INCORPORATING SECURITY MEASURES INTO THE BUILT ENVIRONMENT

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The protection of the built environment has been given increasing attention over recent years, with physical interventions being integrated into the built environment itself and an impetus on the role of those who are responsible for its design, construction and operation. Of particular note has been debate and behaviour surrounding the incorporation of security measures to specifically mitigate terrorist threats, as varying perceptions regarding obligations and incentives to do so have resulted in vulnerable places remaining unprotected. As part of on-going research into the security of the built environment, a three-year study into the protection of crowded places from terrorism has determined the factors that influence whether such measures are incorporated into built assets, in order to further understanding of the perceptions and reality behind decision making. Drawing on data obtained from interviews with 47 construction management and security professionals in the UK and USA, as well as observations during site visits and document analysis, a framework is put forward that presents the factors that influence whether security measures are incorporated, as well as the factors that influence the value of the measures themselves. The framework highlights the need to consider the incorporation of physical measures during the early design stages whilst also reconciling the requirements of such measures against those of other design criteria; to understand the intricacies surrounding risk mitigation within time and cost constraints, and to accrue maximum value. Such a framework, it is argued, would aid policy and key decision makers in co-ordinating their efforts and effectively protecting vulnerable places from the range of risks that the UK faces, thereby mitigating a range of natural hazards and major accidents, not just specific threats.

Keywords: counter-terrorism, design, risk, safety, security

INTRODUCTION

The design, construction and operation of the built environment is influenced by a vast array of legislated and non-legislated considerations. Most notably however, a plethora of hazards, threats and major accidents pose significant risks to the built environment itself (Cabinet Office 2012; Harre-Young 2012; HM Government 2010; Edwards 2009). Whilst it has been acknowledged that the identification of every risk may not be achievable, it has been noted that the vulnerability and protection of the built environment affects everyone, as everyone interacts with it (Bosher and Dainty

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2011: 2). Over recent decades, the growing investigation of the aforementioned risks has resulted in a range of research into notions of resilience, safety, security, and counter-terrorism, most notably in relation to integrating physical interventions into the built environment to protect those who use it. Despite riverine, pluvial and coastal flooding, and severe windstorms, posing the greatest risk to the built environment, and that their occurrence and severity is likely to increase due to changing climatic conditions (Bosher and Dainty 2011; Crichton 2008), of significant concern has been the threat of terrorism faced within the UK through the intentional targeting of crowded places. Concern has been raised regarding how the built environment has been designed and retrofitted to reduce its vulnerability to, and mitigate the impacts of, terrorist attacks (Coaffee 2010). Building on a three-year study into the protection of crowded places from terrorism in which a theoretical framework was developed to understand the factors that influenced whether crowded places were protected, as well as the value of counter-terrorism measures (CTMs) themselves, the research questions whether such a framework can be used to understand the protection of places that are vulnerable to not just the threat of terrorism, but also the plethora of other threats, hazards, and major accidents that pose risks to the built environment. The research also highlights the need to consider the incorporation of physical interventions into the built environment whilst reconciling their needs with those of other design considerations, to understand the intricacies of mitigation within time and cost constraints, and to accrue maximum value from incorporating measures. In doing so, it is anticipated that further debate and guidance will be encouraged on whether, and how, principles of security should be further aligned with the design, construction and operation of the built environment.

SECURITY AND THE BUILT ENVIRONMENT

The built environment is the substantive physical framework that enables society to function in its social, political, economic and institutional aspects (Geis 2000). In its design, construction and operation, a vast number of considerations need to be made, some of which are legislated for, some of which are not; political, social, economic, technological, environmental and ethical, legal, system-focused, structural, and strategic factors are all inherent in the design and retro-fitting of the built environment (Allan and Davis 2006). System considerations include security, and taking the risk of natural hazards as an example, a vast array of natural hazards pose a risk to the built environment and each require an in-depth understanding of their nature and mitigation in order to reduce their likelihood and lessen their impacts effectively and proportionately. Whilst the identification of every risk may not be achievable, it has been acknowledged that the vulnerability and protection of the built environment affects everyone, as everyone interacts with it (Bosher and Dainty 2011). The reduction in vulnerability of the built environment to such risks is, therefore, of significant importance.

