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## Modeling the Economic Costs of a Terrorist Threat to a Large-Venue Public Facility

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MODELING THE ECONOMIC COSTS  
OF A  
TERRORIST THREAT  
TO A  
LARGE-VENUE PUBLIC FACILITY

A Thesis

Presented to the

Department of Economics

and the

Faculty of the Graduate College

University of Nebraska

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

University of Nebraska at Omaha

By

Greg C. Ashley, MBA

December, 2002

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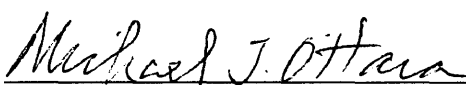
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## THESIS ACCEPTANCE

Acceptance for the faculty of the Graduate College,  
University of Nebraska, in partial fulfillment of the  
requirements for the degree Master of Arts,  
University of Nebraska at Omaha.

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Date Nov. 18, 2002

MODELING THE ECONOMIC COSTS  
OF A  
TERRORIST THREAT  
TO A  
LARGE-VENUE PUBLIC FACILITY

Grèg C. Ashley, MBA

University of Nebraska at Omaha, 2002

Advisor: Michael J. O'Hara, J.D., Ph.D.

Insurance companies will pay out an estimated \$50 billion in claims as a result of the September 11, 2001 terrorist attacks. The enormous consequences of the attacks to both the local and national economy surprised many and have raised concerns about the cost of such events. Predicting the occurrence and economic cost of terrorist attacks is fundamentally different than predicting the occurrence and economic cost of natural disasters. The cost of natural disasters is more predictable and often can be accurately estimated using historical data. Even losses from typical kinds of crime such as burglary show predictable patterns.

Both the frequency of and the magnitude of cost events are typically thought to approximate a bell-shaped curve, with the high point of the curve representing usual or customary loss. Occasionally, an infrequent event will occur near the tail of the curve, but these are the exceptions. Even when a tail-event occurs, typically there is no conscious design to make the event's damage more severe. In stark contrast, a terrorist event, however, does not follow predictable patterns. In addition, when damage does occur, the damage is purposely designed to be a tail-event, although terrorists, like all

humans, occasionally fail, but the cost distribution can be expected to exhibit pronounced kurtosis.

Since the events of the September 11, 2001 terrorist attacks, more attention has been focused on the economic consequences of terrorism. This research explores the legal and economic issues of estimating the cost of a terrorist threat. The primary focus of the research concerns a threat to a large public venue such as a convention center/arena. Estimating the cost of a terrorist threat in this context is a multidisciplinary effort involving, at a minimum, economists, accountants, lawyers, and experts on security/terrorism.

Grateful recognition is given to my Supervisory Committee Chairman

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## INTRODUCTION

There are many types of risks to which businesses are exposed and every business should consider the possibility of and subsequent cost associated with each potential risk. Some risks are commonly understood and in some cases expected, for example, legal suits, theft, and vandalism. All commonly encountered risks are insurable and thus allow management of risk to be a predictable expense. In this regard, few industries have become as adept in predicting future loss potential than the insurance industry. The management of risk for most businesses is enhanced by their knowledge of historical patterns of risk. As historical patterns change, especially when change is quick, the science of prediction becomes more difficult.

The Insurance Services Office (ISO) notes:

In the nine years and ten months from January 1989 to October 1998, the United States property/casualty insurance industry suffered an inflation-adjusted \$98.0 billion in catastrophic losses – 101.2% more than the inflation-adjusted \$48.7 billion in catastrophic losses during the 39 years from January 1950 to December 1988 (Insurance Services Office 1999).<sup>1</sup>

As can be seen, historical loss patterns are increasing sharply. These losses primarily are accrued from natural disasters, such as hurricane Hugo in 1989, the Northridge earthquake in 1994, and hurricanes Andrew and Iniki in 1992.<sup>2</sup> Historically, property/casualty catastrophic loss primarily has been associated with acts of nature. The

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<sup>1</sup> ISO is an independent company that provides risk decision products and services for the insurance industry. Their website is located at:

<http://www.iso.com>

The same report discussed above also notes ISO defines catastrophes as events that cause \$25 million or more in direct insured losses to property and that affect a significant number of insureds and insurers.

<sup>2</sup> Some in the insurance industry believe that weather related natural disasters are increasing both in frequency and in intensity because of human action induced global warming.

rise in terrorist activity against the United States, culminating in the September 11, 2001 al Quaida attacks on the World Trade Center (WTC) and Pentagon using airliners-as-missiles, is changing that view.<sup>3</sup>

The 9-11 event is referred to many times in this research, but it is important to note there is little a building owner (public or private) can do to prevent the style of catastrophic incident that 9-11 exemplifies (Archibald, Jamison et al. 2002). Prevention measures of this kind can only be done by the federal government. The 9-11 event, nevertheless, serves as an example of the consequences experienced when insufficient prevention occurs.

Until 9-11, examples of other recent notable terrorist attacks on American soil include the 1993 basement garage truck bombing of the WTC and the 1995 street truck bombing of the Alfred P. Murrah Federal Building in Oklahoma City. These events, in combination with other al Quaida attacks overseas, and especially 9-11, have heightened awareness of problems associated with catastrophic risk, especially those resulting from acts of terror.

This research considers the cost implications for an economic entity facing a terroristic threat. The nexus of the problem is risk quantification. How, specifically, does an economic entity, public or private, estimate the cost of a terrorist threat? The

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<sup>3</sup> The September 11, 2001 WTC and Pentagon attacks will be referred to as “9-11” in this research. The al Quaida is a terrorist organization with no defined central location but having many cells scattered around the world. The al Quaida springs from the fundamentalist portion of Islam and is particularly concerned with Western influences on the Muslim world. A fourth plane hijacked by al Quaida, with a target now believed to be the USA Capitol Building, was crashed in Pennsylvania as an unfortunate consequence of the passenger’s rescue attempts. According to an Associated Press article printed in the 09/09/02 evening edition of the Omaha World Herald newspaper, 2,801 people are either dead or missing as a result of the WTC attack alone.

problem of cost estimation can be viewed from the vantage point of an economic entity who has just received a threat and subsequently is trying to predict pending cost, or from the vantage point of an entity who has already survived a threat and now is trying to capture cost ex post. Regardless of the strength of an objective attempt to estimate cost ex ante or ex post, subjectivity is unavoidable. This research considers both ex ante and ex post cost estimation issues, although is primarily concerned with the former.

There are seemingly endless examples of economic entities which could be used to focus such a discussion. Since most terroristic threats, however, tend to be directed toward so-called landmark structures having social and political significance, used by a large number of people, and being of significant economic importance, this research will use a convention center/arena (CC/A) as the focal point for discussion.<sup>4</sup> The general question is: "What is the cost of a terroristic threat?". To be more instructive, I specifically append "to a CC/A" at the end of the previous question.

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<sup>4</sup> CC/As, by the nature of their business, act as hosts for the general public, additional cost issues arise that can be used for illustration and expanded discussion.

## **PROBLEM IDENTIFICATION**

### **MACRO VIEW OF TERRORIST IMPACTS**

#### **GDP Impacts**

Calculating the total economic impact of an event like 9-11 is complicated by the vastness and diversity of damage to the economy. In addition to obvious direct costs, like physical damage, there are a number of indirect costs. Consider productivity costs as an example. These costs may include (but certainly are not limited to) handling extra paperwork, stricter access requirements, additional employee drills, training, and counseling. These new indirect costs erode profits. Many of these costs can be hidden from traditional measures of the economy. Another subtle source of economic loss is the postponement of investment decisions. After 9-11, the expected rate of return for many projects probably went down as a result of security costs both to the specific project and the broader economy.

The difficulty in objectively measuring the impact can be seen by observing the wide variance in cost estimates of the attacks. A simple Internet search produces numerous estimates that vary in the billions of dollars. Part of the problem is determining what, exactly, should be included in the measure. How many indirect costs should be included? For example, should cost of an economic stimulus package be included?

Osama bin Laden, the titular head of al Quida and wayward ascetic son of a Yameni construction magnate who made billions serving the Saudi Royal Family, is widely quoted as estimating the cost of 9-11 at \$1 trillion. The International Monetary Fund (IMF), however, often is quoted as estimating the total impact, both direct and

indirect at 0.75% of GDP (Gross Domestic Product) or \$76.5 billion.<sup>5</sup> According to U.S. Treasury Secretary Paul O'Neill, the lack of available terrorism insurance for U.S. businesses is beginning to impact the broader economy with a cost equal to 1% of the gross domestic product (Kopecki 2002).<sup>6</sup> The cost of terrorism is often expressed as a percent of GDP, and as such implies a reoccurring nature. In fact, when comparing disparate estimates of damage, care must be taken to establish the width of time frame used. For example, The Comptroller of New York estimates the total impact of the WTC attacks to New York City to be as much as \$95 billion, but extends the loss period to the end of 2004 (Thompson 2002).

