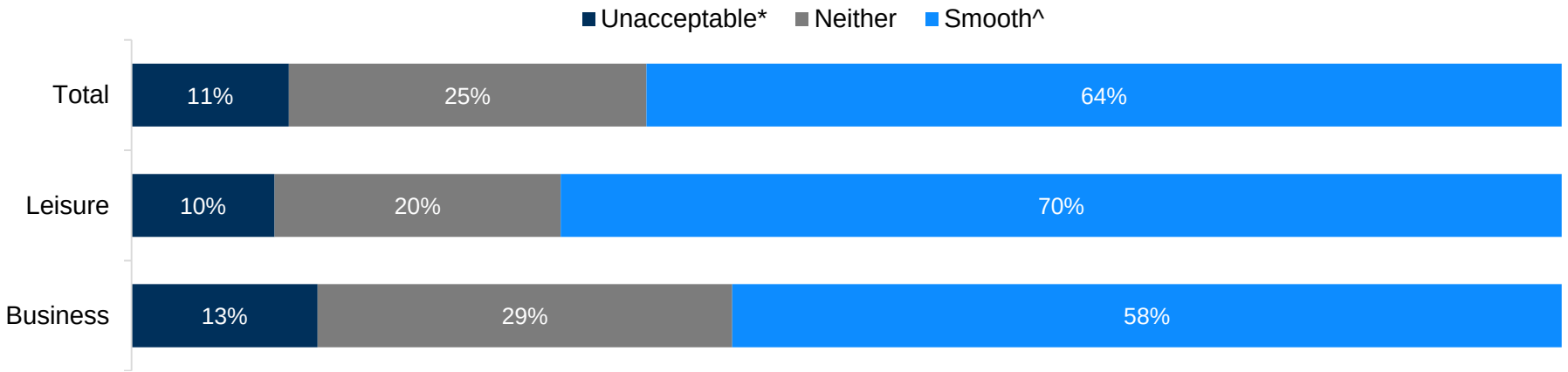
Airport security experiences are widely positive

- About two thirds (64%) of travelers describe their last airport experience as smooth.
- However, between 20-30% of travelers describe their experience as neither smooth nor unacceptable, suggesting room for opportunity to provide an improved experience to this audience.

How would you describe your last experience at an airport security post?



Q5. On a scale of 1 to 5, where 1 is "unacceptable and long hassles" and 5 is "very smooth and quick," how would you describe your last experience at an airport security post? (Base: total n=506; Business Travelers n=252, Leisure Travelers n=254)

** Bottom 2 box on a 1-5 scale*
^ Top 2 box on a 1-5 scale

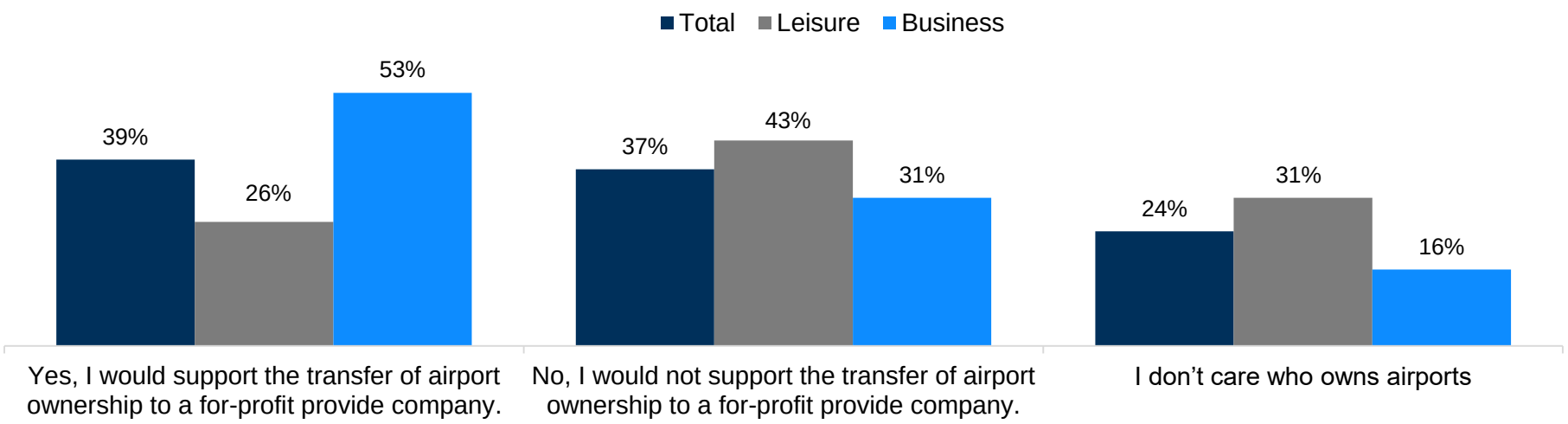
Role of Airports

U.S.-specific Findings

Business and leisure travelers are divided when it comes to future ownership of airports

- About half (53%) of business travelers would support shifting ownership of an airport to a for-profit private company, while two-in-five (43%) of leisure travelers oppose it.
- Additionally, about a quarter (24%) of travelers don't care, showing a relatively large group of passives, especially among leisure travelers (31% vs. 16% of business travelers).

Would you support transferring ownership of the airport you use most often to a for-profit private company?



Q7. Today nearly all us airports are owned by a local, state or regional government authority. would you support transferring ownership of the airport you use most often to a for-profit private company? (Base: total n=506; Business Travelers n=252, Leisure Travelers n=254)

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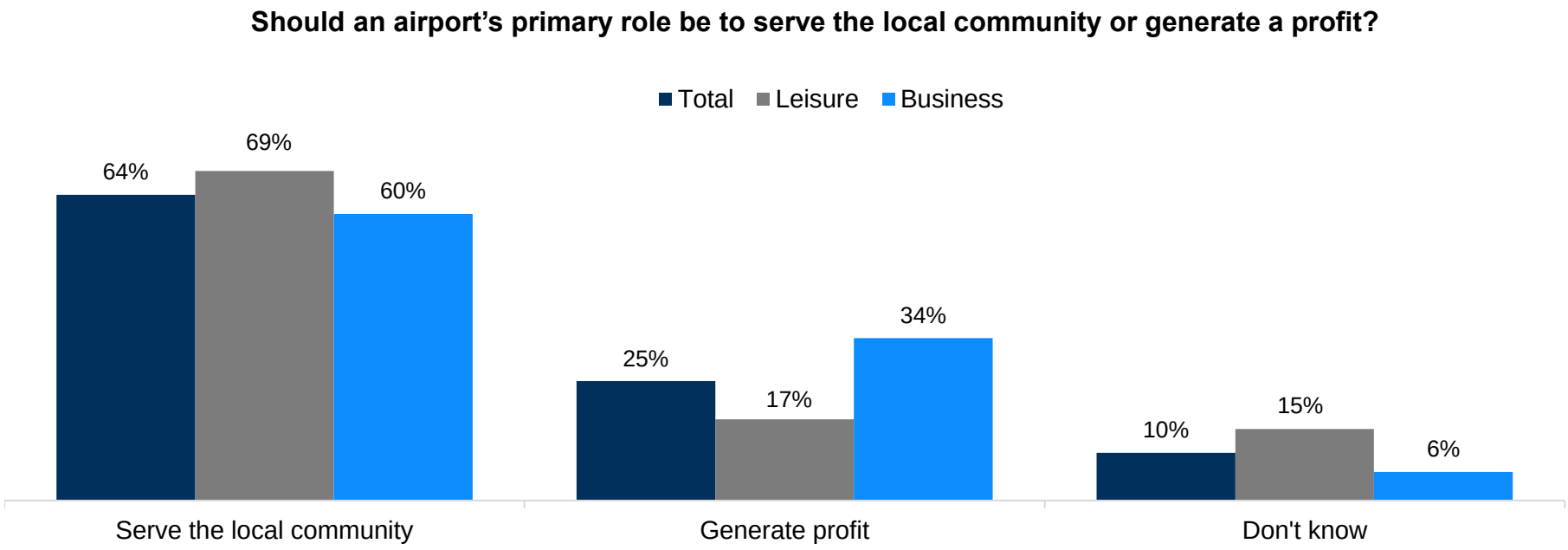
But they are aligned in that airports should serve the local community

- Leisure (69%) and business (60%) travelers agree that an airport should primarily serve the local community over generating profit.