In response to this there has been a growing trend towards the incorporation of physical interventions into the built environment so that the potential impacts of hazards, threats and major accidents occurring are avoided or reduced. Whilst the aim of the paper is not to critically examine or gain intricate knowledge regarding the mitigation of all hazards, threats and major accidents, there is clearly a need to anticipate, prevent and prepare for, and respond to and recover from, their potential impacts as far as is reasonably practicable. The anticipation of irregularity and change in the nature of such risks has also been an emerging appreciation, evident in a

growing body of literature, and has in part led to the concept of resilience, in which its Latin roots of 'resilio' mean to 'jump back' (Sapountzaki 2007).

However, it has been recognised that in most cases it will not be sufficient for a system to simply 'jump back' or return to its original state, as its original state contributed to the disaster or disruption occurring (Bosher 2008). Therefore, the 'resilience' (and security) of a system is its ability to avoid, or at least absorb, disruption, and thereby draw on anticipation, preparation and preparedness, and response and recovery (Institute for Public Policy and Research 2009). The resilience and security of systems are therefore influenced by both human understanding and action, as outlined above; paradoxically, the built environment and its related planning practices are not only affected by disasters, but they can also constitute their causes (Wamsler 2008: 350). Or, in the words of Mileti (1999: 12) "human beings - not nature - are the cause of disaster losses". The way in which the built environment has expanded over the past 30 years has, arguably, had little regard for such influences and has not only caused disasters, but exacerbated their impacts (Dainty and Bosher 2008). Therefore, those who design, construct and operate the built environment have a significant role to play in the avoidance and reduction of disasters and their impacts, and greater debate and understanding regarding the protection of the built environment from the plethora of hazards, threats and major accidents that pose a risk to it is needed. Such an understanding has been developed specifically in relation to the aforementioned threat of terrorism, as recent research (see Harre-Young 2012) has explored the terrorist threat itself, and whether and how the design, construction and operation of the built environment can be used to protect it.

TERRORISM AND COUNTER-TERRORISM

Terrorism has a long established history in the UK, which is evident from a range of literature (Silke 2011; Richards 2011; HM Government 2010) and can be categorised as emanating from three areas, those being international terrorism, Northern Ireland-related terrorism, and domestic extremism. The threat from international terrorism, and more specifically Al Qaeda and their affiliates and supporters, despite being significantly weakened in recent years, is still faced (Cabinet Office 2012), and are seen as highly dangerous and a continuing threat due to their absolutist religio-political beliefs that result in a commitment to mass killing and economic destruction and disruption (Wilkinson 2007a). The threat from Northern Ireland-related terrorism has manifested itself in the form of varied methods of attack, including assassinations, vehicle-borne improvised explosive devices (VBIEDs), and mortar attacks (Wilkinson 2007b), yet it was arguably the 1996 VBIED attack in Manchester City Centre that is most prominent (Harre-Young *et al.* 2009). More recently, there have been consistent attacks in Northern Ireland, resulting in not just a continuing threat (Centre for the Protection of National Infrastructure (CPNI) 2010), but a growing concern (HM Government 2011). In relation to domestic extremism, protests that have resulted in public disorder and criminal damage have been evident more recently, including widespread rioting that occurred in UK cities in August 2011 (BBC 2011). Notwithstanding the targeting of individuals (as above), critical national infrastructure and government buildings that has taken place to date (Andrew 2009), Clarke and Soria (2009) and Harre-Young *et al.* (2009) have highlighted that of all the publicly known cases of terrorist plots and attempted attacks that have come to light since 2000, all have involved attacks on crowded public places and/or transport networks, and evident too has been the prominent use of VBIEDs.

