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The Impact of Security Scanners at Airports and Ethnic Minority Travellers'

Experience

Authors

Wood, S and Raj R

Abstract

Today, airports have a rigorous security focus on operational consistency from legislative and policy mandates being a priority rather than allowing airport operators satisfactory autonomy to adapt policy to their requirements (Poole 2009). Poole and Passantino (2003) stated that there is a tendency to try to treat all passengers the same, which can mean resources are not allocated to areas of greater risk. Resources are diverted to better technology and reducing staffing to process large numbers of passengers. Despite technological changes there are concerns security at airports can often focus on ethnic minority passengers.

This study critically discusses the effects of security changes since 9/11 at UK airports on young passengers particularly the use of full-body scanning on ethnic minorities. In the study (n=709) respondents aged 18-30 years old were surveyed to consider their attitudes towards security at airports and in particular their opinion of profiling passengers and the use of full-body scanning. This study demonstrated a high degree of support for security but a significant difference between how white and non-white respondents perceive airport security towards ethnicity.

Keywords: Terrorism, aviation, ethnic passenger experience, profiling, full-body scanning,

Introduction

There has been a history of terrorist activities in the aviation sector (Sweet 2004). Beck (2009) states that following 9/11 terrorism is a new world risk, which has resulted in significant changes to counter terrorism globally, a ‘widespread tightening of surveillance’ according to Lyon (2001). Since 9/11 there have been further attempts to use aircraft for terrorist purposes, for example in December 2001 a shoe bomber flying from Paris to Miami U.S. In 2006 a liquid bomb plot in the United Kingdom (UK) was foiled which intended to bring down flights travelling from the UK to the U.S and in 2009 on a flight from Amsterdam to Detroit a bomb was secreted into a passenger’s underwear. These incidents have contributed to a heightened level of aviation security on non-metallic objects, particularly liquids, and concealed items with an increased use of full-body scanners to try and detect prohibited objects.

Airport security following 9/11 has impacted on ethnic travellers, particularly young male Muslims (Abbas 2005) going through western airports. Blackwell et al 2013 suggest they are treated as ‘others’ under a greater suspicion because of media portrayals of the radical and extremist terrorist, ‘other’ being both ethically and culturally explicit (van Swaaningen: 293 Walklate and Mythen 2008: 215). In 2016, the total number of passengers travelling by air in the European Union (EU) was 973 million, an increase of 5.9 % compared to 2015. The largest EU Member State for air travel is the UK with 251 million passengers in 2015. To create an ambiance of fear in risky identities of Muslim minority groups, in the performance of safety with millions of Muslims travelling peacefully in the aviation sector is more likely to be counter-productive than counter terrorism (Mythen et al, 2009).

Schneier (2003) states that security is a collection of interacting processes. Airport security is twofold; the first phase is the electronic screening of all luggage and passengers through scanners to detect metallic, non-metallic prohibited objects, CCTV and the screening of Passenger Names Records (PNR) against watch lists; the second phase is, according to Alards-Tomalin et al (2014) is elevated risk screening with the potential of passengers being subject to questioning, detained, stripped searched, and items such as mobile phones being confiscated by the police. When disembarking, passengers are subject to immigration checks and possible police checks. In both cases security checks, Schedule 7 of the Terrorism Act 2000 is the legal means in the UK to determine whether the passenger is a terrorist.

Literature Review

According to Kleine (2010) profiling passengers raises conflicting concerns of efficiency and equity. Viscusi and Zeckhauser (2003) stated that non-white respondents were more reluctant than whites to support targeting passengers. The time cost and benefit components of targeting affect support for targeted screening in an efficiency-oriented manner. In peacetime, racial profiling collectively is illegal or unconstitutional, if not immoral (Shaun et al, 2009). Swiney (2006) also argues that the ineffectiveness of racial profiling weighs against its usage and discredits the many arguments put forth in its defence. Smith (1998) analysed that profiling passengers might result in perceived discrimination or racial harassment resulting in a negative view of policing, which can contribute to the radicalisation of individuals and entrenching social divides. Smith (1998) argued that profiling was a greater terror than terrorism itself. Since 9/11, enhanced security and profiling passengers at airports has gained more support (Volpp, 2002).