Q8. Should an airport's primary role be to serve the local community or generate a profit? (Base: total n=506; Business Travelers n=252, Leisure Travelers n=254)

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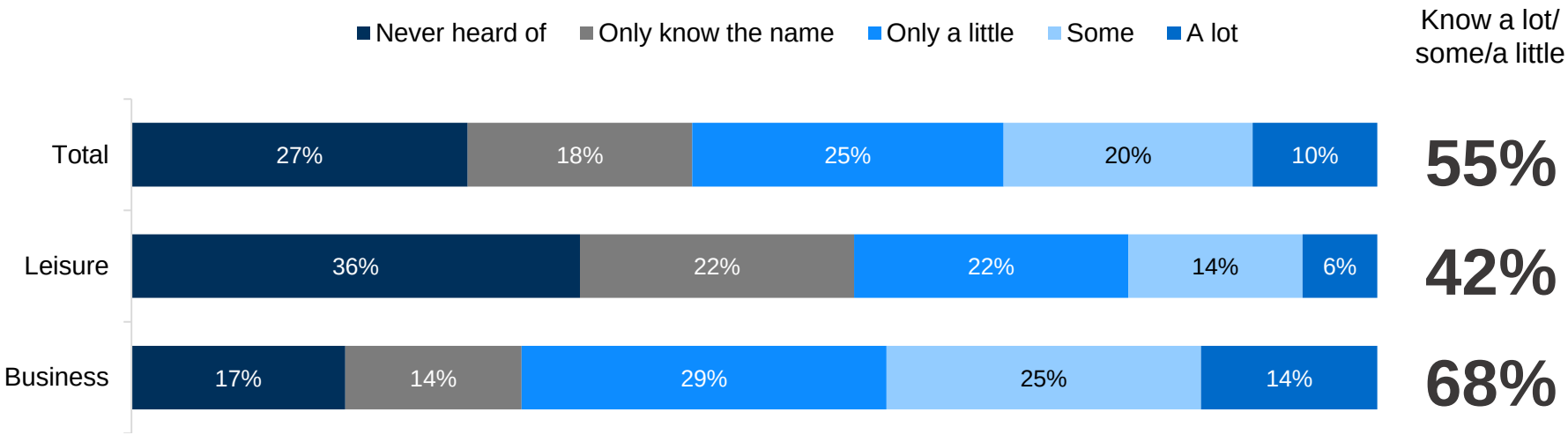
Brand Awareness

U.S.-specific Findings

Half of fliers know a least a little about IATA; familiarity highest among business travelers

- However, only one in ten know a lot about IATA, indicating room for improvement.
- Business travelers have the potential to act as spokespeople for a wider audience, and engaging and informing leisure travelers more in the future is equally as crucial.

How much do you know about IATA—the International Air Transport Association?



Q6. How much do you know about IATA—the International Air Transport Association? (Base: total n=506; Business Travelers n=252, Leisure Travelers n=254)

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U.K.-specific Findings

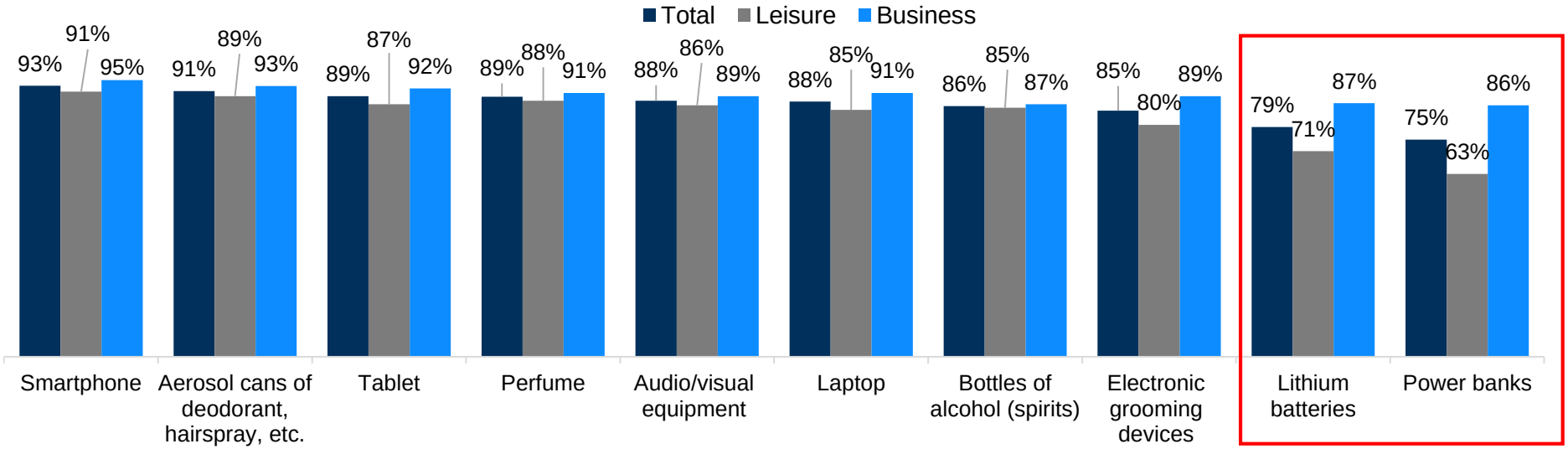
Airline Regulations

U.K.-specific Findings

Familiarity with restrictions is high overall

- Leisure and business travelers are largely on par in knowing the restrictions and requirements of carrying each item with them.
- However, business travelers know more about restrictions related to lithium batteries (87% vs. 71% leisure travelers) and power banks 86% vs. 63% leisure travelers).

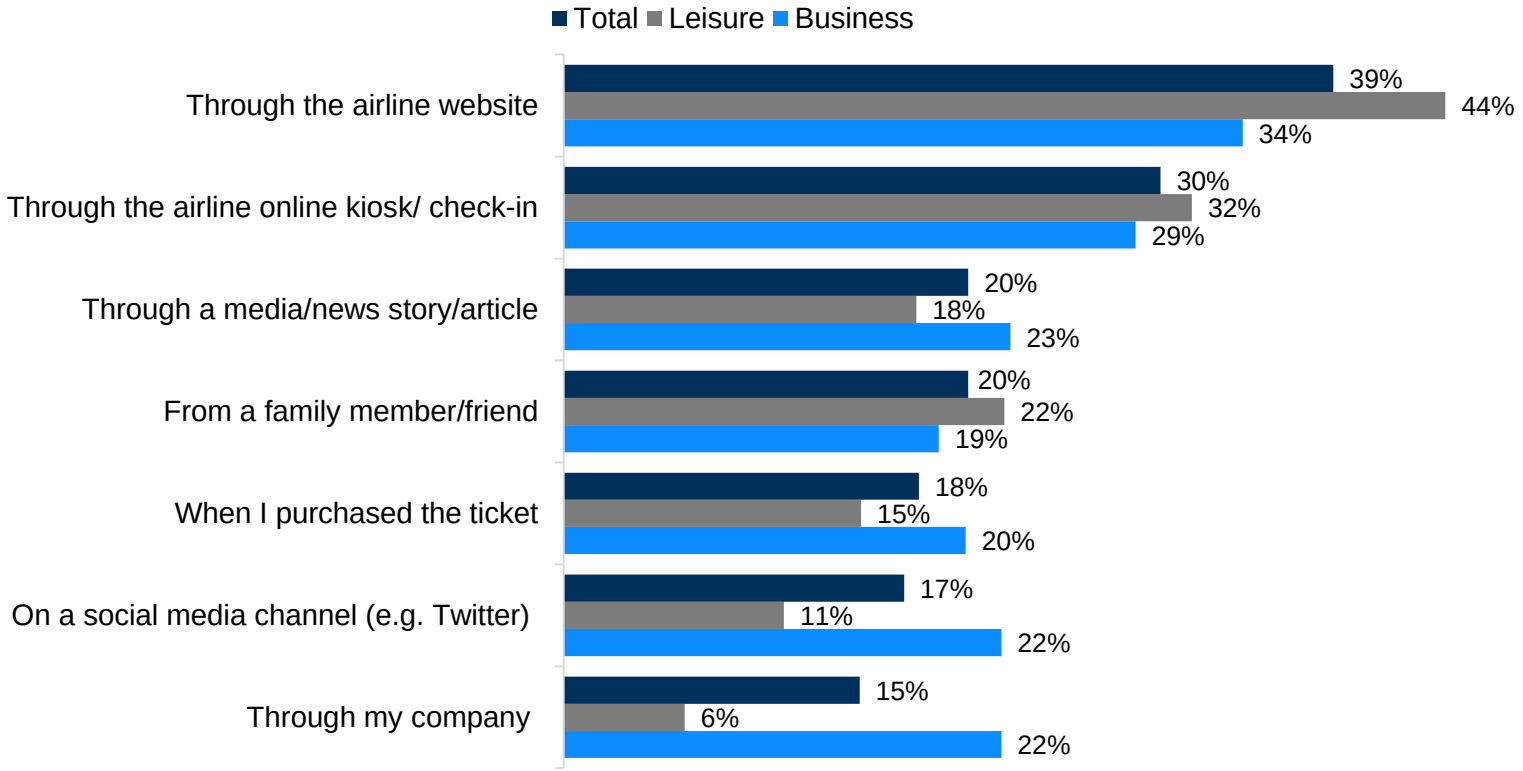
How familiar are you with restrictions/requirements for carrying each of the following items when traveling by plane?
(Those very/somewhat familiar)



Airlines are the top source of information on battery regulations

- Most travelers learned about lithium batteries through the airline website (39%) and kiosk/check-in (30%).
- Business travelers are more likely to have learned about it through their company (22%) and social media (22%).

How were you made aware of the airline restrictions/requirements related to lithium batteries? I found out…
(Among those very/somewhat familiar with Lithium batteries)



Q2. We see you are familiar with Lithium batteries, how were you made aware of the airline restrictions/requirements related to lithium batteries? I found out…. (Base: those who are somewhat/very familiar with Lithium batteries: total n=402; Business Travelers n=222, Leisure Travelers n=180)

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Yet, one-third are still carrying batteries in their checked baggage

- This is even higher among business travelers (42%), indicating fliers are not as familiar with the latest restrictions as they think they are.