As time passes, the cost of terrorism may become a more specific, line-item entry in both national and business budgets.

### **Impacted Industries**

Dramatic economic problems often have a rippling effect causing impact to the broader economy. Even events given much less coverage than 9-11, like the corporate accounting scandals of 2001 and 2002 can have profound impacts.<sup>7</sup> When Enron

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<sup>5</sup> The IMF website is located at:

<http://www.imf.org/>

ABC News Online discusses the report in more detail.

[http://www.abc.net.au/news/business/2001/12/item20011228201738\\_1.htm](http://www.abc.net.au/news/business/2001/12/item20011228201738_1.htm)

Accessed 7 July 2002.

<sup>6</sup> The 1% figure only should be taken as a rough estimate in light of the problems measuring GDP. GDP only measures goods and services passing through organized markets (i.e., production which is bought or sold). In addition, the so-called underground economy, where transactions are hidden to avoid legal problems or taxes, is not captured in GDP measures. Lastly, measurement error is likely. Different sources of measure for GDP components have been known to differ by billions of dollars. Consequently, the real impact to GDP could be over or understated.

<sup>7</sup> The Governors of the USA States, meeting at their annual national conference on 07/15/2002, claim the wave of scandals not only hurt the stock market, but also local economies. For further discussion go to the URL below (note reports of the scandals are ubiquitous):

[http://www.pe.com/nationworld/nationalstories/PE\\_BIZ\\_0715\\_governors.7f4018a0.html](http://www.pe.com/nationworld/nationalstories/PE_BIZ_0715_governors.7f4018a0.html)

Visited 20 July 2002.

announced it had overstated earnings in November 2001, share price dropped under \$4 from a high over \$90, thus erasing billions in shareholder equity and retirement accounts. The Enron accounting debacle is widely considered to be part of the reason for the stock market pullback that started in January and February 2002. The profoundly higher cost of 9-11 make it hard to imagine an economic entity not impacted. There are, nevertheless, some businesses with more severe impacts.

The entire hospitality industry was/is among the most severely impacted, and within this industry subset, perhaps the airline industry was the hardest hit. When regulators closed off air travel for four days, the airline industry lost nearly \$1.5 billion (Reynolds 2002). A working paper from the Federal Reserve Bank of St. Louis concisely summarizes the problem.

The events of 9/11 curtailed airline travel in various ways. First, these events reduced the demand for air travel as a result of the increased concerns about safety. Second, these events reduced air travel by exacerbating the mild recession that began in March 2001. Third, the cost of travel was effectively increased because of the necessity of arriving earlier for departures and the increased delays because of security breaches. The result was substantially less air travel for both work and leisure purposes (Coughlin, Cohen et al. 2002).

Coughlin, et al., goes on to note a dramatic 30% drop in revenue passenger miles during September 2001 as compared to the previous September, and traffic was still down 15% year-over-year in December 2001. The losses were not transient. The world's largest airline, AMR, the parent of American Airlines, posted a second quarter 2002 loss of \$495 million and expected to be in the red for some time. Compared with the same quarter of 2001, revenues for the quarter were off 20%, passenger traffic was off 11%, and American Airline's average fares were off 9.5% (McCartney 2002).

The decline experienced by the airline industry is just part of the broader impacts to the hospitality industry. The head of the NYC & Company, (the name for the Convention and Visitors Bureau in New York), said the official post-9-11 forecast of visitors to New York included a 14% drop (5.4 million people) in 2001 as compared to 2000. Also forecasted is a corresponding drop in spending of 12% or \$2.1 billion (NYC & Company 2001).

A national survey of hotel general managers by Cornell University indicated more than a third of general managers noted a decline in average room rates, and 42.7% had experienced group cancellations due to the events of 9-11. The general managers perceived a declining hotel market even before the attacks, which made the 9-11 impacts even more severe. All of the general managers responding to the survey said they had laid off employees (Taylor and Enz 2002). A more recent analysis of the hotel industry by Pricewaterhouse-Coopers, a New York consulting group, postponed the hotel industry recovery until 2004 due to continuing stock market declines and lingering travel jitters [from 9-11] (Bannon 2002).

The *Travel Business Roundtable of Leading Economic Indicators* declined at a seasonally-adjusted rate of 8.4% after 9-11, and the drop is noted as the most significant monthly drop this index has experienced (Travel Business Roundtable 2001).<sup>8</sup> According to industry analyst, Rob Reynolds, tour operators experienced a 60% decline in travel bookings after 9-11 (Reynolds 2002).

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<sup>8</sup> The Travel Business Roundtable is an independent organization whose purpose is to educate, especially legislative leaders, regarding issues important to the travel and tourism industry. The cited report is one of many statistics they produce. The Travel Business Roundtable Website is located at: <http://www.tbr.org/>



The restaurant business also suffered. A news release from the National Restaurant Association reported the overall negative impact of 9-11 to eating and drinking businesses as exceeding \$1 billion in September 2001 (National Restaurant Association 2002). The release goes on to note, however, by November, monthly sales volume returned to pre-attack levels while total employment remained below pre-9-11 levels.

All of the hospitality impacts discussed above are particularly important within the context of a Convention Center/Arena (CC/A). If we assume the patronage of a CC/A to be composed of both local and regional business, common sense dictates an expected, more-severe impact to the regional component when the overall hospitality industry experiences a shock like 9-11. As an example, consider one of the main staples of a CC/A: tradeshow.

*Tradeshow Week* maintains detailed statistics regarding the tradeshow industry which they publish in their *Quarterly Report of Tradeshow Statistics*. Their third-quarter 2001 report (containing the 9-11 event), indicated the largest decrease ever recorded in the 29-year history of the report (Tradeshow Week 2001). According to the report, professional attendance was the hardest hit, down 7.5% compared with 2000 figures. Exhibiting company participation and net square footage also dropped. This record decrease was immediately broken by the fourth-quarter statistics when professional attendance dropped 20.4% from the same period in 2000 (*Tradeshow Week* 2002). Dramatic decreases in the airline and hotel industry translate into dramatic declines for

the tradeshow business which, in turn, represent a significant component of CC/A revenue.

### **Lifestyle Impacts**

Shortly after 9-11, numerous commentators were quick to note the American lifestyle will forever be changed by the event. More people, for example, now are nervous about staying in high-rise lodging establishments, and when they do stay, they request a low floor by an exit (Kelly 2002). In like manner, the anthrax-infected letters anonymously sent to members of Congress and the media shortly after 9-11 were widely reported as making people afraid to open their mail, or to send their children to school. The changes in lifestyle resulting from a terrorist act are numerous.

One of the problems with dollar-value measurement of damage is the inability to accurately capture adverse lifestyle impacts, especially emotional impacts. While there may be universal agreement an event like 9-11 causes profound and widespread emotional trauma, how that trauma is costed on an individual basis, and subsequently summed to create a total, is more a matter of conjecture than science. The individual impacts are, nevertheless, present. Rand Corp did a survey shortly after the 9-11 attacks asking participants qualitative questions typically used to evaluate stress level<sup>9</sup>. They found 90% percent of adults surveyed experienced at least some degree of stress, and 44% reported a substantial level of a post-traumatic stress symptom (Schuster, Stein et al. 2001).

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<sup>9</sup> Questions asked by Rand attempted to qualitatively measure such things as disturbing memories of the event, reduced ability to concentrate, trouble sleeping, and irritability.

The problem of measuring emotional discomfort is similar to the problem of measuring loss of enjoyment or pleasure. The crux of this problem is highlighted in the *hedonic damages* debate. Hedonic damage measurement essentially is an attempt to measure the value of a human life.<sup>10</sup> Those purporting such a value is measurable typically use some indirect measure, e.g., finding what some economic entity spends to avoid a casualty. In the context of providing expert witness testimony on economic damages, Martin does an excellent job in pointing out the flaws with this approach:

Unfortunately, the range of values is so large as to be nearly without value. The Consumer Product Safety Commission values life at \$70,000 while the Food and Drug Administration sets it at \$132,000,000. A range such as this is absolutely worthless to a jury, so most economists [who support the belief hedonic damages can be measured] do not include these two studies in their examples, but put the range somewhere between \$1 and \$8 million (Martin and Vavoulis 2002).

