MASS TRANSIT: WHERE SECURITY AND SUSTAINABILITY MEET

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ABSTRACT

TOBIN WILLIAMSON: Mass Transit: Where Security and Sustainability Meet
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As it becomes apparent that increasing sustainability is a requirement to be a leading city in modern, globalized society, public and private actors are improving mass transit networks in cities around the world. At the same time, the threat of international terrorism is a security concern which must be addressed by modern cities, particularly those in Western countries like the United States and members of the European Union. This thesis looks at how mass transit, where sustainability and security converge, is dealing with these two realities of the twenty-first century, both of which have become significant issues only in recent decades. Brief histories of transit and terrorism are given prior to a more thorough analysis of security measures that have been taken by cities already, as well as some measures that could be taken in the future.

ACKNOWLEDGEMENTS

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I.   <u>Introduction</u>

On 7 July 2005, London was shaken by one of the worst examples of modern terrorism, perhaps second only to 9/11 in its effects on Western psyche. Within a minute of each other, blasts on three separate trains disrupted Tube service and killed dozens (BBC – Bombing, 2005; Secretary of State, 2011, p.89). At the time, some 200,000 people were riding on over 500 trains within London's Underground (BBC – Bombing, 2005). An hour later, another bomb was detonated on a bus, killing over a dozen more. Attacking mass transit was not without precedent; as will be explored later, it has happened multiple times in recent decades. However, the London Underground is arguably the world's landmark metro system, and that so many casualties occurred generated tremendous worldwide attention to the vulnerability of transit networks to such attacks.

Over the past few decades, international terrorism has become a significant security threat, especially to civilians in the United States and Europe. Consequently, security is now one of the driving issues of American and European politics. Terrorism itself is nothing new, though in the past it has mostly been based on things like separatist movements, ideological differences, power struggles, civil wars…domestic matters. Terrorists were from the countries they attacked, and their targets were often specific leaders or strategic sites. However, in the late twentieth century, a dramatic shift occurred. Attacks on the U.S. on 11 September 2001 were the climax of this new era of international terrorism, frequently used by radical Islamic fundamentalists against civilians in European and American countries.

With that in mind, what are London and other major Western cities doing to ensure transit users are safe from this new phenomenon of international terrorism? The aim of this essay is to provide a comprehensive look at the situation of security in modern public transit networks in some of the cities most vulnerable to attacks. First, there will be a look at the import of mass transit in modern society. Second, a brief background on contemporary terrorism will be given, with specific examples of how it has impacted transit before. That will be followed by an examination of what has been done in light of these events. Finally, ideas on what could be done to prevent attacks in the future will be discussed.

II.   <u>Transit</u>

This brief first section, an essential building block for the rest of the thesis, will show a) why sufficient public transportation is a necessity for modern global cities and b) quantitative information about modern transit networks. For a city to be successful in the twenty-first century, it is important for it to have sufficient public transit, for myriad reasons. According to Kim, Ulfarsson, and Hennessey, "public transit can potentially deliver congestion relief, reduced energy consumption, air quality improvement, and economic development" (2006, p.511). Similarly, Chavan, Peralta, and Steins cite traffic congestion, pollution, obesity, "increasing economic inequality and social isolation" as factors why transit is becoming more attractive to people (2007, p.3).What follows is a more thorough analysis of some of these factors.

One of the most-argued, best-known reasons for using mass transit is that it is often more environmentally-sustainable than using automobiles. The logic for this argument is simple: it is far more efficient to carry thirty people on one bus than thirty people in thirty cars, for example. With gas prices increasing and gas supply decreasing, this factor will

continue to grow (even if climate change is false, as some skeptics claim). Since this argument for mass transit is so well-known, little time will be spent on it here.

Many have discussed how auto-dependency contributes to decline of social cohesion (Duany, Plater-Zyberk, and Speck, 2000; Leinberger, 2007; Mapes, 2009; Owen, 2009). When people hop in their private automobiles, they isolate themselves from anyone else not in the car with them. Yet on transit, people interact with others from all socioeconomic backgrounds, exchanging ideas, thoughts, and just simple conversation with people they might otherwise never encounter. "People who want to understand democracy," said Simeon Strunsky, "should spend less time in the library with Aristotle and more time on the buses and in the subway" (Lummis, 1996, p.8). This idea extends to social networks in addition to face-to-face interaction: one recent study confirms younger generations prefer using their phones on public transit to the private activity of driving their own automobiles, and are increasingly choosing the former instead (Badger, 2013).

Furthermore, there are often economic incentives for using mass transit. The purchase, insurance, and upkeep of private automobiles cost thousands of dollars per year. In cities large enough to support mass transit, parking is usually quite expensive. Increased pedestrian traffic usually encourages economic and housing development around transit hubs and stations, stimulating local business and cultural life. Indeed, "commuters, tourists, and transit-related businesses are indicators of a community's economic vitality" (Waugh, 2004, p.307). Hartong, Goel, and Wijesekera (2008) address the importance of rail transit (of both people and goods) on the American economy in particular.

Additionally, there are many health benefits for using public transit, as most people walk from their jobs, residences, or other destinations to transit stops. In fact, switching from

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automobile-based transportation to public transportation to commute to work results in an average weight loss of six pounds per year, according to one 2010 study (Alleyne, 2010). Many cities have implemented programs which specifically point out and encourage the benefits of walking on riders' commute to work (Copeland, 2008).

Finally, transit networks often play a significant role in shaping a city's identity. Gift shops containing posters and t-shirts of network maps can be found in cities with famous systems, like London, Paris, Washington, and New York. Fecht explains that "no two subway systems have the same design… Each system's design is the result of many factors, including local geography, the city's layout and traffic distribution, politics, culture and degree of urban planning" (2012). In one example, a magazine described the elaborate, ornate "twenty-nine uniquely designed stations" of the subway system of the Uzbek capital as "the jewel in the crown of the new Tashkent… for the city's inhabitants it is a mark of pride, and for the foreign tourist, the object of envy and marvel" (Coffey, 2011). Other cities – Prague, Boston, Montreal, Stockholm, to name just a few – have unique stations filled with artwork, which serve as tourist destinations themselves. There is also a prestige factor that comes with having a great public transit network; according to famous urban planner and economist Richard Florida, the "mark of a great global city is you can get where you want [without] a car" (2013).

Despite these benefits, however, if people do not feel secure whilst riding on public transportation, they are not very likely to use it. Gunilla Fransson says "with an increasingly complex and vulnerable transport environment, there is a growing need for solutions that can offer a higher level of safety and efficiency" (Saab Group, 2010). Fransson is a security expert at Saab, who is contracted to run security on Prague's metro network (Saab Group,

2010). The Czech capital has fortunately not been subjected to a significant terrorist incident on its public transportation network; however, as will now be seen, many other Western cities have not been so lucky.