Travelers who carry one or more of each item in their *checked baggage*

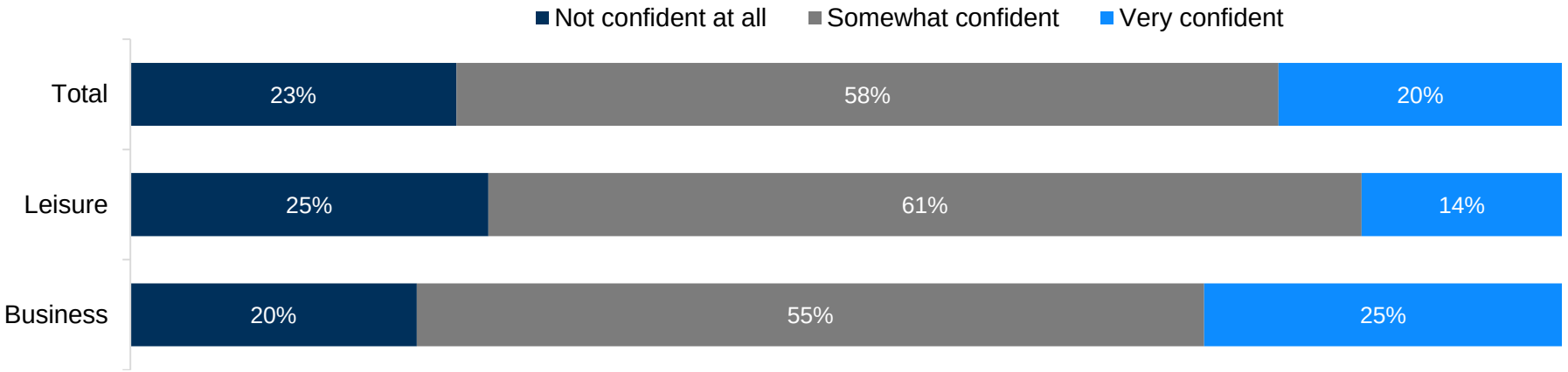
	U.K.		
	Total	**Leisure Travelers**	**Business Travelers**
	n=510	n=255	n=255
Electronic grooming devices	59%	55%	64%
Bottles of perfume	58%	56%	61%
Aerosol cans of deodorant, hairspray, etc.	63%	67%	60%
Audio/visual equipment	39%	33%	45%
Power banks	37%	27%	46%
Spare batteries	35%	28%	42%
Smartphone	31%	21%	41%
Tablet	33%	25%	41%
Laptop	30%	15%	44%
Bottles of alcohol (spirits)	23%	16%	29%

S3. How many of the following items would you normally take with you when flying? Items left blank will be counted as none.

Confidence in tackling carbon emissions is strong, but still room for improvement

- Compared to leisure travelers (14%), business travelers (25%) are more likely to feel very confident towards airlines' plans to tackle carbon emissions.
- However, there is a large portion among both leisure and business travelers who are only somewhat confident, suggesting an opportunity to sway this segment among both groups of travelers.

How confident are you that airlines have strong plans in place to tackle carbon emissions?



Q3. How confident are you that airlines have strong plans in place to tackle carbon emissions?: total n=510; Business Travelers n=255, Leisure Travelers n=255)

Ketchum Global Research & Analytics

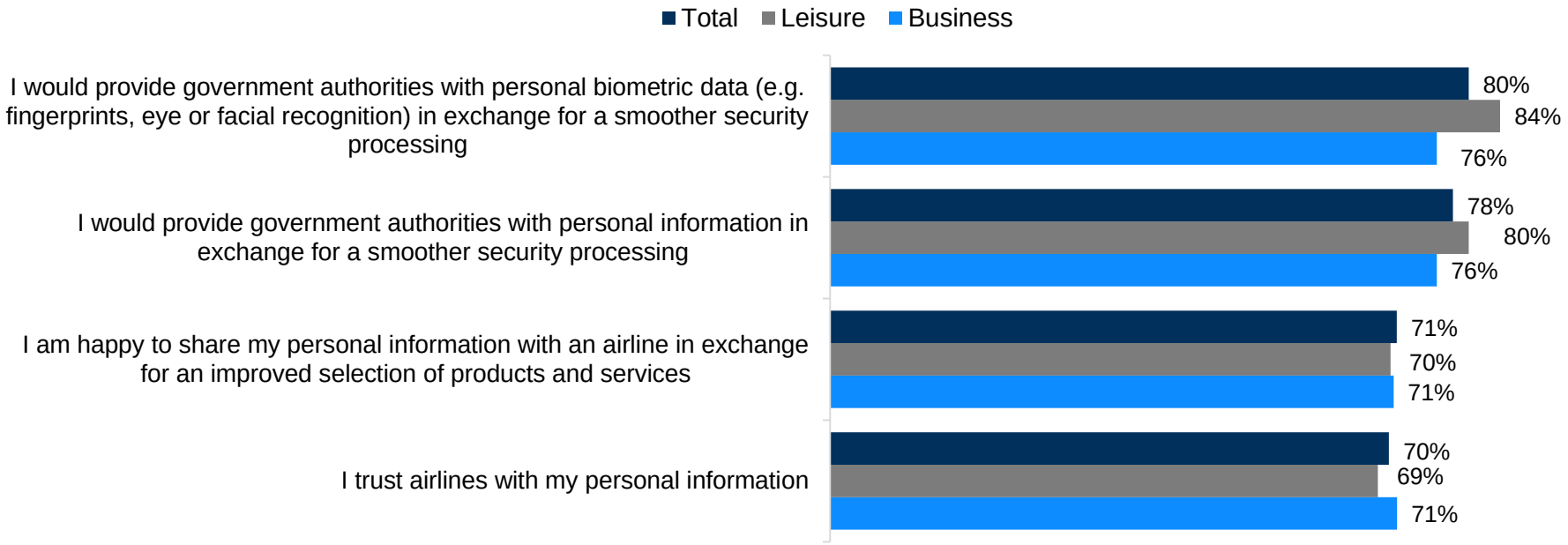
Security

U.K.-specific Findings

Travelers trust airlines and government authorities

- Leisure and business travelers have about equally as high trust in sharing their personal and/or biometric information with airlines as well as government authorities.
- Directionally, trust is higher towards government authorities than airlines.

How much do you agree or disagree with each of the following statements?
(Somewhat/strongly agree)



Q4. How much do you agree or disagree with each of the following statements? (Base: total n=510; Business Travelers n=255, Leisure Travelers n=255)

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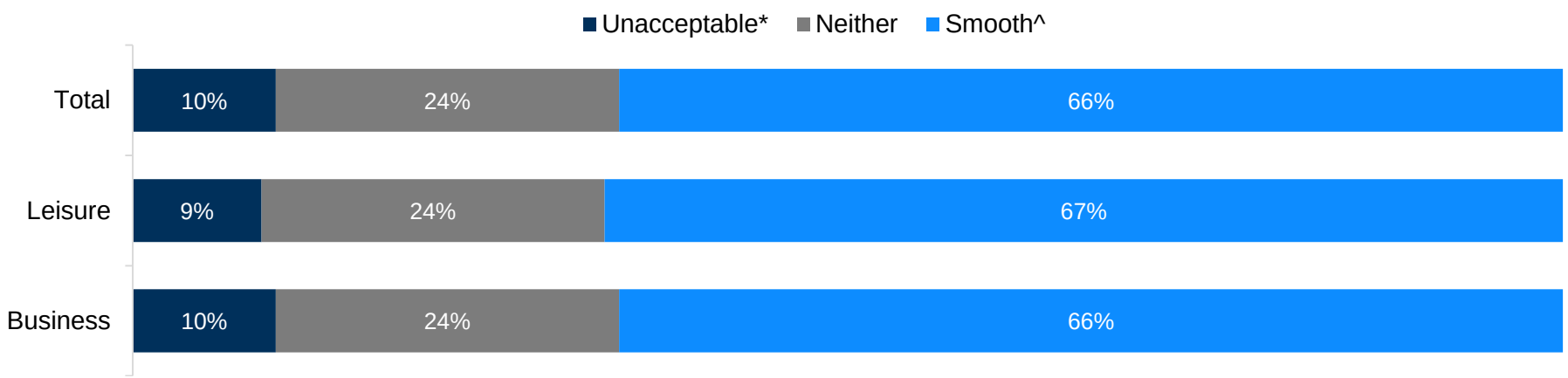
Airport security experience positive for most

- About two-thirds (66%) describe their last airport security experience as smooth, with no differences between leisure (67%) and business travelers (66%).
- However, about a quarter had neither a positive nor negative experience, suggesting an opportunity to further engage these customers.

How would you describe your last experience at an airport security post?