Applying a specific dollar value to human life raises another philosophical problem. For any specific, agreed-upon value, there is an implication that the reasonable person would be immediately willing to give up his/her life for that sum of money. Common sense dictates a rational person would not give up their life for *any* sum of money.<sup>11</sup>

Lastly, many economists believe a market is required to perform the measurement.<sup>12</sup> Without a market, there are no measures, only estimates of what the market would yield. According to these economists, without a market measure, an expert opinion is dubious at best. This is not meant to suggest consideration of hedonic

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<sup>10</sup> Hedonic damage is a distinct measure of the loss of life, itself, and not to be confused with other kinds of loss, such as loss of consortium or pain and suffering.

<sup>11</sup> This leaves open the notion rational people are willing to die in certain circumstances, e.g. to defend a loved one or closely held belief. While money may be a significant factor in justifying such sacrifice, money is not either the sole or the primary cause of the sacrifice.

<sup>12</sup> A market is an institution or mechanism which brings together buyers (“demanders”) and sellers (“suppliers”) of particular goods and services (McConnell and Brue, 1993).

damages is always without merit. To illustrate, note that the U.S.A. Food and Drug Administration (FDA) often conducts benefit/cost analysis regarding new drugs. If the FDA approves a new drug which includes the rare possibility of a death, then the FDA essentially has valued the death at the level of benefit. This administrative agency use of legislative power is not the same as economist's expert opinion. An economic expert witness assists the judicial trier of fact because economic theory and tools of analysis provide a gain in precision. If the issue in question is substantially subjective, rather than objective, then the issue belongs within the ken of the jury. Hedonic damages can be wholly appropriate for the FDA and simultaneously wholly inappropriate for an economic expert in a courtroom.

### **Examples of Economic Impact From a Terrorist Threat**

Two high-profile sporting events occurred shortly after 9-11, Super Bowl XXXVI and the 2002 Winter Olympics<sup>13</sup>. Both examples are at once good and bad examples for use in discussing the cost of a terrorist threat. They are good in the sense they highlight the enormity of spending required to secure a geographically and physically large venue. They are bad examples because both events are so hugely profiled as to make them far more attractive to terrorists than regular CC/A-like venues in ordinary operations, and as such, require disproportional higher levels of protection. Both events were prominent enough to be designated as National Special Security Events (NSSE).<sup>14</sup> The secrecy

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<sup>13</sup> Super Bowl XXXVI was held on February 3, 2002 in New Orleans, Louisiana. The 2002 Winter Olympics opened on February 8, 2002 in Salt Lake City, Utah.

<sup>14</sup> National Special Security Events may be designated under Title 18 of the United States Code. Such a designation allows the Secret Service to help with security. There only have been a dozen NSSE designations since the legislation was enacted. For online access to the Federal Register go to: [http://www.access.gpo.gov/su\\_docs/aces/aces140.html](http://www.access.gpo.gov/su_docs/aces/aces140.html)

surrounding the security of NSSE events precludes getting accurate security spending information. The cost of these security efforts may have been significantly defrayed by the United States government.

The previous caveats notwithstanding, the cost of providing security for Super Bowl XXXVI was rumored to be approximately double that of Super Bowl XXXV. Milt Ahlerich, the NFL's vice president of security, for example, was quoted as saying spending was more than double what was spent in the past (Powers 2002).<sup>15</sup> One article puts the total security cost of Super Bowl XXXVI at \$40 million, although the article is not clear whether this includes the cost of Secret Service help (Horrow 2002). The rumored doubling of spending is at least partially substantiated by New Orleans Mayor Marc Morial who hinted the 600 police officers on hand was double those on hand for the Super Bowl in 1997 (Bell 2002).

Security at the 2002 Winter Olympics was reported to cost \$310 million, and was nearly three times what the Atlanta organizers spent on security in 1996 for the Summer Olympics, even though the Summer Olympics had four times as many athletes and events (Zeigler 2002). As with Super Bowl XXXVI, it is unclear whether NSSE support is included in this cost. Needless to say, the staggering security costs discussed above would loom largely on a balance sheet.

Overseeing the security for a single event or a series of events with a fixed duration may involve less security expense than if the economic entity were ongoing. The United States Postal Service, for example, suffered severe and ongoing losses from

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<sup>15</sup> The article is not clear whether Ahlerich refers to the most recent past, or to games several years past.

the 9-11 and post-9-11 anthrax attacks. Postmaster General John Potter advised Congress the cost would be about \$2 billion in lost revenues and \$3 billion for anthrax cleanup and sanitation equipment (Kestin 2001). There is undoubtedly a reoccurring component to these costs.

## **UNDERSTANDING THE TERRORIST RISK**

### **The Source of Risk**

A detailed root cause analysis of terrorism is beyond the scope of this work, however, a short, high-level review of theory may be helpful to understand forces that predictably change the potential for terrorist acts. Research on terrorism can be focused at different levels:

In much of the existing research on terrorism, explanations have focused on the individual and group level. These aim primarily at providing psychological explanations, such as identifying why individuals join a terrorist group. Explanations at the societal or national level primarily attempt to identify causal relationships between certain historical, cultural and socio-political characteristics of society and the occurrence of terrorism. Explanations at the systemic or international level seek to establish causal relationships between characteristics of the international state system and relations between states on the one hand, and the occurrence of international terrorism on the other (Lia and Hansen 2000).

When reduced to simplest form, those inclined to commit terrorist acts often, but not always, are motivated by economic disparity, political difference, and/or ideological difference.<sup>16</sup> Terrorism inspired out of ideological difference often is considered the most dangerous because ideologically-motivated terrorists typically are less constrained

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<sup>16</sup> When so motivated the terrorist's terrorism can not accomplish the desired objective directly (e.g., terrorism does not redistribute wealth). Instead, the terrorism must unravel the existing social fabric on the hope that the reconstructed social fabric will be more consistent with the terrorist's objective (e.g., ideological purity) While social fabric is plastic in nature, quite often it is spun from a thread with a very resilient memory.

by fear of mass casualties or the euphemistically-labeled collateral damage. As with all maneuvers in war, terrorism is about leveraging limited assets into effective pressure (Sun-tzu 1994). The terrorist defines "collateral damage" differently than the traditional army: but both seek to minimize it.<sup>17</sup> Effective pressure for the terrorist often is measured by fundamental political change. Thus, the terrorist actively seeks to maximize what a traditional army would label "collateral damage" both to tie down that army and to stimulate the political processes to accede to the terrorist's worldview.

Modern society also has unintentionally made terrorism easier by providing a high-tech environment where communication, travel, and shared sources of knowledge are more easily attained.<sup>18</sup> The latter can be used to gather intelligence regarding a possible target and to create or procure weapons. Ease of communication is meant to include not only personal communication,<sup>19</sup> but also the modern media which devotes massive and immediate publicity to terrorist acts. An article written about mass media coverage of 9-11 reports, polls and surveys indicated between 99% and 100% of all

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<sup>17</sup> A modern traditional army may deliberately seek, in some contexts, what is traditionally defined as collateral damage. A modern army first seeks to eliminate the command and control (C&C) structure of the opponent army. The opponent army's C&C structure almost always is interdependent with the civilian infrastructure. Eliminating the opponent army's C&C supply of electricity typically has as an immediate and predictable consequence the termination of pumping facilities for the urban water supply. This was seen in Baghdad, Iraq during the 1991 Gulf War. Additionally, a modern army may deliberately decimate the civilian infrastructure so as to prevent that civilian population from resupplying the opponent army and/or to force the opponent army to divert its existing supplies towards the civilian population. This was seen in General Sherman's 1864-1865 March through Georgia and South Carolina during the USA's Civil War.

<sup>18</sup> Of course, to some extent, the technology of modern society also has provided better means of detecting and thwarting terrorist acts. It remains to be seen whether the gain in defensive detection is greater than, equal to, or less than the gains in the facilitation of terrorist action frequency and magnitude of consequence. However, history teaches that every defense can be defeated.

<sup>19</sup> Proponents of surveillance insist that such surveillance must be effective to the task. However, surveillance that can detect nefarious plots also, of necessity, tramples upon the privacy of the innocent and the formerly free. The terrorist who seeks a closed society "wins" just by prompting this defensive measure.

Americans followed initial news of the attacks (Nacos 2002)<sup>20</sup>. With regard to 9-11, the media not only provided round-the-clock coverage of the disaster itself, but also gave air time to Osama bin Laden and his lieutenants via videotapes made available through the independent Middle Eastern television network Al-Jazeera. Many other U.S.A. domestic TV programs aired having a “why do they hate us” theme. As can be seen, terrorists use the media as a free and easy platform to promote their views.