Protecting from terrorism

Incorporating physical measures into the built environment to deter and mitigate the impacts of such attacks and other forms of crime has been undertaken throughout history (Briggs 2005: 68), yet it has been the use of such measures in relation to the aforementioned terrorist threats that has been increasingly prevalent in debates between, and within the realms of, practitioners and academics, as 'fortress architecture' and 'defensible space' became synonymous with such protection (Coaffee 2010). However, it was arguably the onset of Crime Prevention Through Environmental Design (CPTED) that was the basis from which other frameworks and typologies of protective measures emerged, with CPTED encompassing access control, natural (informal) surveillance, organised (formal) surveillance, territoriality, defensible space, and target hardening (Cozens *et al.* 2001; Moffat 1983). More recently, Harre-Young (2012) has developed a typology of CTMs that can be used to protect such places, which categorises the measures into three groups, those being Hostile Vehicle Mitigation (HVM), protective construction, and planning, detection and procedures. As part of the same study, a further output was made in the form of a theoretical framework that encompassed the factors that influence whether places are protected, and the factors that influence the value of CTMs themselves (ibid.).

PROTECTING THE BUILT ENVIRONMENT

The framework presented in Figure 1, derived from a three-year study into the protection of crowded places involving interviews with 47 construction management and security professionals (the methodology for which is detailed below), highlights eight factors that influenced whether crowded places were protected. Two of those factors (threat and risk assessments (TARAs), and stakeholder understanding and engagement) also influenced the value of CTMs themselves, as did auditing.

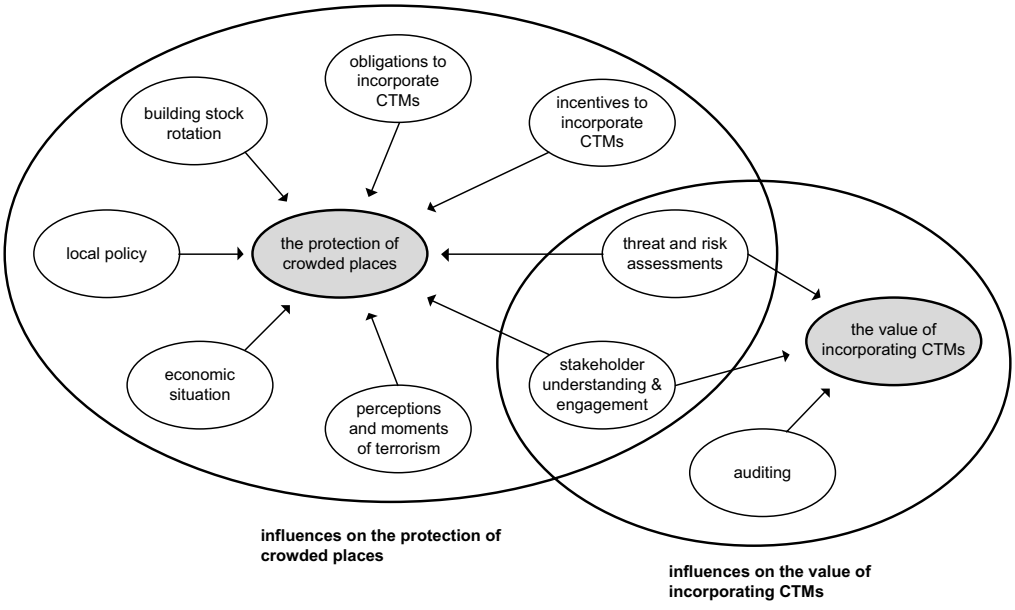

Figure 1: A framework of the protection of crowded places (Harre-Young 2012: 41)