Q5. On a scale of 1 to 5, where 1 is "unacceptable and long hassles" and 5 is "very smooth and quick," how would you describe your last experience at an airport security post? (Base: total n=510; Business Travelers n=255, Leisure Travelers n=255)

** Bottom 2 box on a 1-5 scale*
^ Top 2 box on a 1-5 scale

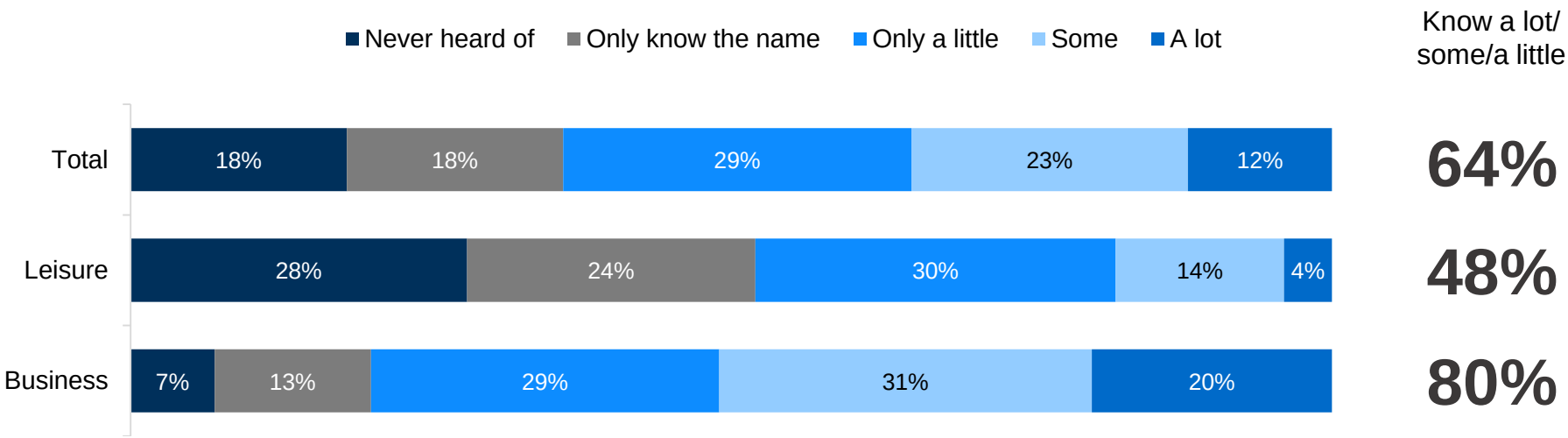
Brand Awareness

U.K.-specific Findings

Nearly one-quarter of British business fliers know a lot about IATA

- Eight-in-ten (80%) business travelers know a lot, some or a little about IATA.
- However, only about half (48%) of leisure travelers say the same, and around three-in-ten say they have never heard of the organization.
- This suggests a large gap in awareness between the two different segments, emphasizing the importance to increase awareness among B2C customers.

How much do you know about IATA—the International Air Transport Association?



Q6. How much do you know about IATA—the International Air Transport Association? (Base: total n=510; Business Travelers n=255, Leisure Travelers n=255)

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Hong Kong-specific Findings

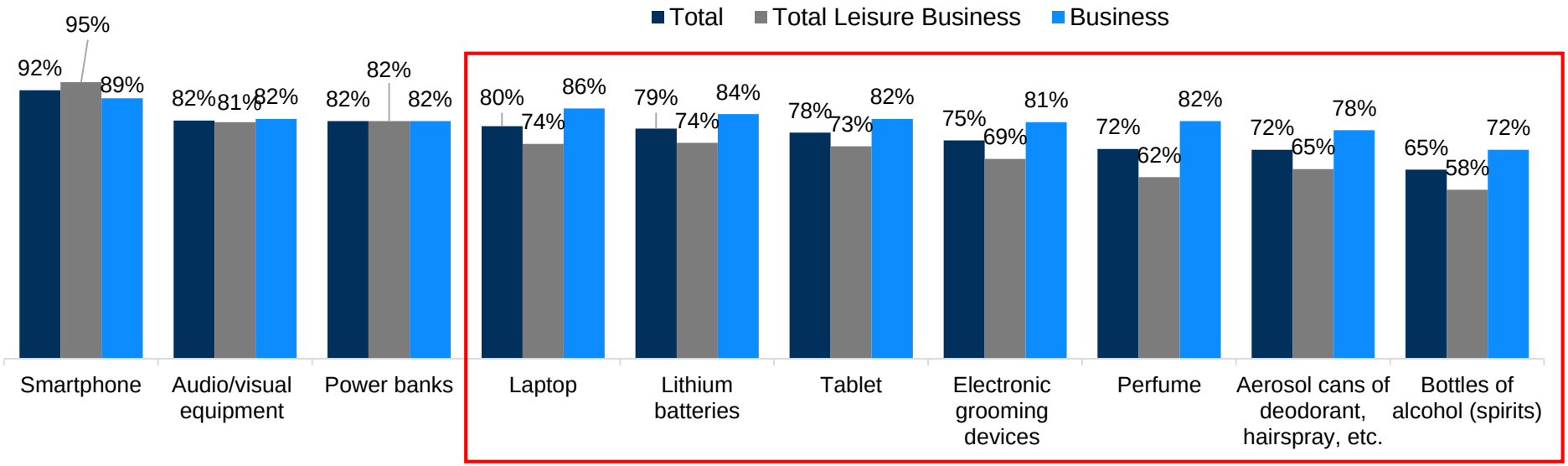
Airline Regulations

Hong Kong-specific Findings

Hong Kong fliers say they know about restrictions

- While Hong Kong travelers say they are highly aware of restrictions of all items, knowledge is lowest in relation to perfume (72%), aerosol cans (72%) and bottles of alcohol (65%).
- Business travelers are more familiar with travel restrictions in relation to laptops, lithium batteries, tablets, electronic grooming devices, perfume, aerosol cans and bottles of alcohol.

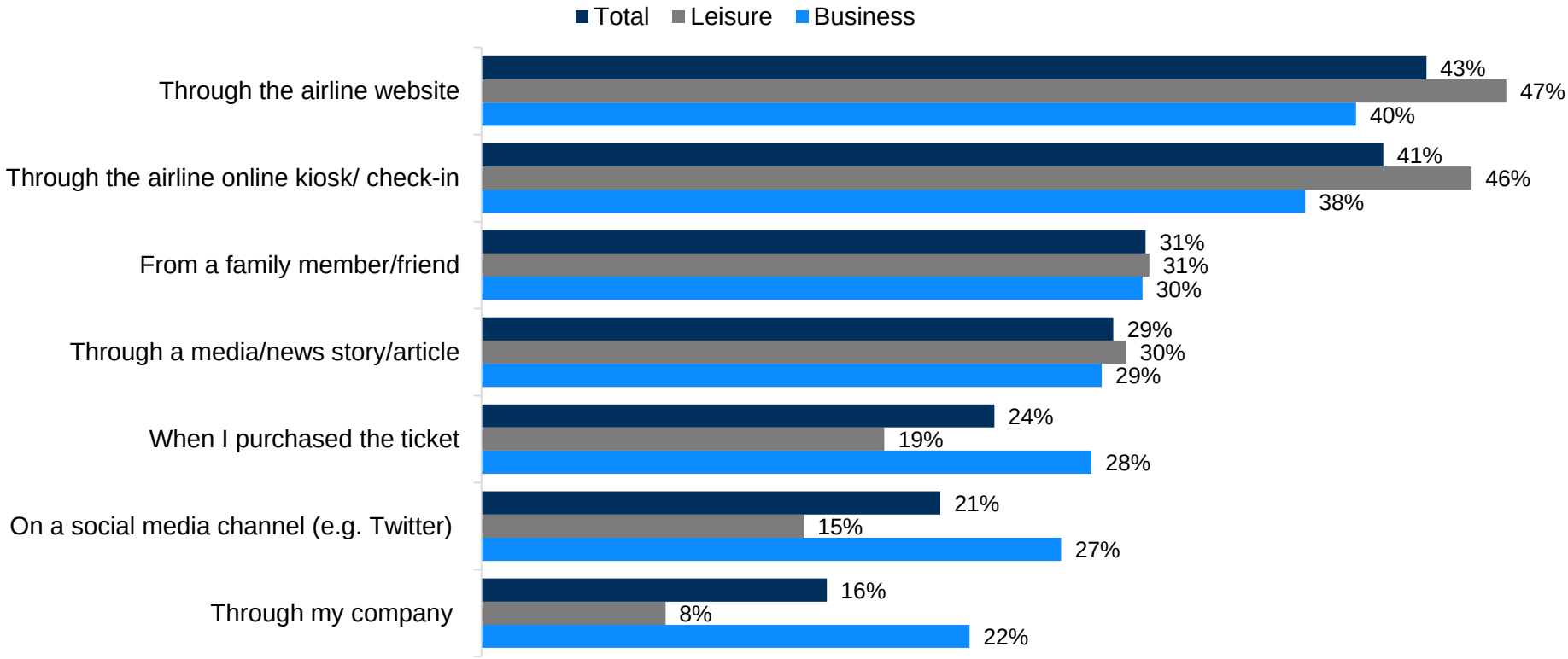
How familiar are you with restrictions/requirements for carrying each of the following items when traveling by plane?
(Those very/somewhat familiar)



Airlines are the top source of information for battery restrictions

- Most travelers learned about restrictions related to lithium batteries through their airlines' website (40%) or kiosk/check-in (38%).
- Social media and employers are less like the source, though popular among business travelers (27% and 22%, respectively).

How were you made aware of the airline restrictions/requirements related to lithium batteries? I found out….
(Among those very/somewhat familiar with Lithium batteries)



Q2. We see you are familiar with Lithium batteries, how were you made aware of the airline restrictions/requirements related to lithium batteries? I found out…. (Base: those who are somewhat/very familiar with Lithium batteries: total n=403; Business Travelers n=214, Leisure Travelers n=189)

Yet, nearly two out of five are still carrying batteries in their checked baggage

- This is even higher among business travelers (45%), indicating fliers are not as familiar with the latest restrictions as they think they are.