### **Terrorist Groups**

At the time of this writing during the year 2002, ideologically-focused terrorist groups based in the Middle East are considered the most likely source for potential terrorist acts, although historically many disparate groups having different motivations and operating in different countries also have used terrorism to advance their goals.<sup>21</sup>

Middle Eastern groups include:

Hizballah, a radical Shia Islamic Group in Lebanon that has committed numerous anti-U.S. and anti-Israeli attacks; HAMAS (Islamic Resistance Movement) and the Palestine Islamic Jihad, both of which use terrorism in the West Bank, Gaza Strip, and Israeli in order to undermine Middle East peace negotiations and to establish an Islamic Palestinian state; the Abu Sayyaf Group, which is a radical Islamic Separatist group operating in the southern Philippines; Al-Gama’a al-Islamiyya (Islamic Group), which is based in Egypt and seeks the overthrow of the Egyptian government; and the Armed Islamic Group, which is based in Algeria and seeks to overthrow the secular Algerian regime and replace it with an Islamic state (Simon 2002).

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<sup>20</sup> The article appeared in the Spring 2002 quarterly publication of Phi Kappa Phi. Phi Kappa Phi is an honorary society whose stated purpose is the recognition and encouragement of superior scholarship in all fields of study.

<sup>21</sup> Examples from the U.S.A. domestic front include the Earth Liberation Front (ELF) and the Animal Liberation Front which is the radical splinter from PETA (People for the Ethical Treatment of Animals). Many, especially in the Muslim Middle East, would point to the post World War II creation of the State of Israel as a successful use of terrorism for political gain.



The religious fundamentalism of the typical Middle Eastern terrorist organizations poses a more likely threat to CC/As and their venues for at least two reasons. First, terrorist groups domestic to the United States typically are more cause or issue-focused, such as environmental protection, animal rights, or anti-abortion activism. The targets of a cause-motivated terrorist typically are highly specific and symbolic, e.g., a chemical plant or an abortion clinic. Unless a CC/A is a venue hosting a targeted cause, the likelihood of attack from these terrorist groups is low. Second, one of the professed targets of religiously-motivated Middle Eastern terrorists groups is the American entertainment industry. The ideology of these terrorists regards the entertainment industry as decadent and sinful.

### **The Role of Ideology in Terrorist's Target Selection<sup>22</sup>**

Acts of terrorism are often referred to as indiscriminate or random. That is true with respect to the perception of the attacked populace, but most often it is not random with respect to the attacking terrorist. Terrorists almost always choose targets whose destruction is warranted by the ideology of the terrorist and whose destruction is perceived beneficial to their cause. The terrorist act is random in the sense terrorists often do not know who their *specific* victims will be.<sup>23</sup>

Ideology is a dominant factor behind most terrorist attacks. Through ideology victims of terrorist acts are dehumanized in the mind of the terrorist, as the terrorist either blames them as the source of the terrorist's plight, or an aid to someone who is.

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<sup>22</sup> The material in this section borrows heavily from an article written by C. J. Drake (2002).

<sup>23</sup> Military across the globe recognize that the ability to kill is enhanced if the target is dehumanized as the hated Other instead of a specific and known human.

According to terrorist's ideology, the victims' alleged guilt merits punishment, and simultaneously absolves the terrorist of any wrongdoing.

Most terrorist ideologies are sufficiently stringent as to apply blame to anyone or any thing even marginally associated with the target.<sup>24</sup> So, for example, a construction worker helping to build an entertainment facility is already "guilty by association," and as such a justifiable target in the mind the terrorist. Using this example, also note the desirability of the construction worker as a target may be enhanced because this target is probably less hardened than the specific object of the terrorist's wrath.

### **Summary of Recent Terrorist Acts**

Appendix A contains information in graphical form regarding the frequency, location, and intended target of terrorist attacks.<sup>25</sup> Although the perceived threat of terrorism has risen substantially since 9-11, recent historical statistics regarding terrorism are less ominous. During the five-year period beginning in 1995 and ending in 2000, there were only fifteen terrorist attacks in North America and only seven casualties.<sup>26</sup> Internationally, 77 United States citizens were killed during the period and 651 were wounded. Although 9-11 certainly skewed the casualty figures, numerically speaking, the odds of a terrorist attack to most U.S.A. located businesses as based on historical statistics are slim.

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<sup>24</sup> During the U.S.A.'s racial unrest of the 1960's, the Black Panther leader H. Rap Brown noted: "If you aren't part of the solution, then you are part of the problem." as well as "Violence is as American as apple pie." In 2002, H. Rap Brown, then living under the post-conversion name of Jamil Abdullah Al-Amin, was convicted of murder of a police officer.

<sup>25</sup> The data in this section were obtained from the United States Department of State located at: <http://www.state.gov/s/ct/rls/pgtrpt/2000/2451.htm>

<sup>26</sup> Note that these dates exclude al Quaida's first attack on the WTC (i.e., basement truck bomb), but include its attacks on the American embassies in Africa. Also see Appendix A for data and graphs.

## MEASUREMENT PROBLEMS

### All Threats Are Not the Same

Quantification of the cost of a threat depends heavily on quantification of the threat itself. The concept of quantifying threats will be discussed in more detail in a later section, but for now, note a high-level classification of threat potential would consider whether the threat was routine (or unspecified), indirect, or direct.

When preparing to quantify the cost of a terroristic threat, it may be reasonable to include the routine cost of protection. Economic entities routinely budget for security threats, even in the absence of a direct threat. This implies a constant, nonspecific level of threat is always present. Since 9-11, the concept of *routine* has changed. Routine now and in the future is more, perhaps much more, than routine before 9-11.

A routine security budget is composed of those security expenditures common to most businesses. With regard to a CC/A, many expenditures are considered boiler plate and would vary in size only with prevailing general perceptions of threat potential. Quantifying the cost of such a routine threat in this circumstance likely is easier than when the threat is more specific, because of the assumption of minimal impact to revenue streams. When the threat is routine (i.e. vague or unspecified), the cost of a threat may roughly be computed by subtracting last year's security budget from the current year's budget.

The situation gets more complicated when the threat is more specific. Since 9-11, for example, the United States government has issued several indirect warnings regarding the possibility of a terrorist attack. These warnings only specify a category of target (e.g.,

bridges). In like manner, a possibility exists a generalized, indirect threat could be issued to CC/A's in general, but to none in specific. In this indirect scenario, security spending by CC/A's presumably would rise disproportionately to entertainment/business facilities in general, and there may be additional impacts in the form of lost business. Obviously, a direct threat, leveled at a specific CC/A, would precipitate the most security spending, as well as impact revenue streams.

The amount of spending required to meet a threat also depends, at a minimum, on the terrorist or terrorist organization alleged to be the perpetrator, the credibility of the source reporting the threat, and whether or not significant free help is available from government sources.<sup>27</sup> The former gives insight whether the terrorist threat has the required resources and expertise available to carry out the threat.

### **Additional Economic Impact Contingents**

A major determinate of what an economic entity will spend to defend against a terrorist threat is the consequence of what would happen if insufficient spending occurs. With regard to a CC/A, insufficient security spending after a credible security threat becomes known may result in a reduction in event bookings and attendance as people avoid the facility because of safety concerns.<sup>28</sup> Reductions in security conceivably increase the chances of a terrorist act, and in the event one occurs, damage to reputation and future business may be large and unrecoverable. The potential for civil damages also are present. As consequences become more profound, the potential for greater cost

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<sup>27</sup> Note security provided by the government is not free, but rather becomes a taxpayer-born externality to the economic entity receiving it.

<sup>28</sup> Safety concerns include not only personal safety concerns but also concerns about the hassles caused by increased security, e.g., baggage checks and longer lines at gates.

increases. How much cost increases is a function of how risk averse the entity is, which is a determinate of security spending. Of course, as with any discounted present value analysis, those costs or revenues that are recognized earlier in time will have a far greater impact on the present value of profitability. Additionally, when those remote in time events also are small probability events, then the present value analysis of profitability nearly will eliminate those costs from the calculation of profit.

A second factor to consider is the kind of event the terrorist has either threatened to use or is presumed to use. According to the renowned billionaire investor Warren Buffet<sup>29</sup>, who has substantial investments in the reinsurance industry, the most likely risk is terrorists introducing a biological agent into the ventilation system of a large office building (Shim 2002).<sup>30</sup> Buffet also notes insurance companies now are excluding such risks, as well as nuclear and chemical risks. The perception of likely risk from these sources is a departure from what history would teach. Terrorists typically have used bombs, arson, and armed attack as their primary tools of destruction. Today, however, may be a new day with new risks.