Schedule 7 of the Terrorism Act 2000 allows designated officers the power to stop passengers at UK airports and question them without reasonable suspicion. Schedule 7 is used on less than one percent of all UK passengers whilst security-screening technology is used on all passengers and luggage suggesting technology plays a greater role in the passenger experience of security. Hurrell (2013) has analysed the use of Schedule 7 over several years in experimental research and determined that it was applied more frequently to ethnic minorities. Choudhury and Fenwick (2011) stated that Schedule 7 impact as well as other terrorist legislation on the Muslim community. They found that the way in which terrorism legislation was being applied affected more negatively on non-white respondents. Indeed Webster (2006) suggested that the Muslim community could expect more security checks.

Langley (2014) reviewed the legitimacy of policing Schedule 7 by contrasting the procedural justice model against an experienced utility model concluding that passengers responded more positively to the procedural justice model that treated passengers with dignity and had created a sense of legitimacy. Hasisi and Weisburd (2011) research into procedural justice in airport security screening in Israel identified that differences in legitimacy perceptions are by and large the result of the processes used in airport screening and not a direct result of ethnic identity and that profiling strategies aimed at preventing terrorism, which often include embarrassing public procedures, may jeopardise passengers' trust in airport security.

Full-body scanning, through new technology to prevent terrorism, has now become a regular feature in many European and US airports to prevent terrorism attacks since December 2009 when the 'underwear bomber' attempted to detonate a bomb over the US as the aircraft started its descent. There is no clear authority to question whether a passenger should be full-body scanned or not, although most airports now do allow passengers an option if they refuse to be

scanned to have a pat-down by a security officer, which is a physical examination of a fully clothed passenger (minus shoes and outer clothing such as jackets). The concerns by passengers about the use of full-body scanning for health and safety and privacy reasons have now substantially addressed through new technology and regulatory requirements. Iztok (2015) analyse that there are human rights concerns from those wearing religious clothing, particularly Muslims, because they are being unduly targeted regardless of which security process applies. Mythen et al (2009) in their study of young British Pakistanis identified there is a real risk of victimisation of Muslim identities if there is a miss-management of safety in public places.

Surveillance and Profiling with Closed-Circuit Television (CCTV)

The introduction of CCTV represents an expansion of surveillance at airports (Lyon 2003). The surveillance and profiling of passengers through CCTV is likely to start even before the passenger enters the airport terminal building, Norris et al (2014). CCTV's primary function at airports is to observe suspicious behaviour, detect petty crimes and help support health and safety. CCTV is not designed to scan beneath clothing or expose those being observed to health risks through its technology and is still subject to regulatory controls in the UK by the Data Protection Act (DPA) 2018 and the Crime and Disorder Act 1998. The DPA 2018 now incorporates General Data Protection Regulation (GDPR).

CCTV provided vital evidence on the terrorist attack at Glasgow International Airport in Scotland on June 30, 2007, where a jeep containing flammable liquid and propane canisters was driven at the airport building. Since this attack, UK airports have reviewed their security procedures for passengers arriving at the airport prior to departure. One key consideration is the proximity of passenger drop-off points to access the airport terminal building. Atlas (2003)

argues that is important for reinforcement of barriers and bollards around passenger access points to prevent any road vehicle repeating this type of attack.

CCTV has played an important role in identifying terrorists, but this is often after an attack (Macdonald 2015). A week prior to the 7/7 attacks in London in 2005, the suspects were caught on CCTV at Luton Railway Station on a 'dry' run. The attack on a bus at Burgas airport in Bulgaria on July 18, 2012 showed the suspect on CCTV at the airport. The CCTV footage of the Burgas attacker is of importance for terrorist profiling. The suspect was, white, and dressed in casual western clothing. This suspect would not fit the terrorist stereotype following 9/11. On 18 August 2015, CCTV captured an image of the suspected Thailand bomber who killed 20 people.

Questions of identity are central to surveillance Lyon (2003). CCTV is however contentious: there is support by some members of the public who believe crimes can be observed and should be acted upon in a timely manner; others see CCTV as intrusive as well as an infringement of their privacy. CCTV provides one means of surveillance in and around airports, other forms of surveillance are, biometric passports, boarding passes, electronic screening of luggage and passengers, and their use of credit cards and mobile phones. Lyon (2001:19) argues that:

“[m]obility creates a world of nomads and unsettled social arrangements

... it is not surprising that in transit areas, such as airports, surveillance practices are intense”

Profiling and the use of full-body scanning using Advance Imaging Technology (AIT)

Full-body scanning initial purpose was to scan passengers who were suspected of drug smuggling by penetrating clothing and the body. This allowed the detection of metallic and non-metallic objects which may have been swallowed or inserted into body cavities. This process is often used in the detection of drug smugglers who have concealed drugs by swallowing condoms filled with cocaine. This form of policing passengers has little to do with the security of an airport or an airline but reveals how function -creep can extend to airports and allow security staff to perform multi-purposes law enforcement roles.