Travelers who carry one or more of each item in their *checked baggage*

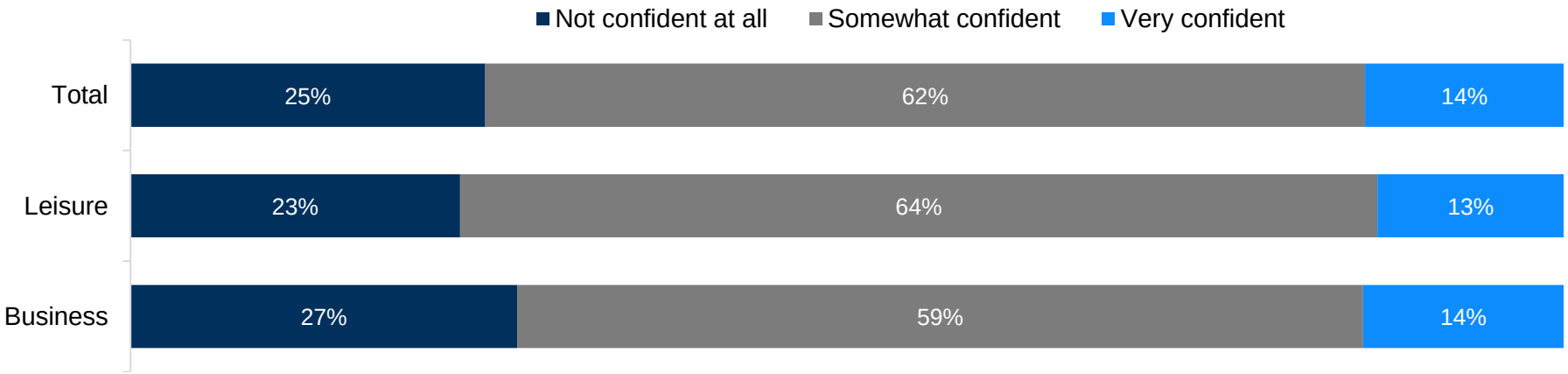
	Hong Kong		
	Total	**Leisure Travelers**	**Business Travelers**
	n=510	n=255	n=255
Electronic grooming devices	51%	44%	57%
Bottles of perfume	44%	34%	55%
Aerosol cans of deodorant, hairspray, etc.	42%	36%	48%
Audio/visual equipment	36%	27%	45%
Power banks	38%	32%	45%
Spare batteries	37%	28%	45%
Smartphone	31%	22%	40%
Tablet	32%	24%	40%
Laptop	31%	18%	44%
Bottles of alcohol (spirits)	25%	16%	34%

S3. How many of the following items would you normally take with you when flying? Items left blank will be counted as none.

Similar to the U.S. and U.K., confidence in airlines tackling carbon emissions is strong in Hong Kong but still room for improvement

- About three-quarters (75%) of travelers are somewhat or very confident in airlines' plans to tackle carbon emissions.
- However, about a quarter (25%) have no confidence at all, suggesting an opportunity to further educate this audience.
- Additionally, merely one-in-seven (14%) say they are very confident, suggesting that support among travelers may be resting on a shaky foundation. This also provides an opportunity to strengthen confidence in those already susceptive of airlines' plans.

How confident are you that airlines have strong plans in place to tackle carbon emissions?



Q3. How confident are you that airlines have strong plans in place to tackle carbon emissions?: total n=510; Business Travelers n=255, Leisure Travelers n=255)

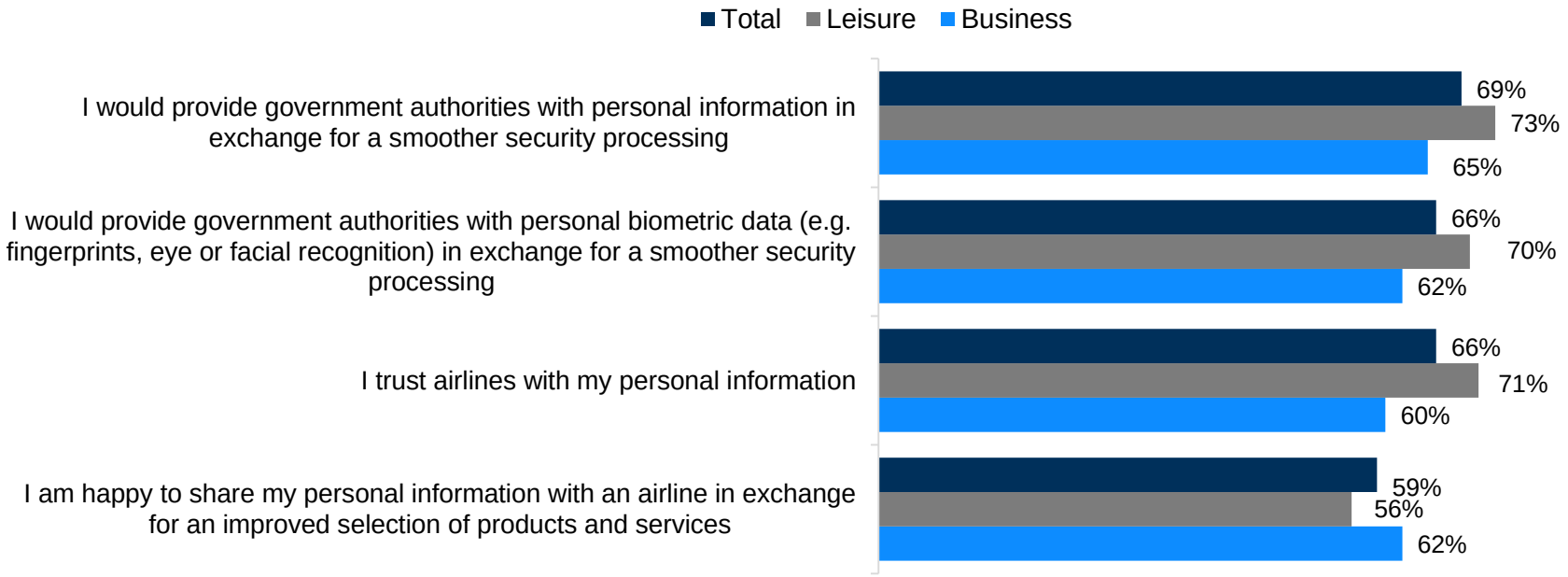
Security

Hong Kong-specific Findings

High trust in airlines and government authorities

- A majority of Hong Kong travelers are willing to share personal and/or biometric data with airlines and government authorities.
- There are no significant differences between leisure and business travelers.

How much do you agree or disagree with each of the following statements?
(Somewhat/strongly agree)



Q4. How much do you agree or disagree with each of the following statements? (Base: total n=510; Business Travelers n=255, Leisure Travelers n=255)

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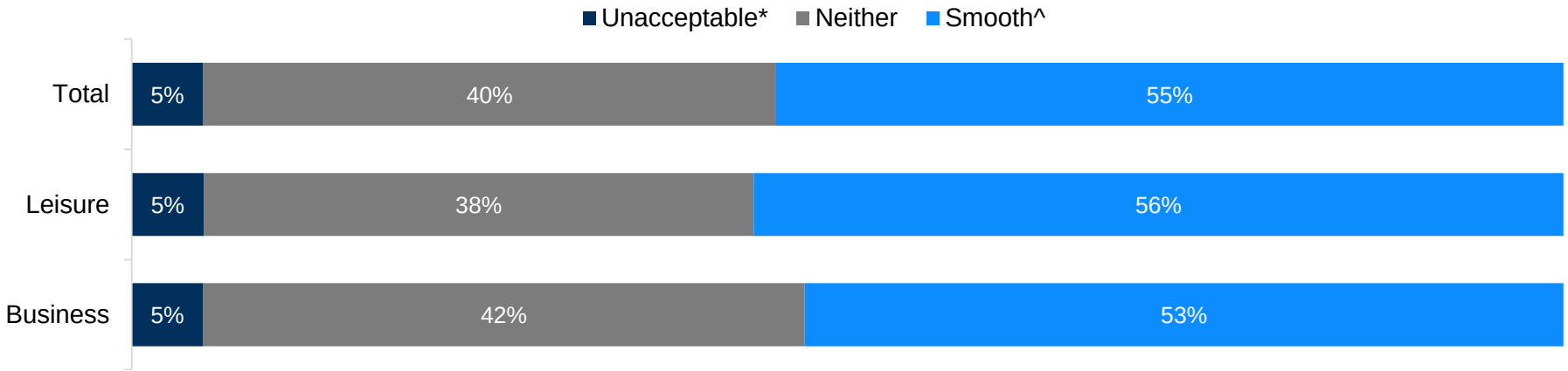
About half had ‘smooth’ airport security experience; room for improvement

- 55% of travelers describe their last airport security experience as smooth.
- While an almost negligible amount (5%) of travelers find their latest airport security experience as unacceptable, about four-in-ten (40%) have neither positive nor negative memories, suggesting room for opportunity to improve these travelers’ experience.

How would you describe your last experience at an airport security post?