III.   <u>Terrorism</u>

Now that groundwork for the import of public transit has been established, it is time to address the next component of the essay: the need for adequate security on those European and American public transit networks. Would it not be easy for terrorists to bring explosive devices onto packed, rush-hour trains and create massive casualties? After all, subway, bus, and light rail networks do not have the level of extensive security checks or screenings as airports do. Think of how many people carry bags, suitcases, and backpacks onto trains; why has this not been exploited more often than it has been? Furthermore, what changed in cities that were attacked? What changes were made in other cities as precautionary measures? What makes terrorism so concerning is that all it takes is just one event, just one lapse in security from the authorities, for attackers to be successful. In the days following the Brighton bombing in 1984, the IRA summed up the situation perfectly: "Remember we only have to be lucky once; you will have to be lucky always" (Taylor, 2002, p.265). Consequently, securing transit has been an increasingly-important concern in this era of the modern international terrorism that has developed over the past generation or two.

Sadly, terrorist attacks in the Middle East are viewed as routine by many Westerners. It often takes one in a place like New York or London or Madrid to make Westerners realise they, too, are vulnerable. When these attacks do happen, there are often harsh reactionary measures taken. In the decade since 9/11, it has often been lamented how airport security screening measures have become such a hassle for travelers: no liquids in carry-ons,

excessive pat-downs, x-ray scanners, shoe removal, long security and customs lines, etc. Entire books have been written which argue that post-911 security has been gone about the wrong way (Molotch, 2012).

Attacks on Westerners by radical Islamists are nothing new; jihad has been taking place for over a millennia. Hopkirk (1994) offers a brilliant volume on how certain peoples of central Asia – in modern Afghanistan, Pakistan, Uzbekistan, etc. – have a history of being hostile toward Europeans. Even today there are tensions in the areas where Islamic and European cultures meet, with many place names becoming buzzwords for tension, crime, danger: Beslan, Grozny, Srebrenica, etc. This conflict of cultures and boundaries has existed for centuries (Hopkirk, 1994), and Russia is one country has recently implemented harsher measures to quell tensions again (Barry, 2013).

However, recent decades have seen two major changes from traditional conflict. First, these events have moved from attacks on Westerners *visiting* places like Kabul and Bukhara to attacks on Westerners *living* in places like London and New York. Second, in the past, if a nation was attacked, the aggressor was likely the army of another sovereign nation, led or at least approved by the head of that state. In modern terrorism, belligerents from many countries cooperate across borders, outside state authority, as the new century's events in Afghanistan, Pakistan, etc. have shown. This sort of underground guerilla warfare is a relatively new type of conflict that subsequently requires new tactics and strategies. The Moscow attack in 2004, for example, was the work of Abu Walid, a Saudi who financed Chechen rebels in Russia (Windrem, 2010), and 9/11 was a multinational effort carried out, planned, and financed by many nationalities in many different countries.
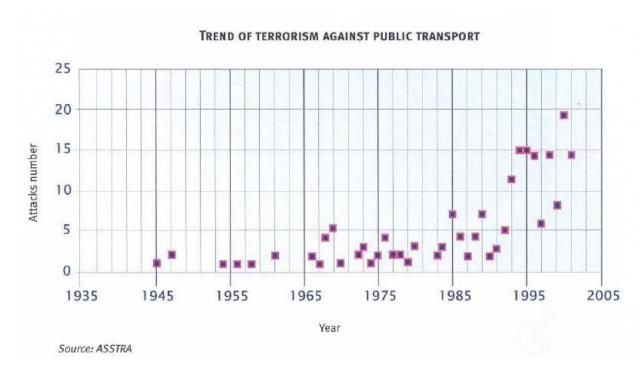
In July 2010, the U.S. Government Accountability Officer issued a report saying "high ridership, expensive infrastructure, economic importance, and location in large metropolitan areas or tourist destinations" make rail and transit networks key targets (Stoller, 2010). According to the British government, there exists a "global risk of indiscriminate terrorist attacks which could be in public areas" (Foreign & Commonwealth Office, 2013).As mentioned earlier, 7/7 showed just how vulnerable mass transit can be; the attackers walked nonchalantly and undetected into the tube on a weekday rush hour, explosives in backpacks. It happened then, so why not again?

By their nature, "subways are meant to be open and easily accessible" (Murphy, 2005). Cox, Prager, and Rose claim "mass transit modes concentrate large numbers of people in confined and often low-security areas" (2009, p.307), and Clarke adds: "tens of thousands of people push through essentially unguarded portals in short periods of time" (2004, p.2). Yet Parker explains "commuters' expectations that public transit take them a few miles with minimal inconvenience makes it impossible to implement in subways the strict screening that exists in airports" (2010). This open and accessible nature of public transportation can be both a blessing and a curse; "How easy it is to waltz into a teeming station 10 minutes before departure, pull your ticket from a machine and glide onto the train without any inspection of your ID or your bags" (Ripley et al., 2004, p.36). Businessmen with briefcases; tourists with luggage; jihadists with bombs; there is no screening measure in place to check. Ten bags used in the Madrid bombings of 2004 caused around 200 deaths and 15,000 casualties (Clarke, 2004, p.2) in "what many intelligence analysts describe as the most significant terrorist attack since September 11" (Windrem, 2010). Waugh summarizes:

> "Transit systems are dependent upon ridership for a significant portion of their funding. Ridership is heavily influenced by convenience and speed. Metal

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detectors and other measures that slow access and reduce convenience may discourage ridership, which can have a serious impact upon the financial viability of transit systems… The choice of commuter rail and subway systems over private automobiles may be swayed if security precautions slow travel time by more than a few minutes" (2004, p.310).

Yet the risk of terrorism cannot simply be ignored solely for the sake of convenience, can it? It is a pressing concern that must be considered as a key security issue of the twenty-first century. Waugh points out "recent bombings of train and bus stations [and] trains and buses… are evidence that precautions need to be implemented to reduce the threat to those modes of mass transit" (2004, p.311). The chart below, showing the number of terrorist attacks on transit throughout the world and made by Italian public transportation agency ASSTRA, clearly shows terrorism has been increasing:

TREND OF TERRORISM AGAINST PUBLIC TRANSPORT

Source: ASSTRA

(Source: Bocchetti, et al., 2009, p.1.)