The acceleration in the introduction of full-body scanners in several airports throughout the world was due to the lone terrorist Umar Farouk Abdulmutallab, boarding Northwest Airlines flight 253 in Amsterdam to Detroit on December 25, 2009. He secreted explosives in his underwear, probably very close to his groin, and probably non-metallic, knowing he was not likely be “patted” down when he would pass through the metal detector. He became known as the ‘underwear bomber’. As a result of the attack, in 2010 the US Transportation Security Administration (TSA), a department of Homeland Security dedicated to all forms of transport threats, announced that the procedure for air passenger ‘pat-down’ was to be more thorough. A similar attack in December 2001 had warranted change to security processes when Richard Reid, the ‘Shoe Bomber’, attempted to detonate an explosive that he had hidden in his shoe. This attempt resulted in many international airports requiring shoes be removed and scanned.

Former USA President Obama’s ordered that all new technologies should be reviewed to prevent any future attempts. He also ordered the former chief advisor for Homeland Security and Counterterrorism, John Brennan, to review the terrorist watch listing process, as the

underwear bomber was not on the watch list although the US intelligence community knew of him. This exposed the complexity of the task in securing the information together. It was not just about gathering data, but also about making effective use of it. In this case, Umar's father had met with US embassy officers in Abuja, Nigeria to warn them that he feared his son was becoming radicalised. Co-ordination of information in a timely manner is paramount to react effectively to terrorists' threats in real time as several US government reports have concluded following the attempted attack on the US with flight 253.

This incident resulted in various countries around the world, who viewed themselves as potential targets of terrorism implementing technology that would combat this threat. The US Government Accountability Office (GAO) presented a paper to the Committee on Homeland Security, US House of Representatives, on 27 January 2010, outlining better use of terrorist watch list information and improvements in deployment of passenger screening technologies. The GAO reported in 2009 that since the TSA has been established following 9/11, the TSA has worked on no less than ten different passenger screening technologies. The TSA, by 2010, had installed around 200 Advanced Imaging Technologies (AIT) machines of its intended target of 878 by the end of 2014. In August 2012, the TSA had deployed around 700 units at more than 180 of the roughly 450 commercial passenger airports. Following the underwear bomber attempt, the US might have focused more on ensuring flights from international airports to the US had AIT installed. AIT was not mandated, but flights bound for the US following the underwear bomber did have higher security requirements such as advanced passenger lists and additional screening (Hatton and Buchanan, 2006).

The initial response to body scanning was one of alarm for the public, in both the US and UK. In the UK, the Prime Minister ordered an immediate review in airport security to consider the

use of greater profiling and an introduction of body scanning within weeks rather than months. Rumours circulated that the imaging would enable security personnel to view 'naked' passengers. The thought that other adults would view children raised further concerns about child protection under the Protection of Children's Act 1978, s.1(1)(a). Questions about privacy, illegality, and whether pictures might legally constitute 'indecent' were all raised as issues. There was also concern about personal health and safety, as individuals would be exposed to radiation after being microwaved or 'naked' going through a body scanner.

Passengers in UK who refused to go through body scanners on health and religious grounds were prevented from flying. The same rule was applied in the US concerning the issue of consent. The 9th Circuit Court of Appeal in United States of America, Plaintiff-Appellee, v. Daniel Kuualoha AUKAI (2007), the Court stated;

"requiring that a potential passenger be allowed to revoke consent to an on-going airport security search makes little sense in the post 9/11 world. Such a rule would afford terrorists multiple opportunities to attempt to penetrate airport security by 'electing not to fly' on the cusp of detection until a vulnerable portal is found". B III para 5.

Airports with body-scanning equipment operate different policies for passengers to pass through scanners and some international airports offered an alternative means of search, for example, the previous methods of metal scanning and patting down. The Department of Transport in November 2013 provided a new code of practice for the implementation of body scanning those UK airports must provide alternative methods of search where passengers object to a full-body scan.