Q5. On a scale of 1 to 5, where 1 is “unacceptable and long hassles” and 5 is “very smooth and quick,” how would you describe your last experience at an airport security post? (Base: total n=510; Business Travelers n=255, Leisure Travelers n=255)

** Bottom 2 box on a 1-5 scale*
^ Top 2 box on a 1-5 scale

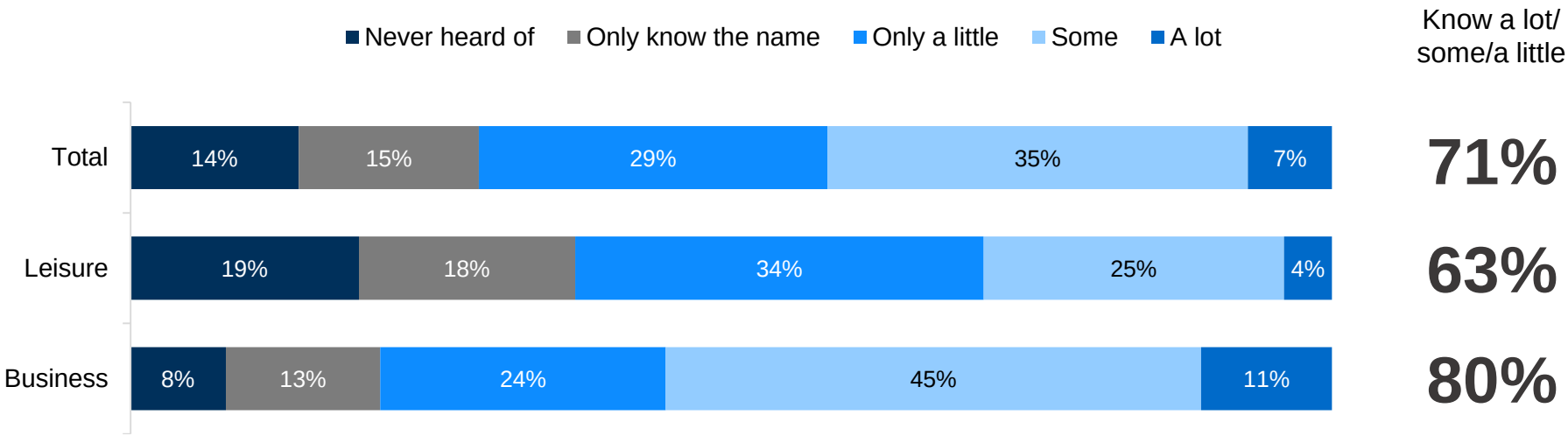
Brand Awareness

Hong Kong-specific Findings

High familiarity with IATA in Hong Kong

- About seven-in-ten (71%) travelers know a lot, some or a little about IATA.
- Business travelers are more likely to know IATA, while about one-in-five (19%) leisure travelers have never heard of the organization.

How much do you know about IATA—the International Air Transport Association?



Q6. How much do you know about IATA—the International Air Transport Association? (Base: total n=510; Business Travelers n=255, Leisure Travelers n=255)

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Appendix: Additional Findings

Globally, there are significant differences between what travelers carry on flight vs. checked baggage

- However, frequent fliers are **just as likely to pack spare batteries in their carry-on as their checked baggage,** indicating education still needed on new TSA rules banning lithium batteries in checked baggage.

Global Total n=1,526	**Packed in Checked Baggage**	**Packed in Carry-On**
Electronic grooming devices	**54%**	34%
Bottles of perfume	**50%**	33%
Aerosol cans of deodorant, hairspray, etc.	**50%**	30%
Audio/visual equipment	38%	**57%**
Power banks	36%	**49%**
Spare batteries	35%	37%
Smartphone	32%	**84%**
Tablet	32%	**54%**
Laptop	32%	**53%**
Bottles of alcohol (spirits)	23%	21%

S3. How many of the following items would you normally take with you when flying? Items left blank will be counted as none.

Green font indicates this is significantly higher compared to checked vs. carry-on baggage respectively

Travel items in checked baggage similar across the globe

- However, there are differences between leisure and business travelers, as the latter group is significantly more likely to pack most items in their *checked baggage.*
- About one-third in each country pack spare batteries in their checked baggage.

Travelers who carry one or more of each item in their *checked baggage*

		U.S.			U.K.			Hong Kong		
	Global Total	Total	Leisure Travelers	Business Travelers	Total	Leisure Travelers	Business Travelers	Total	Leisure Travelers	Business Travelers
	n=1,526	n=506	n=254	n=252	n=510	n=255	n=255	n=510	n=255	n=255
Electronic grooming devices	54%	52%	40%	63%	59%	55%	64%	51%	44%	57%
Bottles of perfume	50%	49%	42%	55%	58%	56%	61%	44%	34%	55%
Aerosol cans of deodorant, hairspray, etc.	50%	46%	38%	54%	63%	67%	60%	42%	36%	48%
Audio/visual equipment	38%	39%	26%	52%	39%	33%	45%	36%	27%	45%
Power banks	36%	32%	18%	46%	37%	27%	46%	38%	32%	45%
Spare batteries	35%	33%	22%	45%	35%	28%	42%	37%	28%	45%
Smartphone	32%	33%	19%	47%	31%	21%	41%	31%	22%	40%
Tablet	32%	32%	20%	44%	33%	25%	41%	32%	24%	40%
Laptop	32%	36%	17%	54%	30%	15%	44%	31%	18%	44%
Bottles of alcohol (spirits)	23%	20%	13%	27%	23%	16%	29%	25%	16%	34%

S3. How many of the following items would you normally take with you when flying? Items left blank will be counted as none. (Global business travelers n=762, global leisure travelers n=764)

Carry-on items also similar across the globe

- Items that travelers pack in their carry-ons are similar across the globe, including smartphones, tablets and audio/visual equipment.
- Similar to checked baggage, business travelers tend to bring significantly more items on board than leisure travelers (across most items).

Travelers who carry one or more of each item in their *carry-on baggage*

		U.S.			U.K.			Hong Kong		
	Global Total	Total	Leisure Travelers	Business Travelers	Total	Leisure Travelers	Business Travelers	Total	Leisure Travelers	Business Travelers
	n=1,526	n=506	n=254	n=252	n=510	n=255	n=255	n=510	n=255	n=255
Smartphone	84%	81%	79%	83%	84%	81%	87%	88%	90%	86%
Audio/visual equipment	57%	53%	48%	58%	55%	55%	56%	62%	61%	63%
Tablet	54%	53%	48%	58%	57%	51%	63%	53%	45%	60%
Laptop	53%	55%	42%	67%	52%	32%	72%	52%	36%	68%
Power banks	49%	42%	28%	55%	42%	29%	55%	65%	61%	68%
Spare batteries	37%	35%	25%	44%	28%	18%	38%	49%	42%	56%
Electronic grooming devices	34%	38%	27%	49%	31%	20%	42%	33%	26%	40%
Bottles of perfume	33%	35%	25%	44%	37%	30%	45%	27%	20%	33%
Aerosol cans of deodorant, hairspray, etc.	30%	33%	24%	41%	31%	21%	42%	26%	18%	35%
Bottles of alcohol (spirits)	21%	17%	8%	26%	24%	18%	31%	22%	14%	29%

S3. How many of the following items would you normally take with you when flying? Items left blank will be counted as none. (Total: business travelers n=762; leisure travelers n=764)

On average, Americans pack more items in their checked baggage than travelers from the U.K. and Hong Kong

- Business travelers across the globe are also more likely to pack more of each item than leisure travelers.
- Global travelers pack an average of two spare batteries in their checked baggage; Americans pack an average of three spare batteries in their checked baggage.

Average amount of devices travelers pack in their *checked baggage

	Global Total	U.S. Total	U.S. Leisure Travelers	U.S. Business Travelers	U.K. Total	U.K. Leisure Travelers	U.K. Business Travelers	Hong Kong Total	Hong Kong Leisure Travelers	Hong Kong Business Travelers
	n=1,526	n=506	n=254	n=252	n=510	n=255	n=255	n=510	n=255	n=255
Spare batteries	2	3	2	3	2	2	2	2	2	2
Bottles of alcohol (spirits)	2	2	2	3	2	2	2	2	2	2
Tablet	2	2	2	2	2	2	2	2	2	2
Smartphone	2	2	2	2	2	1	2	2	2	2
Power banks	2	2	2	2	2	1	2	2	2	2
Audio/visual equipment	2	2	2	2	2	1	2	2	2	2
Laptop	2	2	2	2	2	2	2	2	2	2
Aerosol cans of deodorant, hairspray, etc.	2	2	2	2	2	2	2	2	2	2
Electronic grooming devices	2	2	2	2	2	2	2	2	2	2
Bottles of perfume	2	2	2	2	2	1	2	2	2	2

S3. How many of the following items would you normally take with you when flying? Items left blank will be counted as none.

** Among those who carry at least one of each item (i.e. excluding 0)*

Similar to checked baggage, Americans and business travelers pack the most items in their carry-on

- Global travelers pack an average of two batteries in their carry-on, although Americans pack an average of three spare batteries – more than travelers form the U.K. and Hong Kong.