The chart cuts off before 2005; however, Stoller (2010) provides additional information after that time. Between 1 January 2005 and 30 June 2010, subways and trains

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saw 213 attacks in over twenty countries, resulting in 700 deaths and over 3,000 injuries. By comparison, there were 197 attacks on planes and airports, with 238 killed and 937 injured (Stoller, 2010). Clark Ervin, former inspector general for the U.S. Department of Homeland Security, said "Logic dictates that because mass transit is 'mass,' terrorists are interested in attacking it to maximize death, injury and panic" (Stoller, 2010). John Pistole, new TSA administrator in Obama's administration, said "some terrorist groups see rail and subways as being more vulnerable, because there's not the type of screening that you find in aviation" (Stoller, 2010). Discussing the issue of transit terrorism, Chalk describes it succinctly:

> "We don't know when or where, but terrorists will certainly use this same method of attack again – and the odds will likely grow as tougher security at airports makes it harder to attack planes. A full 42 percent of all terrorist attacks between 1991 and 2001 were directed against mass transit systems, according to a Brookings Institution study" (2006).

A balanced security continuum must be reached, because "as you harden one target, others become more appealing" (Murphy, 2005). Israel is an example: "El Al employs legendary security measures, so terrorists do not bother trying to hit Israeli jetliners. Instead they target malls, buses, and nightclubs" (Murphy, 2005). Could this end up being the case in Western countries, as well? There has not been an airline successfully brought down by terrorists since 9/11, but there have clearly been notable attacks on public transit. "The casualties are lower," says Murphy, "but there are still casualties" (2005).

Before the recent era of international terrorism, which began around 15-20 years ago, domestic terrorism existed in some Western cities. Loukaitou-Sideris, Taylor, and Fink claim that London residents have become accustomed to the threat of terrorism due to the presence of IRA activities in the latter twentieth century (2006, p.735). Spain, also, has a long history of terrorism due to the Basque separatist group, ETA (p.739). After the Tokyo subway attack

in 1995, Presidential Decision Directive 63 – concerning protection of critical infrastructure – was issued in the United States by President Clinton (Waugh, 2004, p.308). Prior to 9/11, the Oklahoma City bombing by Timothy McVeigh was the deadliest example of peace-time terrorism on American soil.

Yet the 9/11 attacks were a turning point in international security; "As the buildings crumbled, so did the taken-for-granted idea that no such thing could happen" (Molotch, 2012, p.7). The game changed, and the world is still dealing with the consequences. Domestic terrorism still exists; in March 2010, female suicide bombers in Moscow killed 38 on the subway (Weber, 2010), and France, Italy, and Spain have also all seen examples of domestic, separatist-based terrorism in recent years (Foreign & Commonwealth Office, 2013). However, the main concern for many these days are threats from "Others," in particular radical Muslim jihadists who target Westerners. This has largely been brought about by globalisation and rapid advances in technology. It is important to note –as Cox, Prager, and Rose do – that terrorists are able and quite willing to adjust their tactics to new technologies or targets to suit their advantage (2009, p.307). There is no room for complacency; one breach in security could result in catastrophe.

Consequently, all major international events must consider security risks. It cost $1.5 billion to secure the Athens Olympics in 2004, according to Samatas, six times higher than the cost in the games four years earlier in Sydney (2011, p.3361), the last pre-9/11 Olympics. The International Olympic Committee requires host sites to have precautionary anti-terrorism policies in place (Samatas, 2011, p.3349). Having video surveillance in and around stadiums is required for applicant cities hoping to host the World Cup (Eick, 2011, p.3337). This shows "security of any post-9/11 international mega event, like the Olympics, the World

Cup, and G8 meetings, is based on new anti-terrorist security solutions," such as CCTV, which are run "by a close transnational collaboration of state police and militaries, alongside the tracking, targeting and profiling of suspect individuals, places, behaviour, associations, and groups" (Samatas, 2011, p.3350). For the past decade or so, the World Cup's influence has extended out of the stadia into the surrounding areas, such as "main infrastructure (airports, railway stations, etc.) and accommodation sites (hotels, training centers, etc.)" (Eick, 2011, p.3332).

Yet it was not just enormous, occasional global events that were affected. The U.S. and its European allies became involved in two long, costly, violent wars, one of which is still going. Many transatlantic alliances became strained to levels of tension unseen in decades. The lives of travelers everywhere were changed; speaking while assuming his companions had successfully carried out a terrorist attack against a large shopping center by using anthrax, a fictional terrorist on the television program Criminal Minds said "What has happened tonight will affect your economy for years, the same way 9/11 affected air travel!" (Criminal Minds, 2006).

It is true that successful terrorist attacks in Western cities are fairly rare. However, their psychological and logistical effects can be disproportionately strong, and for as many successful attacks have occurred, there have been as many unsuccessful ones. In late 2010, for example, multinational security forces uncovered plots based in Pakistan to launch attacks in Britain, France, and Germany that were similar to the one in Mumbai which killed over 160 people in 2008 (Norton-Taylor and Bowcott, 2010). In the United States, there have been at least six plots to attack American subway and rail networks 9/11, primarily in Washington and New York City (Stoller, 2010). The effects on citizens' psyche cannot be

ignored, as the psychological effects of terrorism can impact a population just as much as actual attacks (Bugliarello, 2003, p.503). Security parties and civilians must remain vigilant and resist complacency. "Make no mistake about it," said New York's mayor Michael Bloomberg after a foiled attempt at a subway bombing in 2010, "we have to work very hard to keep this subway system safe" (Long, 2010).

But where is the line separating where people feel safe from where they feel oppressed? Murphy says "as long as most of the public believes—even wrongly—that random searches make them safer," discussing one type of security measure, "the searches could be a plus" (2005). In the days after 9/11, "National Guard troops in airports with no bullets in their guns were a good idea. The psychological component is very important and shouldn't be minimized" (Murphy, 2005). This essay will now take a look at some ways different cities have tried to provide security – whether real or perceived– for their transit passengers.

IV.   <u>What Has Been Done</u>

If relevant parties hope to encourage use of alternative transportation, they must ensure riders remain safe; if people do not feel secure, they will choose other options. The key question, then, is: what can be done to ensure public transit systems are as secure as possible, and ready to handle the consequences of terrorist attacks? Following the detonation of smoke bombs in the city's subway in 2012, Montreal's mayor Gérald Tremblay described the problem:

> "Do you want me to take 4,600 policemen and women and put them in the subway? You want me to close the subway? What do you want me to do? Are we going to stop living because we have a crisis on our hands? No. What's the solution? That's the question'" (Gollom, 2012).

That is the question, indeed. This section will look at measures taken by various governments and transit authorities to address security threats caused by twenty-first century terrorism.