Thirdly, terrorist's targets differ with respect to hardness. An entity consisting mostly of intellectual property (IP) faces fewer of the traditional security issues than a brick and mortar concern, especially if the latter occupies a large amount of space and

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<sup>29</sup> Warren Buffet is the CEO of Berkshire Hathaway, a large holding company. Berkshire Hathaway's website is at:  
<http://www.berkshirehathaway.com/>

<sup>30</sup> Note that some forms of modern terrorism do not include the destructive physical damage associated with bombs and arson. Bioterror attacks and hacking attacks to IT (Information Technology) resources leave physical plant intact but still generate significant psychological effect and/or financial effect.

handles large numbers of people.<sup>31</sup> The relative hardness of the target can act as a deterrent to terrorists. Note, however, hardening further skews the expected negative outcome by reducing the frequency of low loss events.

### **Measuring Economic Impacts**

Whatever negative impact results from a terrorist threat, the measurement of the impact is no simple task. Typically, when a large business or other economic entity experiences an economic loss, the measurement of that loss is a multidisciplinary effort.

Gaughan writes:

The skills of an economist may be invaluable to analyze the relevant economic environment, do an industry analysis, and construct reliable projections. A finance expert may be necessary to analyze relevant variables from financial markets, such as rates of return. An accountant may be useful to conduct a costs analysis or to perform other work, such as the reconstruction of financial statements, including cash flow statements (Gaughan 2000).

In addition to economists, finance experts, and accountants, there also may be a need for a marketing expert and a lawyer when determining economic damages.

Marketing experts have knowledge useful in predicting public response to advertising (e.g., as required to offset a negative event), and, to some extent, what response is likely to ensue from negative stimuli. With regard to lawyers, if final establishment of damage requires the use of the court system, then the entity must note methods and assumptions used in the determination of economic damages may vary between legal jurisdictions and are often subject to interpretation. For example, some jurisdictions permit recovery to the estate while others limit recovery to dependent survivors (Martin and Vavoulis 2002).

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<sup>31</sup> Of course, IP embedded in an Internet context can be reduced in value via hacking.

Requirements like this directly impact the potential size of losses an economic entity may face. If the determination of losses becomes the purview of a court, strict rules regarding the use of scientific evidence are required. A detailed analysis of each discipline's role follows in the next section.

## **LITERATURE REVIEW**

### **VALUATION IS A MULTIDISCIPLINARY EFFORT**

#### **The Accounting Profession**

People unfamiliar with valuation issues often assume accounting to be solely sufficient to quantify changes in valuation. Accountants are an important part of the process, but have limitations. Accountants do not try to capture all costs and consequently do not capture all costs. The accounting profession focuses upon objective value, principally derived from transactions. Unless there is a cash flow (or a cost-based non-cash flow, as in the case of depreciation) resulting from some market transaction, accountants make no entry on a balance sheet. The strength of the accounting approach is that it predictably produces the same result regardless of the condition under which the entity is being valued. An economic entity, for example, may be valued as going concern value, stock market value, or for merger/acquisition value, and this implies the potential for a differing valuation estimates (Sullivan 2000). As the tenants of valuation move further from objective measures, accountants are less likely to measure.

#### **The Finance Profession**

The finance profession, likewise, searches for objective value and often finds valuation to be insufficiently objective. Finance also focuses upon objective value, especially quantifiable items of concern, like price, share, and cash flow. An example of the fringe of sufficiently objective value is the value estimated for the control of an entity versus minority ownership of the entity. Conventional wisdom holds acceptable the addition of a so-called *control premium* in the valuation process (Abrams 2001).



Measuring the control premium is beyond the scope of both the typical accountant and typical financial advisor. Unlike accounting, however, finance will welcome the use of statistical measures when the firm does not individually engage in a transaction.

### **The Economic Profession**

Economists see value in yet another manner, and notably include subjective sources of value. Economists examine the utility of an item, initially measured in utils, but then exchanged for currency and most often measured in dollars. Economists view utility as the stream of current and future benefits resulting from ownership of a good or property. This stream of objective and subjective benefits is then converted into current dollars. "Forensic economics" is a specialty field within economics, accounting, and finance whose goal is to find changes in value often not in the scope of other business disciplines, such as placing a value on control of an enterprise (Mitenko and Okleshen 1998). A forensic economist is commonly employed when someone or something has wrongfully impaired the income producing potential of an asset, and, as such, is appropriate in the context of a terrorist threat.

### **The Marketing Profession**

Marketing experts are involved in nearly every aspect of a CC/A, regardless of whether a terrorist threat has been given. The marketer's presence especially is required during the unstable business climate created by a threat. From an ex ante vantage point, damage estimation turns on the ability to predict how the public will respond to a threat, and how the public will respond to marketing attempts to counter the negative effects of a threat. From an ex post vantage point, the impact of a threat to revenue streams is

already known, although some contention may exist as to what *could* have happened if better management of the threat had occurred.

### **The Legal Profession**

Within the context of a terroristic threat, the legal profession adds value for several reasons. First, and perhaps most obvious, the lawyer is expert in identifying liability risk, the expense of which must be included in the cost of a threat. Liability risk has two components that must be managed: legal liability and legal damages.

Frequently, if not always, the decision makers of an economic entity must know both what their duty of care is under the law to protect patrons, employees, and others in attendance, as well as which injuries trigger a legal obligation to compensate the plaintiff. Many courts, for example, have held that a storekeeper or proprietor of other commercial premises is generally liable for the willful criminal acts of a third party whose criminal acts can be foreseen or anticipated (Caner 1995).<sup>32</sup> Accordingly, if a proprietor receives a credible threat, then the threat is foreseeable and creates a mandate for reasonable preventative actions by the proprietor.

Second, a lawyer may provide useful advice on how to mitigate legal risk. Generically, under USA law liability flows towards those who control risk. Warning of a risk can shift some control of the risk to the customers and mitigate the proprietor's risk. An example of risk mitigation might include a decision to advertise the exact nature of the threat and consequently shift the locus of the control and the risk.<sup>33</sup>

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<sup>32</sup> For an in-depth review of pertinent legal decisions in this area consult the American Law Review as cited in the bibliography.

<sup>33</sup> Of course, such a decision can adversely impact revenue streams in the form of lost business and consequently would need to be balanced against other potential gains. An event with both low probability

Lastly, some losses are not generically recognized by the respective local legal authority, and, if accepted, must be proven using scientific rules of evidence. This becomes especially important if the establishment or recovery of costs is expected via the courts. All expert testimony is now subject to screening to ensure that it is relevant and reliable, and the choice of proceedings to make this determination lies within the purview of the trial court (Federal Judicial Center 2000).

### **The Actuarial Profession**

Actuarial science, which is most commonly perceived as part of the insurance industry, also may be of value when estimating the cost of a terroristic threat. The amount of money an economic entity is willing to spend to mitigate the risk of such a threat likely depends on the probability of occurrence. According to Warren Buffet, for example, the risk for landmark buildings in New York is 10 times that of buildings in less-populated areas (Samples, Miller et al. 2001).<sup>34</sup> Presumably, actuarial science was used to establish this estimate (or they knew they could not know and thus substituted a quantum jump).

Actuaries potentially are useful estimating risk across varying categories of entities and structures. The 9-11 incident, however, demonstrated the insurance industry's lack of experience with modern terrorist threats as evidenced by the unexpected catastrophic losses incurred. A more detailed discussion of actuarial issues follows in a later section.

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and huge dollars losses that could trigger bankruptcy might be concealed from the public to preserve the revenue streams on the belief that shifting the locus of control and of risk is not profitable for the proprietor.

<sup>34</sup> The defining attributes of a landmark building versus an average building are not given in this article.

## The Security Profession

Actuaries focus on objective value as defined by statistics. Actuaries only are, at best, capable of predicting the probability of loss and the probable size of loss if loss occurs, and not the specific locus of loss.<sup>35</sup> A security expert may add value by predicting for any specific entity the likely source of threat, the likely *modus operandi* of the source, and the specific vulnerabilities to be mitigated. One goal, therefore, of the security expert is to assess vulnerability.<sup>36</sup> The security expert enhances the accuracy of the actuary's statistical estimates by quantifying items to which the actuary's statistics do not speak. The analysis performed by the security expert will have cost implications as recommendations are implemented.