The benefit of full body scanning is that as passengers can avoid going through metal detectors and be patted down by security staff, the scanning is non-invasive. Passenger reaction to security changes can be mixed, for some passengers it has little impact for their journey. Where you find a mass of isolated individuals such as on a motorway, in supermarkets or at airports, there are no personal ties made. Carlin (2003) discusses the psychological behaviour of passengers that moves to a standard non-contractual relationship of norms in a matrix, occasionally disturbed by some individuals moving hastily due to their failing to observe advice on allowing enough time for the journey. The passenger experience of airport security is normally supportive of additional measures. If commuters are communicated with effectively before a journey about traffic flows and security checks, then the commuters' expectations are settled and their dissatisfaction reduced (Carlin, 2003).

EU Regulations of Technology at International Airports

The introduction of body-scanners in the UK raises questions of privacy and health as well as wider considerations of treaty obligations to EU citizens and their fundamental rights to freedom of movement. The European Charter of Fundamental Rights (2000) (ECFR) sets out a number of measures that European passengers travelling within the EU might rely on in relation to body-scanners: Article 1, human dignity; Article 7, respect for private and family life; Article 8, protection of personal data. Additionally, Article 35, Health Care, states that a high level of human health protection shall be ensured in the definition and implementation of all Union policies and activities. Further, as to personal rights guaranteed by the charter, all members of the EU are signatories to the European Convention on Human Rights 1951 (ECHR), consequently the rights contained in the ECFR charter are, in many ways, replicated in the ECHR (Mironenko, 2011).

The EU is not only concerned with targeted security processes such as full-body scanning passengers. It has had to deal with policies introduced by the US following 9/11, which have impacted on all air passengers travelling from the EU to the US. The US adopted a comprehensive approach to air passengers by requiring airlines to transfer data relating to both the crew and passengers to the Bureau of Customs and Border Protection (CBP) prior to flying to the US, Passenger Name Records (PNR). PNR included additional passenger information such as payment information, e-mail addresses, frequent flying information, meal preferences, and whether passengers needed special assistance. Failure to comply with these rules could lead to fines for airlines of \$6000 per passenger, denied landing and the potential loss of future landing rights. The decision in C-318/04 *'European Parliament v Council and Commission'* (2007, 57-70) stated that the Council decision relating to the US requirements of PNR were annulled because the data was outside the scope of Art 95 EC of the Treaty of the European Union (TEU) and the directive is specifically related to commercial matters.

In 2016, the European Union's Passenger Name Record (PNR) Data Directive 2016/681 was introduced. The PNR directive appears to have been initially influenced because of US pressure rather than an EU initiative but was later seen necessary in order to protect aviation from Isis, following the Paris attacks in 2015. There are questions on whether the safeguards within the Directive can prevent aviation terrorism, but more importantly protect passenger privacy. Since the introduction of GDPR, the directive will have received additional support by requiring the aviation sector in the EU to follow 'data protection principles'. They must make sure passenger information is used fairly, lawfully and transparently.

PNR is likely to remain a contentious matter with the development of technology and advancement of information that can be contained on a biometric passport. The matter of

personal sensitive information and data protection can be compromised under the guise of counter-terrorism. PNR does run a real risk of function-creep, as Schneier (2010) states:

“Far too often we build security for one purpose, only to find it being used for another purpose -- one it wasn't suited for in the first place”. p.88

Schneier's (2010) hypothesis can be tested against the circumstances surrounding the underwear bomber. The underwear bomber should have been, but was not on the US watch list, rendering the PNR process flawed and requiring the watch list process to re-evaluated. Further, the incident set in train a multimillion-dollar global investment developing new full-body scanning technology at airports to detect secreted non-metallic objects. The first prototypes proved to be questionable both on health and safety grounds, as well as privacy. Schneier (2009) states, ‘when people are fearful, they need to see tangible and visible security changes’, such as full-body scanner machines, to make them feel safe. Full-body scanners may be expensive, but their introduction to airports is reactive. Schneier (2009) describes such responses as ‘security theatre for the present’ not future aviation threats.