At first glance, the outlook might not be very optimistic. Security specialist and journalist Richard Clarke claims "terrorists, if they did surveillance, would know that security hasn't really improved since 9/11" (Ross, 2009). Another former official said "I hear people saying it is virtually impossible to make public transport in the U.S. secure… That's wrong. It *is* impossible" (Ripley et al., 2004, p.36). Another concern is that knee-jerk reactions following attacks only highlight existing security weaknesses (Parker, 2010).Yet on the other hand, riding has statistically never been safer. "Crime is down in the subways, even as ridership increases. In 1990, there were about 50 crimes a day reported in the subway" in New York, "and now there are about five, according to police" (Long, 2010). Riding transit is much safer than being on the roads in a car; a person even has greater chances of being struck by lightning than killed in the subway (Grabar, 2013).

However, fear of crime remains an obstacle, despite national decline in crime rates over the past couple decades (Yavuz and Welch, 2010, p.2492). Murphy claims "you've got to convince people that they are being protected, without scaring them so much that their anxiety shuts down the city" (2005). Occasionally the public becomes aware of specific risks or foiled attacks, but there is more they do not know. "If enemies know where… emergency headquarters are located," says Molotch, "they can zap it, bringing everything down. If access to emergency data is free and open, miscreants can get hold of that" (2012, p.5). Yet does the public not have a right to know when they are at risk and what to do if something happens? Governments do not want to induce panic, but they should induce precaution and vigilance, and let riders know security is taken seriously. Spokesman Kevin Ortiz said

"safety and security of our customers is the MTA's top priority… In a post-9/11 world we have worked together to harden our infrastructure, secure sensitive areas" (Long, 2010). While Francois Rambaud of the French Ministry of Transportation feels "security has become more of a goal than the reality," he says the aim of security should be "create a feeling of security rather than reduce the risk to zero, which is practically impossible" (Loukaitou-Sideris, Taylor, and Fink, 2006, p.731). In all this, "the dilemma," says Molotch, is that "holding information secret also prevents people from knowing what to do when they might be of help" (2012, p.5).

Another hurdle to overcome is funding, especially in the United States, where the focus of anti-terrorism efforts since 9/11 has overwhelmingly been in aviation (2004, p.307). There were over 10 billion trips made on American transit systems in 2009, yet a 108-page security review by the Department of Homeland Security the next year mentioned subways only once (Parker, 2010). $4.5 billion of federal money was spent on aviation security in 2004 compared to just $65 million on rail, "even though five times as many people take trains as planes every day" (Ripley et al., 2004, p.36). Despite all this, many security measures for mass transit *have* been enacted, as will now be shown.

These days, closed-circuit television, or CCTV, is arguably the most prominent type of security technology (Yavuz and Welch, 2010, p.2497). CCTV is used by most if not all subway systems in the world. Atlanta, Los Angeles, Miami, and Washington have all conducted studies showing CCTV is "helpful in improving transit security and reducing fear of crime in transit passengers who are waiting at train stations or bus stops, or riding transit vehicles" (Yavuz and Welch, 2010, p.2498). London is perhaps the world's most surveilled city; its Underground has over 6,000 cameras, yet this sort of "intrusion of privacy for

security reasons is generally accepted by the British people" (Loukaitou-Sideris, Taylor, and Fink, 2006, p.737). CCTV has become commonplace in London and elsewhere in Britain because, simply, it works. In the 1990s, new CCTV technology enabling facial recognition became "perhaps the most striking use of technology in London's Olympic Boroughs" (Coaffee, Fussey, and Moore, 2011). At the turn of the millennium, one Scotland Yard spokesperson claimed the arrest of nail bomber David Copeland "highlighted once more the role of the closed-circuit television camera as a crime-fighting weapon" (BBC – CCTV, 2000).

One of the largest expansions of CCTV technology came in the mid-2000s as myriad cities in Germany were preparing to host the 2006 World Cup. At the turn of the millennium, just four German cities used CCTV; by May 2006, around thirty did (Töpfer, 2007). The impact of the World Cup on security on transit in German cities was significant. It created "modernisation, enduring expansion and centralisation of CCTV systems in the hosting sports stadia, at the railway stations and in urban public transport networks... host cities of the World Cup invested millions of euros to monitor railway stations and subway stations as well as the interiors of trains, subways, streetcars and buses" (Eick, 2011, p.3337). Frankfurt and Hamburg added CCTV to all subway trains and stations. Stuttgart "extended its existing surveillance infrastructure to provide central monitoring for the city's transport network within a30-kilometre radius around the football stadium" (Eick, 2011, p.3337-3338). 2/3 of the cameras installed in Kaiserslautern remained in operation after the tournament ended (Schmitt, 2006).

Whereas Germany took a proactive approach, CCTV is often implemented or enhanced as a security method reactively *after* attacks occur. Following the Aum Shinrikyo

sarin attack in 1995, some 2,200 cameras were installed in Tokyo's subway stations "at strategic points covering different platform areas, ticket gates, and restrooms" (Loukaitou-Sideris, Taylor, and Fink, 2006, p.735). In Madrid, for another example, cameras were retrofitted "with anti-intrusion and detection systems," with more added following the March 2004 attacks (p.740). In Paris, attacks "by Algerian terrorists in 1995 led to considerable reflection about how to better protect transit systems," such as CCTV (2006, p.730). An NYPD spokesperson said "as cameras proliferate, as we build more of them, they become more instrumental in solving crimes. They also act as a deterrent" (Long, 2010).

Of course, CCTV has its flaws. While efficient CCTV "systems have the potential to substantially facilitate post-incident investigations" (Chalk, 2006) and are often effective in identifying perpetrators once they commit an attack, they does not always *prevent* attacks from happening (Yavuz and Welch, 2010, p.2498). Also, for CCTV to be effective, the cameras must be efficient and in working order. In 2010, it was found that around half of the 4,300+ cameras in New York's subway system did not work at all: 2,270 did, 2,043 did not. This led Mayor Bloomberg to caution "maybe someday we're going to get very badly hurt because of it" (Long, 2010).

Speaking of New York, NYPD performs random bag searches throughout the city (Long, 2010), which came about after the first confirmed threat against the MTA in September 2005 (Murphy, 2005). A random bag inspection policy was implemented in Washington in December 2010 (Stoller, 2010). Some cities – such as New York, Los Angeles, Washington, and Boston – randomly search not just bags, but also passengers (Gollom, 2012), as do many northeastern U.S. Amtrak stations. This procedure has actually been advocated by the TSA in place of the kind of universal screening seen in airports

(Stoller 2010). However, selecting only random passengers instead of all of them is hardly foolproof. "There's a chance that a bomber will get through… the potential bomber is a needle in a human haystack. The cops' goal is a psychological one," says Murphy (2005). One member of NYPD claimed their goal was to "keep them thinking that they may be searched at any time and any place" (Murphy, 2005). In Beijing's subway, however, *all* bags are screened (Neumann, 2012); it would be interesting to see how this strategy would work in Western cities.