## VALUATION ISSUES<sup>37</sup>

All valuation methods link back to market value. Regardless of the method used to value an economic entity, the process is complicated both by a volatile market and by market obsolescence. Conceptually, any valuation turns on the ability to predict present and future benefits, and to quantify those benefits in present-day dollars. From a textbook perspective, all of this sounds rather simple, but, in reality, quantification of many of the benefits and discount rates are highly subjective. The subjectiveness of the process is further increased as market volatility rises. With regard to a CC/A, income is

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<sup>35</sup> The problem of predicting both the probability of loss and the probable size of loss if the loss occurs is that this joint estimation is much harder for manmade sources of disaster than for natural sources disasters. This issue is explored later with actuarial issues.

<sup>36</sup> A high-level example of how the vulnerability assessment process works can be seen by viewing the *Anti-Terrorism Risk Assessment Guide* produced by the Governor's office in North Carolina. This is available online (visited 08/16/02).

<http://www.nccrimecontrol.org/forms/terrorismselfassessment.htm>

<sup>37</sup> This section borrows heavily from research authored by Greg Ashley, MBA and Michael O'Hara, J.D., Ph.D. See Works Cited.

largely based on entertainment-based activities. Conventional wisdom regards entertainment as a subordinate priority for consumers when the economy is bad and, as such, income flows presumably are less predictable than for industries providing a staple.

Another issue has to do with obsolescence. Competition to attract sports clubs and other venues is intense in the CC/A business. Older structures lacking modern appearance, security, and facilities are at a distinct disadvantage because they are doubly attractive to the terrorist: they can be softer targets and can allow greater damage.

### **Valuation Techniques**

Smith & Parr (Smith and Parr 2000) discuss at length three methodologies for valuing assets. These are generically known as the cost, the income, and the market value approaches. Smith and Parr argue that any other method of valuation is essentially a variation on these three.

The cost method is a cost-of-replication approach. The cost method seeks to calculate how much money would have to be spent in order to replicate by some other means the exact bundle of benefits being valued. The cost-of-replication approach must be time sensitive. Obviously, most of the benefits being replicated are occurring in the future, and thus require predictions about future cash flows to cost and from revenue. Theoretically, one could replicate all of the values of any economic entity by purchasing each component of value separately. With regard to a CC/A, for example, a would-be customer of a CC/A attempting to capture the same values of a CC/A venue could, among other things, rent floor space at other venues to showcase products, buy newspaper, radio, and television ads to get exposure, or hire firms who specialize in

public relations. In theory, no one would pay more for a CC/A venue unless the cost of the venue was the same as or less than the cumulative cost of buying the values *à la carte*.

A criticism of the cost approach is individual forecasts vary widely on the present value of future costs and revenue cash flows. Most going concerns, especially CC/As, have a large number of values requiring shopping at many different sources to replace all of them. A future cost estimate is required for each source used, and likewise the opportunity for error is increased. These errors may cumulate rather than offset, thereby swamping any forecast with its own range of errors. A second criticism of the cost approach is its failure to fully account for the risk (to the seller and to the buyer) that the future may not be as expected. A seller may not receive payment when due and the buyer may own a nonproducing asset. In other words, if the probability is high that a future benefit is not received, the cost approach cannot directly provide a lower corresponding value.

The income method attempts to compute all of the nominal income, present and future, expected be earned from the entity. If such a dollar figure can be found, then the buyer need only do a NPV (net present value) to arrive at current-dollar worth. Assuming the prospective buyer already knows the cash outlay required to purchase the entity, an internal rate of return (IRR) can then be computed. The IRR can be used by the buyer to compare perceived risk with rate of return. In this manner, the income approach addresses the risk issue better than the cost method. The income method suffers from

many of the same problems as the cost method, however, the income method offers the additional insight of the reward for risk issue.

The market value method seeks to avoid the unavoidable uncertainties and subjective inputs of the building blocks approaches inherent to the cost method and the income method. Instead, the market value method looks to the market for similar transactions and takes those market prices as a proxy for the value of the present transaction. In theory, any entity could be valued by this approach. One needs merely to find similar market transactions. Obviously, subjective inputs are not eliminated, merely moved from the future to the present. However, once equivalent transactions are identified, theory dictates that the amount of money that exchanged hands should be close in value.

The market value method is the preferred method of valuation when like transactions are rare, for example, naming rights deals. The preference for the market value method may have different motivations. For example, the preference for the market value method may reflect recognition of the inherent flaws in the cost and the income methods, or may reflect reluctance to incur the workload necessitated by the cost and the income methods, or may reflect lack of confidence and a willingness to trust the past efforts of others.

The market value method is criticized because transactions often are not sufficiently similar and because there are too few transactions in the marketplace to provide a representative sample. The market value approach requires arms'-length

transactions, and a lack of an arms'-length transaction would in turn require compensating adjustments to maintain the accuracy of the market value method.

### **Valuation of Intangible Assets**

The traditional method of valuing a business is mainly concerned with three economic components commonly referred to as plant, property, and equipment.<sup>38</sup> These are all tangible assets. A business is assumed by this method to be a combination of buildings, land, equipment, tools, vehicles, raw materials, works-in-progress, and finished product, each providing its own share of fair market value to the business. The sum of all this is said to be equal to the value of the entire firm. The dollar value of these so-called tangible resources is more easily determined as a result of known historical costs and other similar arms-length transactions in the marketplace. There can, of course, still be disagreements regarding economic value, and this is one reason, for example, why people often ask for more than one appraisal when buying/selling property. The range of this disagreement, however, typically is small when compared to the total value of the property. Chances are, if you own something that can be seen and touched, there are knowledgeable people who, with the aid of many other transactions in the marketplace, can accurately quantify the worth of your property in dollars.

Businesses, venture capitalists, and even typical stockowners (not to mention government taxing authorities<sup>39</sup>) have in the last century come to realize that substantial

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<sup>38</sup> Traditional valuation methods also may recognize the value of "good will" or "going concern," although historically have lacked accurate ways to quantify these. The accounting profession will be wrestling with these value issues more in the future because Federal Accounting Standards Board promulgated FASB 142 that took effect in 2002.

<sup>39</sup> See, American Bus. Info. v. Egr, 264 Neb. 574 (2002) and at <http://court.nol.org/opinions/2002/august/aug16/s01-470.htm>.



value can exist in things that are not tangible. Some of the most familiar examples of intangible property (also referred to as intellectual capital or knowledge assets) are patents, trademarks, trade secrets, and copyrights. Each of these carries with it a strategic economic value to the business, and as such, has been recognized under law and protected in some manner. The importance of intangible property is rapidly growing as a result of what some have called the New Economy. The value of so-called knowledge property has in many people's view outpaced the value tangible property.<sup>40</sup>

Intellectual property, like other kinds of property, also may be subject to loss in value as a result of a terroristic threat, especially if the threat carried out. Consider naming rights as an example. Everyone entering into a naming rights agreement is hopeful that favorable impressions are generated as a result of the transaction. Occasionally, though, some unforeseen problem or catastrophe can occur that risks linking the corporate name with something negative and undesirable. A May 23, 2000 article written in the *Charlotte Observer* notes such a possibility:

In the 16 months since the Lowe's home improvement chain paid \$35 million of the naming rights of Charlotte Motor Speedway, debris from an Indy racing wreck last May killed three fans and a pedestrian bridge that collapsed injured more than 100 fans on Sunday.

The incidents at Lowe's Motor Speedway mark the first time a sponsor's name has been affiliated with such tragedy since companies started buying the naming rights to sports facilities almost 15 years ago, experts in the business say.

The tragedies should not tarnish Wilkesboro-based Lowe's image, but they will make other companies more cautious in future naming rights agreements, experts said (Klaff 2000).

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<sup>40</sup> For example, on 08/21/02, Ameritrade (online brokerage service) lists Microsoft's capitalization as \$280.8 billion while General Motors is shown as \$26.7 billion (<http://www.ameritrade.com>).

If a terroristic threat has enough credibility and is widely publicized, then some consumers may begin to associate a CC/A name with the threat. Recall that most naming rights contracts span a number of years. That is a long time to deal with public relations damage if the name is continually associated with negative consequences.

### **LINKING THREAT TO LOSS**

The attempt to link the threat of terror to specific losses is easy in concept but difficult in practice. The level of difficulty turns on the level of proof required to establish proximate causation, and on the nature of the threat itself. With regard to the former, casual or anecdotally established causation may be a sufficient level of proof for purposes of internal use by the economic entity. If, however, recovery of damages is sought in a legal forum, then USA law requires a stricter standard.