METHODOLOGY

The aim of the research was to understand (and therefore change or influence) the social world through the identification of the 'structures at work', so an interpretivist epistemological position was adopted, as was a critical realism position in relation to

ontology (Bryman and Bell 2007: 18). In explaining the reality of the situation, creating theory as a result of that understanding, and then testing the developed theory, the research was iterative in nature due to it being inherently inductive and deductive, and required the adoption of a reconciliatory approach to examine and understand the 'structures at work' whilst recognising that such understanding was subjective and required interpretation (Robson 2011: 31; Walliman 2006: 20). In order to capture the subjective nature of the research, a qualitative research strategy and respective research methods were used that included interviews, site visits and document analysis, all of which were carried out in both the UK and the USA. The analysis of data was carried out through analytic induction, in which the universal explanation of the phenomenon being studied was sought, through the collection of data until no identified cases were found to be inconsistent with the developed explanation (Bryman and Bell 2007: 583). Thematic coding was used, with emergent themes forming the basis of the theoretical framework, which then became a coding frame upon which data was labelled, reflected on, and informed the collection of further data (Robson 2011). A total of 47 participants were recruited for the research, with the collection of data spanning 16 months.

THE NEED FOR A BROADER UNDERSTANDING

Whilst the research furthered understanding in relation to the design, construction and operation of the built environment in relation to countering the threat of terrorism, it can be questioned whether the development of a theoretical framework in relation to the above could be used to understand the mitigation of more than just terrorist threats. A range of natural hazards are both more likely and of higher consequence than terrorism-related risks (Cabinet Office 2012), so an in-depth understanding of the incorporation of protective measures more broadly, as well as their value, seems of use practically to those who are responsible for the design, construction and operation of the built environment, and pertinent in furthering academic debate and knowledge in the area. The previous theoretical framework (Figure 1) is therefore built on in order to develop a theoretical framework that could be used to understand the incorporation of protective measures to mitigate the plethora of risks that the built environment faces, as presented in Figure 2.

INFLUENCES ON PROTECTING VULNERABLE PLACES

The eight factors influencing the protection of vulnerable places (obligations, incentives, risk assessment, stakeholder understanding and engagement, perceptions and occurrences of risks, the economic situation, local planning policy, and building stock rotation) are explored below.

Obligations and incentives

Legislative, insurance-based and moral obligations determined whether crowded places were protected and whether CTMs were incorporated (Harre-Young 2012), and literature is clear in stating that interpretations of existing legislation are such that 'duties of care' do encompass terrorist acts (Harre-Young 2012; Fussey 2011; CPNI 2010) and that such legislation has been used to prosecute where counter-terrorism advice had been received but not acted on (Veale 2009: 291).

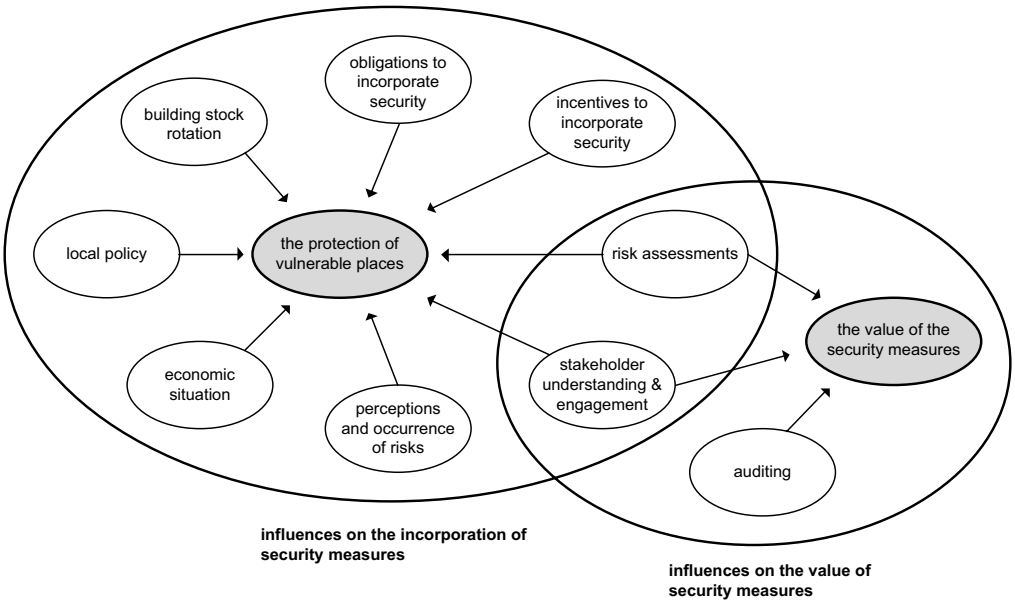

Figure 2: A theoretical framework for influences determining the incorporation of security measures