Another anti-terrorism tool is practice; "regular testing of existing security protocols to identify gaps and loopholes would also be useful," explains Chalk (2006). Similar to fire or tornado drills, some cities have implemented attack drills to prepare. In October 2003, for example, a nerve gas attack in the Paris Metro was staged by French authorities (Loukaitou-Sideris, Taylor, and Fink, 2006, p.731), and in the summer of 2012, the Department of Homeland Security tested new sensors in Boston's MBTA by releasing harmless bacteria which would be registered by the sensors (Anderson, 2012). Preparation for attacks "places huge demands on training; for instance, subway operators need to be trained to understand the fundamental difference between actions required in a fire and those required in a biological or poison attack" (Bugliarello, 2003, p.504). However, if lives are saved, those demands would be worth it.

One way of gathering information on users are "Smart Card" systems. Portable, durable, and small, smart cards have been replacing traditional ticket cards in an increasing number of European cities – "especially in France, the U.K., and Italy" – as well as "being extensively used in Asia" (Pelletier, Trepanier, and Morency, 2011, p.559). They are also found in over a dozen metropolitan areas in the Americas, from San Francisco to Santiago

(p.559). Some of the world's most famous mass transit networks have smart cards that are instantly recognizable; London's Oyster, Washington's SmarTrip, Boston's CharlieCard, etc. By using a microchip that serves as a sort of memory card (p. 558), these systems "produce large quantities of very detailed data on onboard transactions'" (p.557), from fingerprints to medical data to photo ID, depending on how extensive the chip is (p.588). The smart cards can also be used for purchases of things other than just passenger fares, such as parking fees and retail transactions (p.559), and also reloadable, which increases convenience for the consumer, and tracking information for authorities if needed. Additionally, many services offer discounted rates for passengers who use smart cards, therefore providing an additional incentive. Bugliarello says "a key need for each city is for an integrated model capable of identifying the complex interactions among its systems, their vulnerabilities, the means for addressing them, and also the ability to provide real-time guidance to first responders" (2003, p.506); smart cards go a long way in achieving this, though not surprisingly there are associated privacy concerns voiced by some critics (Pelletier, Trepanier, and Morency, 2011, p.559).

Oslo has a five-line subway system with over one hundred stations and a daily ridership of over 200,000. Around a decade ago, the Oslo Metro Company "started to ask ourselves whether we should really focus all our resources on the handful of people who cause damage or the other approximately 200,000 people who don't," according to one spokesperson. Consequently, Oslo began practicing what many cities do now: their security switched from "standing at remote stations waiting for something bad to happen" to having security personnel with significant presence at subway hubs (Securitas, 20--). In addition to

changing policies, Oslo Metro Company's security changed their looks, too. According to security contractor Securitas,

> "Boots and batons have been banned. Instead, the team of approximately 60 security officers wear slacks, dress shirts and ties; carry mobile phones and a first-aid kit; keep handcuffs out of sight; receive training in conflict management [and] practical ethnic issues; and are recruited to reflect the Oslo's demographics in terms of age, gender and ethnicity" (Securitas, 20--).

Uniformed presence is a crucial security component. London's Underground has over six hundred British Transport Police officers in highly noticeable blue uniforms patrolling its Tube stations (Loukaitou-Sideris, Taylor, and Fink, 2006, p.737). In Copenhagen, officers called metrostewards serve as public faces and liaisons for the metro (Municipality of Ørestad, 1999). This strategy has proven to be effective. Yavuz and Welch explain: "Simply increasing staff presence, especially uniformed staff, in stations and stops [aids] in feelings of personal safety due to increased transit information availability and surveillance; passengers have reported more fear when such staff are not visible" (2010, p.2498).

As with other security options, increased police presence often occurs following attacks. After one in Moscow left over three dozen dead in 2010, Washington and New York increased security on their own respective systems. In D.C., "teams of officers and bomb-sniffing dogs [conducted] random, precautionary sweeps through rail yards and the system's 86 stations" and "transit police officers [were] on 'high visibility patrols,'" whereas in New York, "special units distinguished by their black uniforms, helmets and body armor also were assigned to monitor" America's busiest subway (Weber, 2010). Additional patrols were added in Tokyo following the sarin attacks of 1995 and in Madrid following the bombings in 2004 (Loukaitou-Sideris, Taylor, and Fink, 2006, p.734). After Madrid, TSA created VIPR teams – "Visual Intermodal Prevention and Response"— random, unannounced, and

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noticeable officers in select transit facilities like subway, train, and bus stations throughout the United States (Patterson, 2012; Stoller, 2010). Fifteen existing VIPR units conducted around 4,000 operations in 2010, though there have been plans to expand in recent years "after intelligence from Osama bin Laden's Pakistan compound revealed al Qaeda plans to target U.S. rail systems on the tenth anniversary of 9/11" (Patterson, 2012).

However, it is important not to go overboard or create feelings of a police state. One way to lighten the burden of security and transit officials is by having passengers help. Brian Jenkins, "director of the national transportation security centre at the Mineta Transportation Institute, … stresses the importance of getting riders involved in their own security" (Gollom, 2012). According to U.K. security minister Lord West of Spithead, "the thing that causes fear is ignorance of things" (The Scotsman, 2008). By training civilians, civic authorities can have people besides officials prepared for attacks. Denver has implemented what they call Transit Watch: "From increased patrols and electronic surveillance, to unannounced security sweeps of RTD vehicles and facilities, we take every precaution to ensure the security of our vehicles and passengers" (Regional Transportation District, 2012). "CERT" – Community Emergency Response Team – is a three-day training certification for citizens "with basic-level training from homeland security experts," covering topics ranging from first aid to evacuation procedures, and is one part of Denver's plan (Regional Transportation District, 2012). A CERT program is also offered in Washington (Washington Metropolitan Area Transit Authority, 2012). Chalk advocates that employees, too, should undergo awareness education in order to "be equipped with a decision-making framework that they can apply to assess potentially dangerous and suspicious situations without having to be an expert in threat identification" (2006).

Similarly, many cities both in the United States and Europe have implemented "if you see something, say something" awareness programs (Bay Area Rapid Transit, 2012; Chicago Transit Authority, 2012; Dou, 2010; Gollom, 2012; Regional Transportation District, 2012). This has long been the case in London, which has a history of terrorist activity on transit; "people are so vigilant and raise the alarm so frequently," claim Loukaitou-Sideris, Taylor, and Fink, "that London Underground has to deal with reports of about 10,000 unattended items every month" (2006, p.738). Greg Hull of the American Public Transit Association said "whether it's Washington Metro, New York, Los Angeles, San Francisco, virtually all the public transit systems have adopted the concepts of public awareness, public engagement" (Kaiser, 2011).