### **Legal Standards for Recovery of Damages**

There are really two issues needing resolution in a damage recovery case:

In order for damages to be recoverable, they must be *proximately caused* by the wrongful acts of the defendant. In addition, damages must be proved within a *reasonable degree of certainty* [italics sic]. A key word in the latter phrase is “reasonable.” In applying the modifier reasonable, the courts have acknowledged that it may not be possible to compute damages with 100% certainty. Therefore, some degree of certainty less than 100% is acceptable. Here the opinion testimony of an expert can be used to establish the reasonable limits of acceptability. In allowing some level of certainty less than 100%, courts recognize that, even for historical damages, the actions of the defendant may have permanently changed events so that one may never know exactly what would have transpired in the absence of such actions (Gaughan 2000).

Finding proximate causation becomes more illusive as the directness and credibility of the threat wane. If, for example, a CC/A receives a direct threat from a well-known terrorist group, and the threat is widely publicized, then revenues likely will

drop sharply and in a manner rarely seen absent a threat. The infrequency of sharp drops in revenue absent other explanations makes the link to causation easier.

### **Economic Uncertainty**

Damages may occur in the context of stable, nascent, or unstable income streams. Nascent and unstable income streams complicate both the proximate causation and reasonable degree of certainty legal requirements. Under these conditions, the need for expert testimony often is inescapable.

Revenue streams also occur in the broader context of the economy at large, local business conditions, and specific conditions within the respective industry of the economic entity. With regard to the former, an example of this impact can be seen by recalling the condition of the hotel industry discussed in an earlier section. The USA and European economy was softening even before the 9-11 event. While no doubt remains 9-11 had severe impacts on the hotel industry, the question is still out on what percentage was caused by 9-11 versus what percentage was caused by a softening economy.

### **PREDICTING TERRORISM AND CONSEQUENCES**

Future patterns of typical crime often are predictable via past crime statistics. The typical genre of crime is repeated with frequency. Frequency of occurrence aids in prediction. Crime statistics are nearly worthless, however, as a predictor of terrorism because terrorism is not typical. As can be seen in Figure 3 (Appendix A), less than ten people were killed in North America during the five-year period between 1995 and 2000. While other hints of the impending, post 2000, the 9-11 attacks may have been available, crime statistics certainly was not one of them.

Another problem complicating prediction of terrorist acts is the target-rich environment America offers. According to data from the USA population census taken in 2000, the United States has 49 metropolitan areas with populations over 1,000,000, and another 32 with populations between 500,000 and 1,000,000.<sup>41</sup> Each of these metropolitan areas contains numerous large office buildings, heavily attended venues like those of a CC/A, and geographically dispersed critical infrastructure, all of interest to a terrorist. Even knowing in advance that terrorists' target selection process is heavily based on ideology, predicting which specific target will be hit is more a matter of guesswork.

### **Quantification of Risk**

Stan Kaplan and John Garrick (1981) authored an often quoted article on risk assessment that appears to be the prototype for much of the later research in the area of risk management. They consider risk to be a function of both probability and consequence. Concisely stated, they believe the following three questions must be answered to properly assess risk:

What can happen?

What are the chances of a happening?

If something happens, then what are the consequences?

Table 1 expresses this concept mathematically.

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<sup>41</sup> These figures were available as of 08/29/02 from the U.S. Census Bureau at:  
[http://factfinder.census.gov/bf/\\_lang=en\\_vt\\_name=DEC\\_2000\\_SF1\\_U\\_GCTPH1R\\_US10S\\_geo\\_id=01000\\_US.html](http://factfinder.census.gov/bf/_lang=en_vt_name=DEC_2000_SF1_U_GCTPH1R_US10S_geo_id=01000_US.html)

Table 1

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Kaplan and Garrick scenario, probability, and consequence list.

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Scenario	Likelihood	Consequence
S1	$p1$	$x1$
S2	$p2$	$x2$
.	.	.
.	.	.
.	.	.
SN	$pN$	$xN$

Using brackets to denote a set:  $R=\{<S_i, p_i, x_i>\}$ ,  $I=1,2,\dots,N$ .  
Source: adapted from Kaplan and Garrick (1981).

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Kaplan and Garrick probably did not author this work with terrorism in mind, but their work is nevertheless broadly applicable to all kinds of risk.<sup>42</sup>

Gordon Woo also has provided significant research in the area of risk, specifically with regard to natural catastrophes, and more recently, with terrorist threats.<sup>43</sup> Woo attempts divide risk factors into more manageable components:

In the probabilistic risk assessment (PRA) of nuclear installations, which provides the methodological basis underlying insurance natural catastrophe modeling (Woo 1999), and more recently civil aviation risk modeling, the damage consequences of an initiating hazardous event are logically charted via a multi-branch event-tree. The process of systematically dis-aggregating [sic] risk into component elements, through an event-tree, is an important aspect of structuring a risk analysis (Woo 2002).

In constructing an event-tree, Woo notes that four conditional probabilities need to be quantified:

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<sup>42</sup> We should assume any skillful terrorist has read the work of Kaplan and Garrick, and will plan attacks accordingly.

<sup>43</sup> For additional reading on natural catastrophe risk see: Woo, Gordon. 1999. *The Mathematics of Natural Catastrophes*. London: Imperial College Press.

- [1] Given that an attack is planned, what is the probability that there is some prior intelligence about it?
- [2] Given that an attack is planned, and there is some prior intelligence about it, what is the probability that the intelligence is acted upon?
- [3] Given that an attack is planned, and either no intelligence exists or else it is not acted upon, what is the probability that the attack is nevertheless detected by border guards, police or other security personnel?
- [4] Given that an attack is planned, but remains completely undetected, what is the probability that it fails to cause significant loss due to technical or logistical shortcomings (Woo 2002)?

In its simplest form, the use of an event-tree is makes the complex appear simplistic. Even the component decisions of an event-tree, however, often require input from respective experts especially since quantitative data may be missing or inaccurate.

### **Insurance Company Perspectives**

The actuarial concepts of risk, as frequently utilized by the insurance industry, offer another way to think about risk. General Cologne Re,<sup>44</sup> a prominent reinsurer, discusses three types of risk:

1. **Process Risk** – A measure of dispersion of an actual/observed outcome from a true mean value (or expected outcome). Example: the odds that a coin tossed 100 times will produce 40 heads and 60 tails, when the expected outcome is 50/50.
2. **Parameter Risk** – A measure of dispersion of error in the assumptions (parameters) about the mean. Example: Using the coin toss example above, the observer may incorrectly assume a “fair” coin, i.e., one not weighted to produce heads 40% of the time.
3. **Model Risk** – A measure of dispersion of error caused by not knowing or understanding the loss process. Example: on the 1,000<sup>th</sup> toss, the coin lands and stands on its edge. In this case the

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<sup>44</sup>

<http://www.gcr.com>

observer did not “price” for a third possibility (Ferguson, Reindel et al. 2002).<sup>45</sup>

The 9-11 tragedy caused actuaries to rethink the concept of risk. Insurance companies, for example, often try to diversify their risk in much the same manner as investors do with their stock portfolios. By insuring a portfolio of many so-called uncorrelated lines of business, e.g., property coverage versus life insurance, insurance companies have historically reduced the potential of catastrophic loss. The 9-11 tragedy changed that by encompassing an estimated 23 lines of insurance in one event (Ferguson, Reindel et al. 2002). The 9-11 tragedy greatly reduced the potential value and security of using diversified product lines. The insurers did avoid having the 9-11 attack on the two towers of the WTC being classified as two events; instead, the court ruled it was one event (Starkman 2002). This reduced the insurer's losses because coverage limits often is by event.

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<sup>45</sup> In the interest of brevity, much of this quote was edited to reduce additional explanation of risk concepts.

## **METHODOLOGY**

### **THE MORE SPECIFIC CASE**

So far, most of the discussion in this research has been high-level and has, for the most part, purposely avoided the specific case. The intent now is to enhance the previously discussed conceptual framework of costing a terroristic threat by considering a less-obtuse example. The example will, nevertheless, still be less than fully specified and named for several reasons. First, no prudent economic entity would release much of the kind of data required for such an analysis for both security and competitive reasons. Secondly, even if such data were available, the analysis would require professional support resources far beyond the scope of this work. Lastly, even if all relevant data were disclosed and all professional resources were available, many hypothetical assumptions are required regarding the nature of the threat and its source. For these reasons, discussion of an actual entity and actual threat is impractical. As was mentioned at the beginning, a medium-sized CC/A in the Midwest will be used to illustrate cost issues.<sup>46</sup> A generic CC/A example provides sufficient specification for this discussion.