Average amount of devices travelers pack in their *carry-on baggage

	Global	U.S.			U.K.			Hong Kong		
	Global Total	Total	Leisure Travelers	Business Travelers	Total	Leisure Travelers	Business Travelers	Total	Leisure Travelers	Business Travelers
	n=1,526	n=506	n=254	n=252	n=510	n=255	n=255	n=510	n=255	n=255
Aerosol cans of deodorant, hairspray, etc.	2	2	2	3	2	2	2	2	2	2
Bottles of alcohol (spirits)	2	2	2	3	2	2	2	2	2	2
Spare batteries	2	3	2	3	2	2	2	2	1	2
Electronic grooming devices	2	2	2	2	2	2	2	2	2	2
Bottles of perfume	2	2	2	2	2	1	2	2	2	2
Audio/visual equipment	2	2	1	2	2	1	2	1	1	2
Power banks	2	2	2	2	2	1	2	1	1	2
Tablet	2	2	1	2	1	1	2	2	1	2
Laptop	2	2	1	2	1	1	2	1	1	2
Smartphone	1	2	1	2	1	1	1	1	1	1

S3. How many of the following items would you normally take with you when flying? Items left blank will be counted as none. (Total: business travelers n=762; leisure travelers n=764)

** Among those who carry at least one of each item (i.e. excluding 0)*

Most travelers carry at least one lithium powered items; many carry those alongside alcohol, aerosol and perfume

- A majority of travelers carry lithium battery powered items in their checked baggage (74%) and carry-on (96%).
- Many also carry lithium battery powered items alongside alcohol, aerosol and/or perfume in their checked baggage (57%) and carry-on (44%). Business travelers tend to be more likely to follow this behavior than leisure travelers.

		U.S.			U.K.			Hong Kong		
	Global Total	Total	Leisure Travelers	Business Travelers	Total	Leisure Travelers	Business Travelers	Total	Leisure Travelers	Business Travelers
	n=1,526	n=506	n=254	n=252	n=510	n=255	n=255	n=510	n=255	n=255
Checked baggage*										
Carry at least one lithium battery powered item with them in their carry on	74%	71%	60%	83%	78%	75%	82%	73%	64%	81%
Carry at least one lithium battery powered item AND at least one alcohol/aerosol/ perfume with them in their carry on	57%	53%	42%	65%	66%	63%	69%	51%	40%	63%
Carry-on baggage*										
Carry at least one lithium battery powered item with them in their checked baggage	96%	95%	93%	96%	97%	95%	98%	97%	97%	96%
Carry at least one lithium battery powered item AND at least one alcohol/aerosol/ perfume with them in their checked baggage	44%	45%	34%	57%	50%	42%	58%	36%	27%	45%

S3. How many of the following items would you normally take with you when flying? Items left blank will be counted as none.

**Note: We did not ask which items travelers carry together. This analysis is based on which items each traveler normally carries with them when traveling.*

Travelers Poll 2018

Prepared by Ketchum Global Research & Analytics
March 2018

Appendix F Response to ICAO survey FINAL

Contents

1.1 Background

In January of 2018, the ICAO Secretary General wrote to Alexandre de Juniac, requesting that IATA airline members complete an ICAO designed survey. A copy of that letter is attached as Appendix A. The survey was designed to better understand the risks associated with the carriage of portable electronic devices (PEDs) in checked baggage and to seek data to more precisely determine the associated safety risks.

IATA Safety considers that the survey questions provided were subjective and could not be answered with any degree of accuracy by airlines as the majority of questions related to items contained within passengers' baggage, which the operator would not be aware of. In order to remedy this, IATA proposed the distribution and administration of two separate surveys - one to airlines and one to travelers - to gather data more effectively. IATA met with ICAO to propose this approach and ICAO agreed. The surveys may be found as Appendices B and C to this paper.

1.2 Specific comments in response to ICAO Survey questions

1.2.1 Q1 How many aircraft with Class D compartments or equivalent are currently in operation?

26 airlines responded to IATA's request for information. The total number of Class D cargo compartments recorded by respondents was:

- Cargo aircraft – 7
- Passenger only aircraft – 377
- Cargo and passenger aircraft - 1258.

This gives a total of 1,642 Class D compartments for the 26 airlines that responded. This number raised questions as to the accuracy of responses and it is possible that actual fleet sizes were reported, as opposed to the number of Class D cargo compartments. This was perhaps driven by a misunderstanding of the question by respondents. As it is difficult to have confidence in these numbers, no further analysis was carried out.

1.2.2 Q2 How many incidents involving PEDs have occurred or been reported?

For the purpose of this data collection, respondents were asked to provide historical data from 2007 to date. However, many of the airlines surveyed could not provide data this far back, with the majority of responses dating between 2014 and 2017. Therefore, the analysis focuses on these years.

The original ICAO question asks for the number of incidents, but does not ask what type of incident (overheating, smoke, smoke, fire or explosion) and is not factored to the number of sectors operated. This was therefore included in the IATA created survey to airlines.

Again the original ICAO question did not differentiate between in checked luggage on the aircraft or in the airport environment. Therefore, the IATA designed survey explicitly differentiated between the two scenarios and checked luggage means 'checked luggage loaded into the cargo hold'.

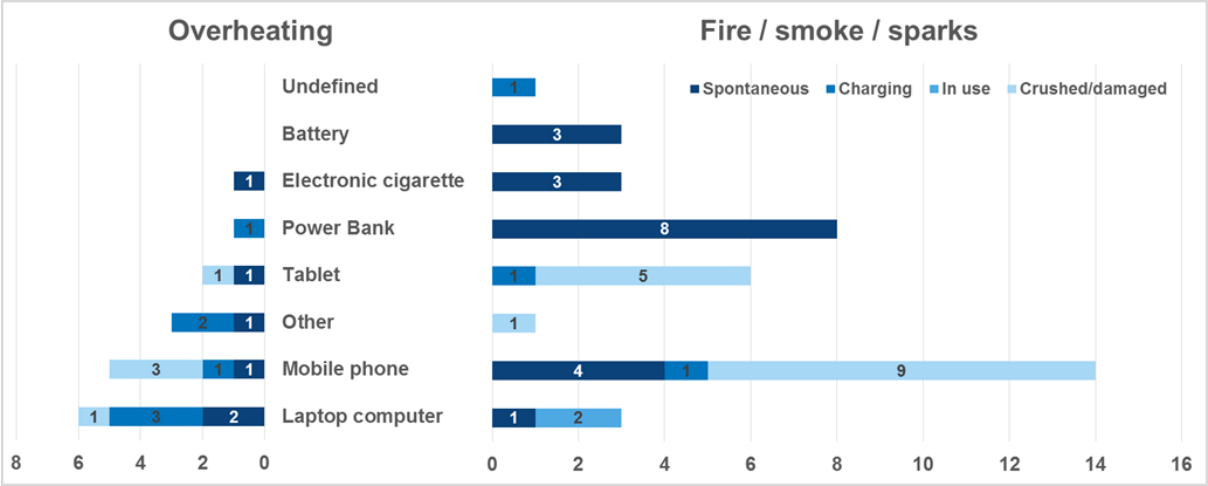
From the survey conducted with member airlines, the following data was received:

Year	In the cabin	In checked luggage	In the airport	Number of sectors represented
2017	17	0	1	1,200,696
2016	4	0	0	616697
2015	4	0	1	403968
2014	1	1	0	303206

This data represented a relatively small set of industry data, so IATA referred to several recent STEADES analyses on Lithium battery events, as follows:

1.2.2.1 PED incidents in the cabin

In June 2017 IATA published analysis on cabin related PED incidents during Q4 2015 – Q3 2016 inclusive. This data demonstrated that during this 12 month period there were 29 overheat incidents and 44 fire/smoke/sparks incidents. – a total of 73 incidents, over 12,715,473 flights operated by members submitting data. This equates to one cabin PED incident per 174,184 flights.



The reports related to **electronic cigarettes, power banks and spare batteries** that resulted in Fire/Smoke/Sparks indicated that the devices were not in use and stowed inside passengers' cabin baggage at the time.

All of reports regarding tablet devices were charging or in use. Furthermore, 64% of mobile telephones which ignited, did so as a result of crushing/damage encountered within the cabin environment.

All cabin incidents were contained and mitigated by existing cabin safety procedures.

1.2.2.2 PED incidents in checked baggage

In December 2017 IATA produced STEADES analysis related to incidents in cargo holds containing Dangerous Goods including Lithium Batteries in 2017. This analysis returned 46 reports relating to checked baggage containing Li Batteries.

N**one** of these incidents resulted in ignition/fire/smoke/sparks.

In April 2017, IATA produced STEADES analysis relating to *fire and smoke events in cargo compartments* during the period Q1 2012 to Q3 2016.

This analysis returned a total of 51 reports relating to fire or smoke in 48,998,173 flights operated by members submitting data during this time period.

Smoke was identified in 14 reports related to passenger baggage, and fire identified in 4 of these reports. These 14 reports represent a rate of one incident per 3,499,870 flights. **However none of these related to lithium battery fires within checked luggage in flight.**

The analysis summary is as follows:

- Over the last 5 years there were an average of 10 confirmed fire and/or smoke events in the cargo compartments per year. Giving an average rate of **1 incident per 925,926** flights.
- Out of 51 reports for the period 2012 Q1 – 2016 Q3, 8 led to a fire in the hold. 29 (57%) were detected or identified on the ground, either prior to or after the flight.
- In 74.5% (38) of reports, the source of the smoke and/or fire could be identified:
    - Passenger Baggage (14*) - Undeclared item from passengers (e.g. Matches, equipment with batteries, DGs such as Monomers, Acids, Acetone)
    - Cargo Shipments (7) - DGs Shipments (Lithium Batteries, Dry Ice, Pharmaceuticals) and Mail Shipments

***Of the 14 reports identified above in passenger baggage, only one was related to lithium batteries.** In addition, this report related to a passenger attempting to carry a large number of lithium batteries not contained in PEDs, which is not permitted in accordance with regulation. The incident occurred before loading onto the aircraft.

1.2.3 Questions 3 to 5 – Number of PEDs carried

Q3 What is the average number of PEDs (larger than a mobile phone, including power banks) carried per passenger per flight?