Passengers can see suspicious activity, but they also see poor conditions in their surroundings. In 2012, New York's MTA worked on increasing security presence in its stations "for the mutual benefit of riders and the agency," though the aim was primarily to combat fare evaders, not terrorists (Flagenheimer, 2012). New York is well-known for its idea of fighting big crime by going after small crime first, the "broken windows theory," which is that "perceptions of insecurity are determined by the 'messages' people get from the signs of neighbourhood disorder: if no one cares that these happen, then anything could happen here; the place is not safe" (Yavuz and Welch, 2010, p.2496). According to New York City's vice-president of security Vincent DeMarino, "Those of us who believe emphatically in the broken windows theory feel that when they go after the little things like fare evasion, big things are also taken care of" (Flagenheimer, 2012). In other words, "If the physical environment is neglected, bad social behaviour starts. A well maintained physical

environment on the other hand signals that the common values of society apply in that area"
– this is the official policy of Denmark's Municipality of Ørestad (1999).

Finally, station designs themselves have been changed to adjust to the threat of
terrorism. Improved station design is one component of "reducing the vulnerability of the
national rail and London Underground systems," according to the United Kingdom's official
Strategy for Countering Terrorism (Secretary of State, 2011, p.81). British examples include
eliminating "places where people can conceal explosives without being noticed. Vending
machines and telephone booths are built with sloping tops, so that nothing can be hidden on
top of them," and in some cases, "trash cans are completely banned in some stations or
replaced with receptacles that have a plastic ring holding a bin of see-through plastic"
(Loukaitou-Sideris, Taylor, and Fink, 2006, p.738). Similar measures were implemented by
the U.S. Department of Homeland Security in 2004 (Stein, 2004, p.17), one reason being
"plastic is less likely to emit deadly pieces of shrapnel should an explosive device go off in
one" (Chalk, 2006). In Washington, bins, vending machines, and storage lockers were
removed from Metro stations after 9/11, with similar justifications used in Britain and New
York (Waugh, 2004, p.312), suggestions that Chalk claims should be implemented
universally at all transit stations (2006). Loukaitou-Sideris, Taylor, and Fink explain how
design changes can be seen in Paris:

> "The environment and context of the [newer] stations are quite different from
> the rest… Absent are the narrow, mazelike access ways and tunnels to the
> platforms and exit doors that twist and turn at odd angles that characterize the
> older stations, and inhibit police response to a terrorist attack. There are few
> curves to obstruct sight lines, and passenger waiting and walking areas are
> large, giving better opportunities for surveillance. Station construction
> materials are mostly transparent, reflective, and resistant to graffiti or
> vandalism. There is maximum use of direct natural or indirect artificial light"
> (2006, p.732).

V.   <u>What Could Be Done</u>

The final thesis section will look at possible actions that could be taken in the future in order to improve security on public transit networks in Western cities. There is a clear concern that exists among both the general public and authorities. One of the four main goals of the United Kingdom's Strategy for Countering Terrorism for 2011-15 is to "reduce the vulnerability of the transport network" (Secretary of State, 2011, p.13), while Clarke writes that "in New York City, with more than 4 million rail and subway commuters daily, security has become an obsession" (Clarke, 2004, p.2). So, in addition to the methods that are already in place, what else could be done to ensure that transit systems are as secure as possible?

For one, services should be more efficient. Yavuz and Welch claim that reliability and punctuality influence feelings of security (2010, p.2497). The authors cite three components to this: 1) being frequent, 2) being on-time, and 3) knowledge of when the next service is coming. This explains why "frequent and on-time service may help passengers to feel more secure by reducing uncertainty and the length of time that individuals spend waiting in [intimidating] environments" (Yavuz and Welch, 2010, p.2498). As anyone who has flown could explain, though, increasing security often means the exact opposite of punctuality and efficiency. Yet high-speed trains in Spain now screen passengers in areas similar to those used in airports. Officials say it "is a great method from the security point of view. And contrary to what we thought when we implemented it, passengers appreciate it as something good that makes them feel calmer" (Loukaitou-Sideris, Taylor, and Fink, 2006, p.740). Amtrak, the U.S. passenger rail network, checks passenger names with government watchlists after deciding metal detectors would not be worth the cost or inconvenience (Ripley et al., 2004, p.37). In 2002, TSA Security Chief Richard Bennis stated that

"ultimately you are going to see some level of baggage screening" on Amtrak (Peckenbaugh, 2002, p.75), though Amtrak's police chief Ernest Frazier believed "there is some gate control that may work, but we are just not going to be able to set up a checkpoint kind of system" (Peckenbaugh, 2002, p.75).

Yet inter-city rail is different than intra-city subways. Surely each passenger coming into the subway cannot be screened individually; this would create a logistical nightmare far worse than anything at airports, which in turn would kill viability of using public transit. Brian Jenkins said it would cost $8-10 per passenger to screen transit like is done at airports. "If you add that cost to a subway fare," he said, "it would destroy public transportation" (Stoller, 2010). In addition to added costs, there would be tremendous added time. "People may be willing to wait in line to undergo security at airports or cross-country flights," said Jenkins, "But to impose that kind of wait on a system where you take a 15-minute, 20-minute ride two times a day is not realistic… costs would be prohibitive and the delays involved would essentially destroy convenient surface transportation" (Gollom, 2012). Murphy believes screening transit this way is not only inconvenient, but could be dangerous:

> "The surest way to protect the subway system from bombs would be to screen every passenger's bag. But that would not only be enormously expensive in terms of time and manpower, it could have a human cost. The subways would become very inconvenient to ride, more people would drive cars, and there'd be more fatal road accidents. That's not to mention that the long lines of riders waiting to get screened would pose a tempting target" (2005).

Former U.S. Senator Joseph Lieberman, ex-chair of the Homeland Security and Governmental Affairs Committee, put it bluntly: "Rail and transit security will never achieve the level of security that exists at airports" (Stoller, 2010). Even if a quick screen process could be introduced, mass transit could still be vulnerable in other ways. "An explosive device could be placed in subway or rail cars when they're out of service in a train yard,"

explains Stoller, or "the rails, bridges and tunnels they ride on or pass through could be sabotaged" (2010).That being said, efforts should still be made to achieve as much security as possible. Additionally, the current administration seems much more concerned about protecting public transit than the previous one was; Kristin Lee of the TSA said "the Obama administration has made extraordinary investments in surface transportation security" since he took office, allocating almost one billion dollars for it (Stoller, 2010).