Aviation terrorist strategies have indeed changed since the underwear bomber, which show how limited expensive responses such as full-body scanning machines can be. Airport employees, known as ‘insiders’ who sympathise with terrorist groups, such as Isis, have supported attacks by placing bombs on aircraft, for example in 2015 the Russian Metro-jet Flight 9268 exploded over Egypt killing all 224 passengers and crew.

The Costs of Full-Body Scanning for Airports

The EU failed to make a final decision and confirm that X-ray backscatter scanners are safe, despite early reports and research suggesting they were. The EU Commission did allow the continuing use of body scanning but under strict operational and technical conditions, but the trialling of X-ray backscatters was to cease. The effect of such an announcement was to suggest they would not be taking any chances to health if there were other options such as the millimetre technology on offer. In response to the EU Commissions decision to adopt a new legal framework on security scanners in a press release (2011), Kallas Vice-President, Commissioner for transport stated:

“Security scanners are not a panacea but they do offer a real possibility to reinforce passenger security. Security scanners are a valuable alternative to existing screening methods and are a very efficient in detecting both metallic and non-metallic objects. It is still for each Member State or airport to decide whether to deploy security scanners”.

In the UK, Manchester international airport had been running backscatter tests for three years from 2010 and was satisfied with their use. However, the EU’s failure to give confirmation on their safety, coupled with the press release in 2011, which effectively ruled out any further testing for X-ray backscattering machines, resulted in their removal. This cost Manchester airport approximately £1.3 million and required them to recruit an additional 55-security staff. Manchester was the only airport in the EU using backscattering scanning machine at the end of the three-year trial. India made a similar commitment to remove the controversial X-ray backscatter machines from some airports and replace them with millimetre-wave machines, subject to intense scrutiny of the technology and price. The US government in 2013 had ordered

the removal of 250 similar machines in favour of millimetre-wave machines. The TSA had requested a scientific test from the National Research Council (NRC) in July 2015 to review, on the grounds of health and safety, two-millimetre machines that were in current use L3 ProVision 1 and L3 ProVision 2. The conclusion was the machines were safe but passengers who may have concerns, because they had pacemakers or other medical problems to consider other forms of screening such as physical pat-downs.

On the matter of personal images, airports gave assurances that personnel could not see the passenger only the electronic image and were monitoring images elsewhere in the airport. Whilst this process was in line with the 2011 UK Code of Practice at the time of governing the use of body-scanning, passengers did not get to see the picture or images produced of themselves, or the level of transparency and imagery of those pictures. In contrast to UK airports, the experience at Schiphol Amsterdam Airport was quite different. Their use of millimetre wave technology and ATR software no longer showed an actual body shape of the passenger but a generic cartoon human shape or no shape at all. This process appears far less intrusive because it is possible for the person scanned to see the cartoon outline. The US has taken a similar line to the EU in the removal of X-ray backscatter units and the introduction of millimetre wave with ATR software by 2013. There will be clearly a significant cost to the whole sector for those who were active in the introduction of X-ray backscatter machines. Indeed, in 2014 Manchester Airport, as well as all other major UK airports, introduced new state-of-the-art non-invasive body scanning technology in response to new regulations put in place by the UK Department for Transport and the Security Scanners Direction 2015 and adapted into the Aviation Security Act 1982.

The growing acceptance of the use of full-body scanning can be explained by the improvement of the technology and the availability of more information and research on the actual impact on health. The absence of superfluous news headlines about full-body scanning might have also play a part in supporting confidence in the use of new technology and separating fact from fiction.

The key to improving passenger satisfaction and the aviation security experience is by having a system that is safe, reliable, and efficient in processing large volumes of people quickly as possible through security. Airports generate significant income for their owners, from car parking, hotels, airline chargers, to the rents generated from leasehold units within the airport, engages airports with passenger satisfaction. The recommended check-in for long haul airlines increased from two hours to three hours post 9/11; today this has been mitigated through new technology. The ability to check in on line 24 hours before the flight allows passengers to check in their luggage 90 minutes before a flight. Airports have been transformed over the last two decades from having basic shopping and eating opportunities to the equivalent of large shopping malls. In large airports, they offer a multitude of goods and services. Therefore, airport owners have an interest in making airport security an efficient, dignified and a quick transitional experience when passengers are departing to ensure they have time to spend monies on goods and services.