Q4 How many PEDs on average does a passenger have on/with them in the cabin?

Q5 How many PEDs on average are checked in by passengers?

The following data was extrapolated from the passenger survey results in response to Qs 3, 4 and 5.

(a) = estimated total number of passengers carried in 2016: **3,242,870,346** (source IATA BIS)

Devices in checked baggage	(b) Percentage of passengers who declared they carry in checked baggage.	Total number potentially carried in checked baggage (a) x (b)
Spare battery/ies	35%	1,135,004,621 (1.13 bn)
Tablet	32%	1,037,718,511 (1.03 bn)
Power bank	36%	1,167,433,325 (1.16 bn)
Audio/Visual Equipment	38%	1,232,290,731 (1.23 bn)
Laptop	32%	1,037,718,511 (1.03 bn)
Electronic grooming equipment	54%	1,751,149,987 (1.75 bn)
	Estimated total carried:	7,361,315,685 (7.36 bn)

Devices in carry-on baggage	(b) Percentage of passengers who declared they carry in carry-on baggage.	Total number carried in carry-on baggage (a) x (b)
Spare battery/ies	37%	1,199,862,028 (1.2 bn)
Tablet	54%	1,751,149,987 (1.75 bn)
Power bank	49%	1,589,006,470 (1.59 bn)
Audio/Visual Equipment	57%	1,848,436,097 (1.85 bn)
Laptop	53%	1,718,721,283 (1.71 bn)
Electronic grooming equipment	34%	1,102,575,918 (1.10 bn)
	Estimated total carried:	9,209,751,783 (9.20 bn)

1.2.4 Q6 How are PEDs stored in checked baggage?

A total of 57% of passengers who stated that they carried electronic devices in checked baggage, also carried at least one item of non-medicinal toiletry items, classified as dangerous goods (e.g. alcohol, aerosol or perfume).

1.3 Conclusions

- An estimated 7.36 billion PEDs containing lithium batteries are carried in checked baggage each year, with 9.20 billion in carry-on baggage.
- From STEADES data, there was one confirmed PED related fire in checked baggage in **48,998,173** flights during Q1 2012 to Q3 2016. The one event reported, occurred on the ground and was intercepted before flight.
- From STEADES data, within the cabin there was one PED incident per 174,184 flights.
  - The majority of incidents reported in the cabin were related to items in the cabin being used, charged, or damaged by crushing in seats.
  - All cabin PED incidents were effectively managed using existing procedures and equipment.
- STEADES data shows that power banks, spare batteries and electronic cigarettes, may be more prone to thermal runaway, even when not in use. Therefore IATA Dangerous Goods Regulations prohibit the carriage of these higher risk PEDs in checked baggage.

Appendix G Lithium Battery Passenger info

PASSENGERS TRAVELLING WITH LITHIUM BATTERIES

2018

Carriage of portable electronic devices (PED), portable medical electronic devices (PMED) and spare batteries by passengers is dependent on the Watt-hour (Wh) rating for lithium ion (rechargeable) batteries or the lithium metal content for non-rechargeable batteries.

Use the below table to determine if your PED, PMED or spare battery(ies) can be carried.

Wh rating or lithium metal content	Configuration	Carry-on baggage	Checked baggage	Operator approval
≤ 100 Wh / 2g	In equipment (PMED)	Yes (max 15 PMED[1])	Yes	No[1]
	Spare battery(ies)	Yes (max 20 spare batteries[2])	No	No[2]
>100 to ≤160Wh	In equipment (PMED)	Yes	Yes	Yes
	Spare battery(ies)	Yes (max 2 spare batteries)	No	Yes
>160Wh	Must be prepared and carried as cargo in accordance with the IATA Dangerous Goods Regulations			
> 2g ≤ 8g	In equipment (PMED only)	Yes	Yes	Yes
	Spare batteries for PMED	Yes (max 2 spare batteries)	No	Yes

1. Each person is limited to a maximum of 15 PED. The operator may approve the carriage of more than 15 PED.
2. Each person is limited to a maximum of 20 spare batteries of any type. The operator may approve the carriage of more than 20 batteries.

Portable electronic devices (PED) containing batteries

PEDs, which may include electronics such as cameras, mobile phones, laptops and tablets containing batteries, when carried by passengers for personal use, should be carried in carry-on baggage.

If devices are carried in checked baggage:

- measures must be taken to protect the device from damage and to prevent unintentional activation;
- the device must be completely switched off (not in sleep or hibernation mode).

Spare lithium batteries

Spare batteries must be individually protected to prevent short circuits by placement in the original retail packaging or by otherwise insulating terminals, e.g. by taping over exposed terminals or placing each battery in a separate plastic bag or protective pouch and carried in carry-on baggage only. Articles containing lithium cells or batteries, the primary purpose of which is to provide power to another device, e.g. power banks, are considered as spare batteries and are restricted to carry-on baggage only.

Batteries must be of a type that meets the requirements of the UN Manual of Tests and Criteria, Part III, subsection 38.3.

Electronic cigarettes containing batteries – “e-cigarettes”

Electronic cigarettes including e-cigars and other personal vaporizers containing batteries when carried by passengers for personal use must be in carry-on baggage only. Recharging of these devices and/or batteries on board the aircraft is not permitted and the passenger must take measures to prevent accidental activation.

Baggage with integrated lithium batteries – “smart luggage”

These devices could include integrated lithium batteries, motors, power banks, GPS, GSM, Bluetooth, RFID or Wi-Fi technology. The presence of the lithium batteries can contravene various regulatory requirements. Examples of “smart” luggage include features such as:

- Lithium ion battery and motor allowing it to be used as a personal transportation device.
- Lithium ion battery power bank that allows charging of other electronic devices.
- GPS tracking devices with or without GSM capability.
- Bluetooth, RFID and Wi-Fi capability.

All portable electronic devices (PED) carried on an aircraft are subject to specific requirements to ensure that they do not pose a hazard to aircraft systems due to electromagnetic radiation.

Baggage equipped with a lithium battery, other than lithium button cells:

- If the baggage is to be checked in, the lithium battery must be removed from the baggage and the lithium battery must be carried in the cabin; or
- The baggage must be carried in the cabin.
- Baggage where the lithium battery is designed to charge other devices and cannot be removed is forbidden for carriage.

Please contact your carrying airline in advance of travel as they may impose additional restrictions.

For more information, please visit
www.iata.org/dgr-guidance

Revision 1 effective March 2018

DANGEROUS GOODS REGULATIONS

Stop.Think.Check.

APPENDIX C

INFORMATION FOR PASSENGERS TRAVELLING WITH ELECTRONIC DEVICES PUBLISHED BY IATA AS PART OF AN AWARENESS CAMPAIGN

Traveling with electronic devices?

Here's three steps to help you fly safely:

1 It is best to pack **lithium-powered devices** and accessories into your **carry-on bag**.

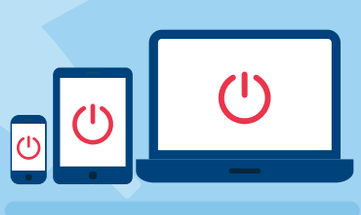
2 Electronic cigarettes, power banks and spare batteries **MUST be kept in your carry-on bag.**

ELECTRONIC CIGARETTES

POWER BANKS

SPARE BATTERIES

3 If you must pack your tablet, mobile or laptop in your checked luggage, be sure they are **completely turned off** (not in "hibernate" or "sleep" modes).



If in doubt, contact your airline.

More information: www.iata.org/ped

IATA

APPENDIX D

ICCAIA RESPONSES TO QUESTIONNAIRE ON THE CARRIAGE OF PORTABLE ELECTRONIC DEVICES (PEDS)

ICCAIA Responses to

QUESTIONNAIRE ON THE CARRIAGE OF PORTABLE ELECTRONIC DEVICES (PEDs)

For the purpose of this data collection, please provide historical data from 2007 to date. If data older than 2007 is available, kindly provide that data separately.

We are providing data for aircraft built since 2007. Data on older aircraft is being collected separately.

1. How many aircraft with Class D compartments or equivalent are currently in operation?

ICCAIA airframe manufacturers have been queried regarding delivery of aircraft with Class D cargo compartments since 2007. The following ICCAIA manufacturers have confirmed that they have not delivered aircraft with Class D cargo compartments since before 2007:

Manufacturer	**Passenger**	**Freighter**
Airbus	0	0
Boeing	0	0
Bombardier	0	0
Embraer	0	0
Mitsubishi	0	0
UAI (Russian) Manufacturers	0	0

2. How many of these are:
o Passenger only aircraft
o Cargo only aircraft

See answer to question 1.

3. What assumptions are/were used by aircraft manufacturers when calculating a fire probability of 1E-7 per flight hour?

Manufacturers estimate the rate of occurrence of onboard fires, including cargo fires, by first counting the number of known fire occurrences, then dividing by the known flight hours of the aircraft fleets associated with those occurrences. The rate for cargo fires in all classes of compartments has historically been between 1 x 10-8 and 1x10-7 per flight hour. For safety assessments addressing specific issues, the System Safety Analysis (SSA) and Functional Hazard Analysis (FHA) describe the general terms of the calculation. The conservative rate of 1 x 10-7 has traditionally been used for generic safety analysis purposes.

4. What is the average number of PEDs (larger than a mobile phone, including power banks) carried per passenger per flight?

ICCAIA has no data available with which to answer this question.