What else other than increased screening measures could be useful, though? People are increasingly reliant on mobile devices, like smart phones or tablets. Directly related to this is the rise of social networks, such as Facebook and Twitter. They can play a positive role in anti-terrorism: they can be used by passengers to alert authorities of suspicious activity, or by authorities to alert passengers in case of an emergency. On the other hand, one Canadian terrorism expert cautioned "cellphones and the network signals used to connect them are common tools for terrorists, particularly when it comes to the detonation of explosives and the communication it takes to pull off such crimes requiring conspiracy" (Davidson, 2012). He cited the London and Madrid attacks as specific examples; the British government said "careful use of mobile phones" contributed to 7/7, and mobiles were used to detonate the explosives in the Madrid attacks (Davidson, 2012).

Another option would something like weapons-sniffing dogs, briefly mentioned earlier. In 2004, the U.S. Department of Homeland Security passed a measure including a provision that "bomb-sniffing dogs will monitor passengers and baggage during special events or if threats emerge" (Stein, 2004, p.17). Dogs are part of the aforementioned TSA-VIPR teams (Patterson, 2012). However, dogs likely could not be used as a deterrent in *every* station; there are almost 300 stations *each* in the London underground and Paris metro, 101

each in Vienna and Milan, 85 in Frankfurt, 166 in Barcelona (Schwandl, 2012). Again, the logistics would likely make this method impossible, or at least quite limited. That being said, they could still be useful on occasion.

Garfinkle is one expert who feels the biggest security concern for transit systems is biological and chemical weapons. He warns "we need to devise ways to better control the uses of bioscience in our own country and internationally. We need an international regime to both monitor and set standards for bioscience research" (2008, p.417). Since so many biological and chemical agents are of a dual-use nature – meaning they have positive medical or scientific effects in addition to negative ones – he has a point. Houston has implemented what is called the "Breathe Safe System," technology that kills almost 100% of some types of bacteria. "The primarily goal is hygienic: preventing the spread of viruses such H1N1, bacteria, or mold," according to Parker. "But," he adds, "the technology is also evolving to prevent against a biological attack on a mass transit system" (2010). A security feature sought by Washington's Metro after 9/11 was "an expanded chemical sensor program" (Waugh, 2004, p.312). Senator Lieberman advocated sensors "that automatically detect chemical, biological and explosive threats" (Stoller, 2010).

However, it is difficult to get ahold of biological or chemical weapons in lethal quantities, and there is little past precedence for their use in successful terrorist attacks other than sarin in Tokyo; explosives seem to remain the preferred method used by terrorists. Since the previous ways suggested all have weaknesses, one way of narrowing it down could be profiling. However, it would almost be impossible to get away with that legally, not to mention the myriad ethical concerns that it would raise. Security expert Paul Cornish mentioned a new "super-fast profiling on transport" mechanisms in his class in November

2009, so it is clear innovations continue to be made (Cornish, 2012). However, as Murphy points out, "Besides the civil liberties questions, there's a basic problem with targeted searches: The targets know they've been tagged… You know if you've been questioned. You know if you're asked to stand in a special line. You know if you've been frisked. All of this open scrutiny makes it possible to learn an anti-profile to defeat [the screening system]" (2005). As such, blatant profiling is also unlikely to be a realistic solution.

Finally, besides changes in passenger behavior, official policy, and station design, Chalk says that new train car designs, too, can make transit safer: "Retrofitting rail cars with pop-off roofs and pop-out windows to dissipate explosive shockwaves, although expensive," he says, "would certainly help" (Chalk, 2006). The key word in his comment is expensive; as with so many things, transit security needs large amounts of funding. Yet, again as with so many things, funding is a contentious issue, especially in tough economic times. It is important to remember that "investments in these types of technologies must always be considered in light of the safeguards that can be reasonably achieved and at what expense" (Chalk, 2006). James Carafano of the conservative American think tank The Heritage Foundation said mass transit networks "would consume every cent we spend on homeland security, and there still would be vast vulnerabilities" (Stoller, 2010).

Nevertheless, mass transit receives relatively little amounts of funding. William Millar, president of the American Public Transportation Association, explains "subway, passenger rail, cargo rail, bus, and some ferry security" has been given under $2 billion in federal funding since 9/11; aviation well over $15 billion (Stein, 2004, p.17; Stoller, 2010).This discrepancy concerns Congressmen like Bennie Thompson, chairman of the U.S. House Committee on Homeland Security, and Jim Turner, who in 2004 proposed new

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legislation that would allocate almost $3 billion over three years for improving transit

security (Stein, 2004, p.17). A month after 9/11, Senator John McCain introduced the Rail

Transportation Safety and Security Act, "which would have increased penalties for attacking

or threatening to attack freight and passenger trains and funded security upgrades ranging

from more guards to surveillance equipment" (Waugh, 2004, p.312)

McCain's proposal did not pass, though, and the U.S continued to focus largely on

aviation security. Many feel the same as Ron Heil, a security consultant for transportation

industry firm TranSystems: "The airplane can be used as a weapon of mass destruction, such

as in the 9/11 attacks, and there is no recovering from even a small blast at 40,000 feet…

Trains must travel on rails, making them hard to steer into other targets but easy to attack

externally on their routes" (Stoller, 2010). So, even though more people ride mass transit,

airplanes have higher potential to create larger amounts of casualties. However, it must be

noted that there could be costs other than just human lives; a report by the Metropolitan

Transit Authority in New York "revealed that an explosion and a breach in the many subway

tunnels that run under Manhattan's East River could shut down the tunnels for years" and

cause incredibly large numbers of casualties (Ross, 2009); this is just one hypothetical

example.

7/7 was something that finally got the attention of the U.S. government, though. In

the weeks leading up to July 2005, the Senate was considering reduced funding for mass

transit security; after 7/7, some congressmen pointed out how important transit security was.

According to Senator Chuck Schumer, "It is clear that we're not doing close to enough and

must do more… The soft underbelly of buses and subways and railroads are fully exposed to

similar terrorist attacks" (Murray, 2005). The national bus carrier Greyhound said they would

"screen all passengers if a bill sponsored by Senator Max Cleland" was passed; "Greyhound would use contractors to screen passengers for weapons with handheld wands at the company's roughly 200 staffed terminals" (Peckenbaugh, 2002, p.75).

Ultimately, though, the Senate was did not reach a deal, and rejected proposed increases on the mass transit budget of the Department of Homeland Security (Lipton, 2005). In fact, the new budget appropriated $50 million *less* than 2004, with Bush's Homeland Security secretary Michael Chertoff emphasizing the need for aviation security instead, in spite of the fact that up to that point, $250 million (with an m) had been spent on transit whereas $15 billion (with a b) on aviation. Echoing previous sentiments, Chertoff said "a fully loaded airplane with jet fuel… has the capacity to kill 3,000 people. A bomb in a subway car may kill 30 people" (Lipton, 2005).