The cost benefit analysis of full-body scanning raises several questions. Since the underwear bomber, there is no evidence of any other similar attempt or that full-body scanning would have prevented that attempt. The evidence suggests that terrorism has benefited those who sell security technology and services rather than the passenger. The passenger has had to suffer

security processes, such as, additional waiting times, inconvenience of screening and packaging of liquids.

Methodology

In the framework of this study, the primary research is meant to collect data from students at Leeds Beckett University (LBU). It was decided to undertake research utilising a quantitative approach, the rationale for using this data sample is twofold; the first was the accessibility to respondents on campus, the second was the attention counter security services, the media have focused on British Universities, and the age profile of those engaged in terrorist activities. Many students and recent graduates have taken part in several terrorist attacks or convicted on related charges. In the recent Counter Terrorism and Security Act 2015, the Government has now placed a duty on Universities to be proactive in counter terrorism.

The data was collected over a four period between 2011 -2015 from 711 respondents. Manchester and Leeds Bradford airport accounted for 64% of security experiences from the 711 respondents which suggest a degree of regionalisation in the findings. There is no evidence to suggest that there are any significant security differences at major airports in the UK in treating passengers differently. Therefore, this data sample can be generalised to cover UK passenger experience of airport security. 93% of respondents were aged 18-25, which gave an insight into the experiences of airport security from young passengers.

Over the four-year period 62% of the respondent were female. This is comparable with the LBU university population data in which the male average over this period was 38%. It is also comparable with the gender population of UK Universities. It has been suggested that there is

no gender imbalance for the support of extremist views, which is supported by the significant number of women that have travelled to Syria to support Isis. Nevertheless, it is acknowledged that men have carried out the majority of terrorist attacks in the West since 9/11.

The data was analysed using two methods, the first was a Chi-Square test and the second was cross-tabulation. In the first method of analysis, the data set in Table 1 was recoded from the large list of ethnic backgrounds and divided into two categories white and non-white to enable a Pearson Chi-Square χ^2 (Nonparametric test). Table 1 shows that the first three ethnic groups consist of White British, White Irish and other White, which cumulatively the White grouping accounts for 61.9% of all respondents. The other 39.1% consisted of thirteen groups and were placed together and coded as non-white. (see Table 1).

The second method of analysis used cross-tabulation to enable more variables to be assessed, such as gender, and recode ethnicity more broadly into white, South Asian, black and other. The largest non-white ethnicity group was South Asian which consisted of two groups Asian or Asian British Pakistani and accounted for 17% of respondents. No religious data was gathered but an assumption can be made that the South Asian category would contain a large Muslim population. This data would consider whether certain ethnic groups other than White British, Irish or other White passengers are more prone to, or perceive themselves to be more prone to, be subjected to extra security checks. Respondents were able to reflect on several flight/security experiences, so the survey could maximise the security experiences.

Table 1 Ethnicity

	Gender		Total
	Female	Male	
White British	291	125	416
White Irish	1	1	2
Other white	11	10	21
Asian or Asian British Indian	8	11	19
Asian or Asian British Pakistani	72	54	126
Asian or Asian British Bangladeshi	3	8	11
Chinese	1	0	1
Other Asian	5	13	18
Black or Black British Caribbean	4	6	10
Black or Black British African	21	23	44
Other Black	2	4	6
Mixed White and Black Caribbean	10	2	12
Mixed White and Black African	2	3	5
Mixed White and Asian	3	2	5
Other mixed	6	0	6
Other ethnicity	2	3	5
Total	442	265	707

Government literature and the 2009 and 2014 Codes of Practice relating to the implementation of Schedule 7 clearly state that no one should be stopped and searched solely on the grounds of ethnicity. Anderson (2015), the Independent Reviewer of Terrorism legislation (2011-2017), stated in his report that the statistics so far concerning Schedule 7 did not indicate Schedule 7 was being exercised in a discriminatory way. This study does not ask its respondents directly whether they have experienced a Schedule 7 screening. It asks respondents several questions on whether profiling is a positive security measure and whether it should discriminate against certain passengers.

Findings and Discussions

In this study, 96% of respondents agree with the current level of security checks at airports and 98% suggested they did not discriminate against them. Border Control officers had stopped 44% of respondents which appears an unduly high number, however respondents could reflect on more than one flight leaving or returning to the UK which resulted in recording 3867 flight experiences, and this means an average of 18% of the respondents were stopped. Female respondents suggested that when stopped they were 7% more likely to be treated professionally than male respondents. Those respondents who claimed they had experienced unprofessional behaviour, when stopped by officers, suggested it was either the officer's attitude or being picked out, whilst other passengers had not, as their reason. There was no suggestion by the respondents that any detainment was related to suspicion of terrorist activity.