Such 'duties of care' apply to all hazards, threats and major accidents that pose a risk to places and spaces, and are therefore highly pertinent when designing new places or spaces, or renovating/refurbishing existing ones. A range of incentives influenced whether CTMs were incorporated, those being reductions in risk and loss of/damage to life, property and reputation; accruement of competitive advantages; generation of revenue; conduciveness with the agendas of pedestrianisation, regeneration and master-planning; and insurance incentives in the form of competitive policies and possible reduced excesses (Harre-Young 2012). Incentives to incorporate security measures would also remain highly influential, as reductions in risk and loss of/damage to life, property and reputation are significant factors upon which the incorporation of protection can be based. Harre-Young (ibid.) found that no CTMs were explicit to counter-terrorism (every CTM identified had additional benefits), and that the minimum additional benefits accrued through incorporating protection was the mitigation of other forms of criminal damage and public disorder.

Rouse (2004: 64) argues that "to account for value of architecture to companies, what you actually talk about is value to business" and therefore, in identifying incentives to incorporate security measures into architecture (and other built assets), the value of doing so to business must be identified, which has been done so in terms of revenue generation, the accruing of competitive advantages, the conduciveness of other agendas, and gaining insurance incentives (Harre-Young 2012). It could be argued that security measures, by reducing the likelihood of and mitigating the impacts of, a range of hazards, threats and major accidents, would accrue more significant incentives than CTMs alone, benefitting end-users and other stakeholders relatively more than if CTMs had only been incorporated. Whilst questions remain regarding obligations to incorporate security measures and how such practices are aligned with the design, construction and operation of the built environment, it raises whether there are in fact a range of incentives that could compel stakeholders to do so, regardless of perceived obligations.

Assessment, perceptions and occurrences of risk

The undertaking and contents of TARAs influenced whether crowded places were protected as the outcome of such an assessment could be to protect (the extent to which would vary in relation to the type and scale of the terrorist threats faced), or to not protect/incorporate CTMs. TARAs are, as a result of the above, inherently sensitive and confidential, and should only be conducted by trained people, such as Counter Terrorism Security Advisers. The undertaking and contents of risk assessments would remain highly influential in understanding the needs of broader protection, as they would influence both the incorporation of security measures and their value. Arguably, their influence would be exacerbated due to the increased complexity in not only determining what hazards, threats and major accidents the assessed place or space is vulnerable to, but how each would be reduced and mitigated whilst trying to achieve a joined up or 'holistic' approach. Whether any unintended consequences of security measures would impact others would also need to be understood and identified. Perceptions and occurrences of the risks remain a consideration, as peoples' views of risk and of the risks faced will vary, and will continue to be influenced by the occurrence or manifestation of them, such as flooding events.

Stakeholder understanding and engagement

Engagement between, and understanding of, stakeholders was also found to influence the protection of crowded places, and would remain pertinent, especially considering the aforementioned increased complexity. A solution towards the adequate and effective engagement between stakeholders in which security measures and solutions could be identified and examined is through the use of charette-type meetings whereby architects (and other design professionals) could invite required stakeholders to work through such issues, thereby enhancing the quality of the design produced, as well as enhance their own understanding (Glass 2008: 180).