As a result, most security funding for mass transit has been left up to state and local authorities. In financially-distressed places – like most any American or European city in recent years – this can lead to severe budgetary constraints. In April 2010, the American Public Transportation Association released a report saying America's mass transit networks "are facing unprecedented funding challenges due to widespread declining state and local revenues" (Stoller, 2010). William Millar, American Public Transportation Association president, emphasized the need for national support: "State and local governments and transit agencies are doing what they can to improve security, but it is important that the federal government be a full partner in the effort" (Murray, 2005). On the other hand, the aforementioned Chertoff, then-Secretary of Homeland Security, said "I think our transit systems are safe," adding "I wouldn't make a policy decision driven by a single event," without sensing the irony given his position (Murray, 2005).

All things considered, perhaps the best idea is to "keep calm and carry on," as the cliché goes. It is important to have emergency systems in place *in advance*; escape routes, CERT, etc. Mainly, just be prepared for as many potential scenarios as possible. This would ideally lessen panic and chaos among citizens, responders, and civic authorities, as well as keep casualties to a minimum. If a terrorist can cause long-term disruption to the lives of millions, they might consider that a victory. The terrorist group may only strike once, but the effects on the populace can be long-lasting; for example, the 9/11 attacks occurred over a decade ago, but the hassle and inconvenience of the consequent increased security measures at airports is still extant to this day, as has been mentioned. 9/11 has cost the American economy some $123 billion dollars over the past eleven years, according to Kenny, who says "these days, the TSA's major role appears to be to make plane trips more unpleasant" (2012).

The important thing is to not let everyday life be disrupted in the long-term. Said one New York commuter: "Every day, I see the NYPD out here. I see the dogs. I can't let it affect my life right now… I don't think about terrorism. I only think about it when I hear about it. Other than that, it never enters my mind" (Weber, 2010). Even after mass casualty events, sometimes transit networks can be remarkably resilient. Cox, Prager, and Rose look at the role resilience plays in overcoming attacks: though it may not be possible to prevent all terrorism, "by augmenting a security strategy of prevention and detection with a strategy of encouraging transportation network resilience, we can reduce the consequences of an unforeseen attack on the transportation system" (2009, p.308). Perhaps the best example of transit resilience is a chilling anecdote provided by Robert Krulwich, explaining the tale of Tsutomu Yamaguchi following the atomic bomb blast in Hiroshima, August 1945:

> "With nowhere to go and desperate to get away from the destruction and the burned bodies, [Yamaguchi] heard a rumor the railroad might still be working.

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He decided to head for the train station, which was across a river. The bridges were down. He tried crawling across a logjam of corpses, but couldn't cross, then found a single railroad beam and made it to the other side, where, amazingly, trains were indeed leaving for other cities. He pushed himself onto one heading southwest to his hometown: Nagasaki" (2012).

VI.   Conclusions

As sustainability becomes an increasingly important component of the world, cities learn improving their transit structure is essential to keep up with the pace set by global trendsetters. At the same time, new security concerns must be properly addressed for this to be effective. Over the past few decades, Western cities in particular have become susceptible targets of global terrorist organisations, and security against the ever-present threat of terrorism has become one of the key drivers of policy-making at both the domestic and international level in that time, especially since 9/11, 7/7, and other attacks (some successful, some not) brought in the twenty-first century. No type of travel has been immune to security risks, especially those types which concentrate many people together in compact spaces, such as airplanes, subway and light rail carriages, and buses.

In response, increased security measures have been implemented by both the private and the public sector at various levels. For example, "installing more closed-circuit television cameras, increasing the presence of security, both visible and undercover, and adding bomb-sniffing dog teams are all options that security experts sometimes recommend" (Gollom, 2012), as well as the other options mentioned herein, such as public awareness programs and changing the designs of transit stations. There have been a few notable tragic exceptions, but for the most part, traveling on mass transit can be considered as safe as ever.

However…will any of this be enough? One Madrid transportation official claimed "Security does not exist. What do exist are methods to lessen insecurity. You never know

what is going to happen. I am telling you this because when the politicians tell you that these methods will guarantee our security, it is all false" (Loukaitou-Sideris, Taylor, and Fink, 2006, p.743). Jennifer Dorn of the Federal Transit Administration thinks "completely preventing terrorist attacks on public transportation systems is an unrealistic goal," a sentiment she told the U.S. Senate in the months following 9/11: "Given the inherently open nature of our transit system, it is more important to concentrate on mitigation than prevention, frankly" (Peckenbaugh, 2002, p.74). This idea was echoed by Chalk, who said "attempting to institute 100 percent security is impossible given the nature and purpose of mass transit" (2006).

Regardless, with so much information floating around, it is essential for the right people to be informed. However, this is sometimes easier said than done. Referring to the logistical trouble of sharing information from the FBI, CIA, DHS, etc. one character in the show Criminal Minds said "it sure would be a lot easier if there was centralisation of all of this" (Criminal Minds, 2006). Though the show is fictional, her concerns are valid in real life. The problem is not limited to the United States; in Britain, transit operators – like the London Underground or Nexus in Newcastle/Sunderland – secure the trains, whereas Network Rail secures stations (Loukaitou-Sideris, Taylor, and Fink, 2006, p.736).

Likewise, it is just as important to cooperate internationally as well as domestically, especially in this globalised era. As with any multinational problem, it is necessary for relevant parties to share ideas and solutions across borders. Loukaitou-Sideris, Taylor, and Fink emphasize that security cannot "be achieved without global cooperation and worldwide networking" (2006, p.727). It is essential for cities to learn best practices from others; to work on "building a smarter planet," as the IBM catchphrase goes. According to transit

engineer David Levinson, "Understanding how subway networks grow and evolve might one day help to design better systems" (Fecht, 2012). Loukaitou-Sideris, Taylor, and Fink provide a specific example, saying "all of the British transit operators we interviewed stressed the importance of sharing information and knowledge about security with their neighbors on the Continent" (2006, p.737). To fight a multinational problem, there must be a multinational effort.

There likely is no perfect solution, as there will always be some degree of risk given the open nature of mass transit. However, by using a comparative approach to security threats on public transportation systems and learning from others, relevant parties can figure out what some of the best practices are to ensure that people remain as safe as possible. Civic authorities, companies in the private sector, and public citizens all need to be prepared for what they would do in an attack situation; by having plans and preventative measures in place in advance, casualties can be minimized, services can be restored quicker, and passengers can feel more secure. That is really the best thing that can be done.

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