18% females and 36% males disagree that profiling is good to target passengers acting suspiciously and 21% male and 11% female agree that profiling is an opportunity to harass ethnic minorities. The majority of ethnic minorities disagree. 84% females and 80% males disagree with the statement that profiling allows and unrestricted right for security to harass any traveller. However, 16% females and 20% males agree with the statement of which a greater proportion are British whites than ethnic minorities.

Technology and Security

In relation technology as a means of airport security. Table 2 shows 76% respondents agreed with being searched when the metal detector detected metal. A further 15% remained neutral. 4% of those who suggested they should not go through a metal detector or be searched, did so

because they said they did not look like a terrorist were Asian or Black respondents, against 1% White. This might suggest that White passengers are more willing to adhere to security processes or that some ethnic minorities perceive security to be driven by ethnic profiling. The differences in gender resistance to metal detectors showed male respondents approximately twice as likely as females to disapprove. Overall there is a strong acceptance for the use of metal detectors, but some resistance to the process, when the respondent perceives that they do not look or dress in a way that could practically secrete weapons. Every passenger goes through a metal detector, so its perhaps unreasonable to suggest there could be any form of human profiling on the grounds of ethnicity in this particular security process.

Table 2 Going Through Metal Detectors

Ethnic Categories	White	Asian	Other	Black	Total
I fully accept being searched when the detector goes off	345	102	22	49	518
I do not like being searched because I do not look like a terrorist	5	16	0	6	27
I do not like being searched because I am with family and I am obviously not a threat	13	12	3	1	29
I do not like being searched because my clothing would not secrete anything dangerous	9	10	1	5	25
I neither like nor dislike being searched	67	22	4	16	109
Total	439	162	30	77	708

Table 3 shows that 77% of respondents are in approval of full-body scanning, which is very similar to the approval of metal detectors. 17% of Asian respondents raised greater concerns than 8% White, suggesting that full-body scanning is an intrusion on their personal lives. 9% of Asian respondents raised greater concerns than 2% White, that full-body scanning might be a risk to their health. Only one person, from the Asian ethnicity group agreed that passengers wearing religious clothing should be subject to full-body scanning. The gender resistance to

the use of full-body scanning is similar to metal detectors with male respondents twice as likely to disapprove than females.

Table 3 Body Scanners

	White	Asian	Other	Black	Total
I welcome additional security like body scanners	381	97	17	48	543
I think body scanning is an intrusion on personal life	33	27	6	14	80
I am concerned about the possible health risks of being scanned	10	15	4	6	35
Body scanning is unnecessary and causes delays	16	22	3	9	50
Only foreign nationals and British nationals wearing religious clothing should be scanned	0	1	0	0	1
Total	440	162	30	77	709

Profiling

A series of questions were asked to respondents to in order to determine the hypothesis ‘Airports security applies risk assessment equally to all passengers in UK airports’ (H_0 null). 18% females and 36% males disagree that profiling is good to target passengers acting suspiciously and 21% male and 11% female agree that profiling is an opportunity to harass ethnic minorities. The majority of ethnic minorities disagree. 84% females and 80% males disagree with the statement that profiling allows and unrestricted right for security to harass any traveller. However, 16% females and 20% males agree with the statement of which a greater proportion are British whites than ethnic minorities.

Although most respondents in Table 4 (605 or 85%) disagree that profiling gives an opportunity to harass ethnic minorities, differences in proportions of White and Non-White who disagree are observed. A Chi-square test was carried out to see if these differences were significant. The expected count in all cells was five or more so the test is valid. According to the test ($P = .000$) which is less than the specified $.05$ ($\alpha = .05$). Therefore, from this example the H_0 would be rejected and consequently risk assessment does not apply equally to all passengers in the opinion of these respondents. Gender was not included in the Chi-square test, however from the previous descriptive data it appears that males are more likely to be opposed and suspicious of security process than females.