Economic situations, local policy and building stock rotation

Economic influences are both pertinent to the current situation both nationally and internationally, and have been noted as influencing the incorporation of security measures through the prioritisation of other agendas over those of security (HM Government 2010: 21). This furthers the potential significance of incentives to incorporate security measures and therefore highlights a need for research into the incentives that are inherent in the incorporation of them. Local policy was proven to influence the incorporation of CTMs as different local authorities had different stances regarding what CTMs they deemed as appropriate or not (Harre-Young 2012) and so it can also be assumed that such influences would remain when considering the incorporation of security measures more broadly. This reinforces the need for stakeholders to effectively engage and further highlights the need for a platform from which this can occur, such as charette-type meetings (Glass 2008), in order to understand local policies and produce appropriate and compliant solutions. The influence of building stock rotation remains pertinent to the incorporation of security measures, as the vast majority of vulnerable places already exist, so the retro-fitting of them remains the most likely scenario considering their incorporation. Impetus would still need to be put on engaging as early as possible during the design process though, as retrofitted measures can cost more and be less effective (Harre-Young 2012).

INFLUENCES ON THE VALUE OF SECURITY MEASURES

Whilst TARAs and stakeholder understanding and engagement evidently influenced the protection of crowded places and whether CTMs were incorporated, they also influenced the value of CTMs themselves, as did auditing. The contents of the TARA itself, the situational context in which the focus of the assessment resides, the terrorist threats faced, and the understanding and incorporation of proportionality all influence the value of CTMs, as they can determine whether the proposed or incorporated protection is under-engineered and vulnerable, or over-engineered and obtrusive (ibid.), and the same can be assumed for protecting against other threats, hazards and major accidents given the need for an accurate risk assessment. Stakeholder understanding and engagement influences the incorporation and value of security measures due to it encompassing, amongst other factors, understanding of the requirements, performance and consequences of the measures themselves, a matter which if misunderstood could leave places and spaces vulnerable to attack. Auditing influenced the value of security measures a lack of, or insufficient, auditing could lead to inappropriate and ineffective measures that leave 'protected' places vulnerable to attack, that could potentially exacerbate the impacts of an attack, and could therefore result in additional capital outlay to remove, make safe, and replace inappropriate measures with correct/appropriate ones. The implication here for stakeholders is the over-engineering and potential obtrusiveness, or under-engineering and vulnerability of the places and spaces planned for and designed, coupled with the potential for mistakes in incorporating security measures to exacerbate the impacts of an attack, should one occur.

CONCLUSIONS

There is a need for further debate within the construction industry as to the alignment of protecting the built environment and any means through which the likelihood and impact of disasters are reduced, and the design, construction and operation process. Whilst questions remain regarding obligations to incorporate security measures, incentives to do so have been highlighted that could compel stakeholders to incorporate them, regardless of perceived obligations. A framework has been put forward that presents the factors that influence whether security measures could be incorporated, as well as the factors that could influence the value of the measures themselves. The framework provides a strategic overview of the issues that are of relevance to construction managers, inherent in the protection of vulnerable places, as obligations exist under legislated duties of care; a range of incentives are evident; risk assessments and stakeholder understanding and engagement are highly influential; perceptions and occurrences of risks also influence protection; economic influences remain highly topical and influential and highlight a need for research into security measures and their incentives and value to business; local policy variations influence the incorporation and choice of security measures; and building stock rotation also influences the incorporation of security measures due to the vast majority of built assets already existing and therefore require retro-fitting (Harre-Young 2012). The research also highlights the need to consider the incorporation of physical interventions into the built environment whilst reconciling their needs with those of other design considerations, to understand the intricacies of mitigation within time and cost constraints, and to accrue maximum value from incorporating measures, which can be achieved through such a framework. Such a framework, it is argued, therefore aids those responsible for the design, construction, operation and importantly, the protection, of vulnerable places in proportionately protecting built assets that are or

could be vulnerable to the plethora of hazards, threats and major accidents that the built environment is at risk from, and ensure that they are neither over-engineered and obtrusive or under-engineered and vulnerable, or incorporated in such a way that could exacerbate the impacts should those risks manifest themselves.

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