Table 4 Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
White and Non-white categories * Profiling gives an opportunity for security to harass ethnic minorities	709	99.7%	2	0.3%	711	100.0%
		Profiling gives an opportunity for security to harass ethnic minorities		Total		
		Disagree		Agree		
White and Non-white categories	White	410	30	440		
	Non-white	195	74	269		
Total		605	104	709		

Respondents were asked whether they agree or disagree that airport security legitimises discrimination against ethnic minorities. The majority set out in Table 5 disagree (676 or 95%).

A Chi-square test was again carried out to see if these differences were significant between White and Non-White. According to the test ($P = .002$) which is less than the specified .05 ($\alpha = .05$). Therefore, from this example the H_0 would be rejected and risk assessment does not apply equally to all passengers in the opinion of these respondents. Whilst it can be suggested there are concerns from some ethnic minorities, the majority of passengers (96%) agree with the current level of security checks and that 98% agreed security did not discriminate against them.

Table 5 Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
White and Non-white categories Question Airport security legitimises discrimination against ethnic minorities	709	99.7%	2	0.3%	711	100.0%
		Profiling gives an opportunity for security to harass ethnic minorities		Total		
		Disagree		Agree		
White and Non-white categories	White		428	12	440	
	Non-white		248	21	269	
	white		676	33	709	
Total						

The key to improving passenger satisfaction and the aviation security experience is by having a system that is safe, reliable, and efficient in processing large volumes of people quickly as possible through security. Airports generate significant income for their owners, from car

parking, hotels, airline chargers, to the rents generated from leasehold units within the airport, engages airports with passenger satisfaction. The recommended check in for long haul airlines increased from two hours to three hours post 9/11; today this has been mitigated through new technology. The ability to check in on line 24 hours before the flight allows passengers to check in their luggage 90 minutes before a flight. Airports have been transformed over the last two decades from having basic shopping and eating opportunities to the equivalent of large shopping malls. In large airports, they offer a multitude of goods and services. Therefore, airport owners have an interest in making airport security an efficient, dignified and a quick transitional experience when passengers are departing to ensure they have time to spend monies on goods and services.

Summary

As the study revealed, the impact of the higher levels of security, both full-body scanning and metal detectors, show how technology has increased at airports to support security processes. All passengers go through metal detectors, whilst currently only certain passengers in the UK go through full-body scanning. The prerequisite is often, but not mandatory, an individual who has triggered the metal detector. There appears to be a higher perception, from the Chi-Square test, that non-white respondents are selected for full-body scanning because of their ethnicity rather than the metal detector being triggered. The use of full-body scanning has reduced in the UK since 2015. Therefore, the data outcomes might be different if another survey was carried out today. Full-body scanning is still widely used throughout the US. Developing countries who did not respond to the underwear bomber with technology, such as full-body scanning machines, are currently introducing them or updating previous systems. India has directed 84 airports to introduce full-body scanning technology for March 2020.

Throughout 2014, the UK moved its security focus away from full-body scanning a significant number of passengers traveling outside the UK and UK airports have reduced body-scanning machinery. Passengers, who now trigger metal detectors, are to be subject to tougher pat-downs as well as shoe removal and scanning if metal is detected. These pat-downs could be described as both thorough and intrusive, but at the same time more effective than the previous pat-down system that operated in the UK and that still operates outside the UK. The use of full-body scanning is clearly now used as a final scan or deterrent when all other processes are deemed not appropriate. This might be when a passenger for religious reasons does not want to be touched. It is unclear what practice now triggers a full-body scan, but one explanation appears to be when passengers have removed items and are still triggering the metal detector. In late 2013, the UK Department of Transport issued a new Code of Practice for full-body scanning. Airports must now provide alternative means of search other than full-body scanning. This move is to pacify passengers concerned with images and health rather than prevent terrorist attacks because anyone asking for an alternative means of search are likely to attract a thorough pat-down.

Full-body scanning was always going to be challenging because it is almost impossible to scan every passenger and be commercially viable and competitive at the same time. It could be reasonably suggested that following the underwear bomber's attempt in 2009, security at international airports simply needed to intensify pat downs rather than rush to spend more than a billion dollars collectively on machinery and technology. Full-body scanning is still important and rational; whether a passenger will be scanned is today decided by the policy of the airport or simply that the passenger has triggered a metal detector alarm. Although, full-

body scanning has been reduced at UK airports it is likely to be a permanent, albeit specific feature, in the future.

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