This generic specification of threat also is helpful for academic purposes. Unless the range of possibilities arbitrarily is restricted, the estimation of probabilities and outcomes, and subsequently relating these to cost, becomes unmanageable for purposes of illustration. In this regard, we presume direct threat from a foreign source widely

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<sup>46</sup> A medium-sized CC/A is defined as being between 250,000 and 500,000 square feet in size. An example of a large CC/A is the Anaheim Convention Center in California, which has 800,000 square feet.



assumed to have requisite resources to carry out the threat.<sup>47</sup> The historical preference of the source is explosives, but bioterrorism<sup>48</sup> cannot be ruled out.

### **Moot Issues in the Current Scenario**

In the absence of a direct threat, one of the first questions a CC/A should consider is its relative desirability as a terrorist target. As was noted earlier, metropolitan areas always contain many potential targets. The determination of what to spend to counter a potential threat turns in part by estimating, and subsequently ranking, target desirability from the terrorist's perspective. Many targets do not have the ideological fit terrorists often prefer, or are sufficiently hardened to act as a deterrent. Of course, given the presence of a direct threat, target desirability becomes a moot point and requires the assumption of "desirable". Given the assumption that the CC/A is a desirable target, the question no longer is whether to spend for defense above routine levels, but rather how much to spend.

An analysis of the terrorist's ability to deliver an attack also is not required in this scenario. With regard to foreign terrorists, a CC/A located in the Midwest theoretically is harder to hit than one on the coast because of the logistics in transporting dangerous material over long distances. Whether the terrorist is foreign or domestic, if the source of

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<sup>47</sup> A direct threat in this context may be an expressed threat and/or those combinations of circumstances and conditions synergistically summing to equate to the same threat potential as an expressed threat. For example, a sequence of direct threats to CC/As in other regions may sum to equate a direct threat on the prototypical Midwestern CC/A.

<sup>48</sup> "Bioterrorism" is a broad category that includes chemical weapons (e.g., chlorine gas), a dirty nuclear bomb (e.g., high explosives to create and disperse a radioactive cloud), disease (e.g., anthrax), and infectious disease (e.g., small pox). In addition to not ruling out bioterrorism, the cost structure and engineering difficulties associated with each delivery system may encourage bioterrorism.

threat is known to have sufficient financial and other resources, their logistical barriers are of less concern.

Lastly, and as discussed previously, estimating the cost of a threat involves many professions; accounting, finance, economics, marketing, legal, actuarial, and security. After a direct threat exists, however, the scope of the actuarial and security professions has a much narrower focus. A direct threat removes the need for prediction of threat. The tasks that remain relate to estimation of the losses suffered after a successful attack and estimation of the costs of prevention.

### **CATEGORIES OF THREAT COST**

Breaking the cost of a threat into component parts may help to manage where and how costs attach. These costs can be roughly divided into five categories as shown in Table 2.

Table 2

Categories of Threat Cost.	
<b>1: Education/Information/Intelligence</b>	<ul style="list-style-type: none"> <li>hiring of specialized security professionals</li> <li>information regarding source of threat</li> <li>information regarding most-likely kind of threat (e.g. bomb?)</li> </ul>
<b>2: Control of Risk</b>	<ul style="list-style-type: none"> <li>legal advice</li> <li>analysis of financial impact</li> <li>liability</li> </ul>
<b>3: Defense</b>	<ul style="list-style-type: none"> <li>prevention</li> <li>surveillance</li> <li>security personnel</li> <li>hardening</li> </ul>
<b>4: Contingency Costs</b>	<ul style="list-style-type: none"> <li>first-aid: inventory and delivery staff</li> <li>crowd control</li> </ul>
<b>5: Loss of Revenue</b>	<ul style="list-style-type: none"> <li>fewer venues</li> <li>lower attendance</li> <li>increased advertising</li> <li>structural damage</li> <li>insurance cost</li> </ul>

Efficient and effective security spending requires knowledge of potential sources of threat, the methods of terror used by those sources, and intelligence regarding their current condition or status. This knowledge is required to find and evaluate specific sources of weakness within the CC/A relating to those threats and methods. The CC/A will rely heavily on security experts and public law enforcement entities to acquire this knowledge.

As mentioned earlier, owners of risk are at increased danger of incurring legal liabilities. The probability of legal liabilities (as distinct from the probability of the risk) can be reduced by shifting the legal control of risk to the customers of the CC/A, i.e., the

venue organizers and their attendees. This is primarily done by disclosing specific information about the threat. Such disclosure is likely to be private when given to the organizers and will need to be public when given to the attendees.<sup>49</sup> Note that shifting the locus of risk increases the potential for lost revenues if organizers and/or attendees avoid the CC/A. Accordingly, costs are rarely avoided in total.

Cost of defense may be significantly offset by involving all levels of law enforcement.<sup>50</sup> Local, state, and federal enforcement agencies at a minimum can provide advice, and often have access to intelligence regarding the source and *modus operandi* of threat. In addition, given the political climate at the time of this writing in 2002, any threat from a known terrorist would likely result in every level of government providing significant protective surveillance and intelligence at no charge to the CC/A.<sup>51</sup> The amount of protection offered also may increase if the economic importance of the CC/A or its venues are high for the local community or the nation.

Various contingency costs also are a moral and a legal requirement. These are the costs associated with preparations to handle post-attack problems. Examples include, but are not limited to, first-aid, crowd control, and containment of damage.

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<sup>49</sup> Even if the CC/A gives the organizer notice of the risk, that notice will not necessarily relieve the CC/A of legal liability for attendees' losses if the CC/A should have known the organizer's response to the notice of risk was insufficient. Additionally, even if the CC/A successfully transfers legal control of the risk and legal liability for the risk to the organizer and/or the attendees, then the CC/A still can be assured of being sued by all injured parties to verify that the transfer was successful. That litigation expense is an unavoidable fixed cost of the CC/A.

<sup>50</sup> Notification of legal authorities is an obvious moral requirement. The intent here is to note the difference between legally required minimal reporting requirements and the solicitation of active involvement. A free society leaks information like a sieve. If the CC/A makes a disclosure of a known risk to local officials, then the CC/A should begin to expect unplanned public disclosures via rumor. Effective public relations may require the CC/A to make some public disclosure so as to minimize pressures generated by rumor. Soliciting active involvement of law enforcement is sure to come at a price no less than coordination of public announcements.

<sup>51</sup> This cost becomes a taxpayer-born externality of the CC/A.

Lastly, there is a significant potential for loss of revenue. A list of possible sources of loss is quite large. A few examples include fewer venues, lower average attendance, and increased insurance cost (if available at all)<sup>52</sup>. If an attack is successfully carried out, long-term damage to the physical structures of the CC/A also may impact revenue streams.

### **Quantifying Costs Associated With Threat Categories**

The process of categorizing threat costs makes the budgeting process more manageable. At a high level, the methodology involves employing those experts associated with each category of cost with the goal of developing the most accurate estimate possible. To this end, an approach similar to the event-tree discussed above may prove helpful. In a previous section, Woo's event-tree was discussed as an aid in quantifying the chance of terrorists successfully inflicting major damage. The event-tree concept can be reworked with the goal of estimating cost. Such an example is shown in Appendix C.

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<sup>52</sup> Problems concerning insurance availability are discussed later in a section entitled "Specific Expense impacts."

## ANALYSIS

The discussion thus far has focused on the conceptual framework for costing a threat. Of necessity, demonstrating with a real-world example is not practical because of the paucity of academically suitable examples, a lack of entities willing to disclose information, and because of resource constraints. All of this notwithstanding, a high-level discussion with the goal of getting closer to practical application is possible. One obvious goal of an entity facing a threat is to be able to predict the economic consequences. To this end, any measuring tool may be of value, including a heuristic.

## **COMPARATIVE IMPACT**

*Ex ante* consideration of costs associated with a terrorist threat begins with the assumption of greater subjectivity, and consequently less precision, than an *ex post* consideration. This, of course, is the result of the inherent inaccuracies in predicting future cost versus having experienced historical costs. Therefore, from an *ex ante* perspective, the management of a CC/A may consider using the *ex post* established loss faced by a like entity in like circumstances as a rough guide of what is to come. The likelihood of finding a like entity in like circumstances, however, is low. Note especially the small number of direct, credible threats received by U.S. entertainment facilities or even foreign based entertainment facilities.<sup>53</sup> If terrorist efforts are more successful than counterterrorist efforts, then the problem of lack of comparable entities/circumstances may change on a going-forward basis.

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<sup>53</sup> On Wednesday, 10/23/02, about 40 Chechen gunmen burst into a theatre in Moscow and took an audience of about 700 hostage. Russian President Vladimir Putin linked the attack to a broader offensive by Islamic militants connected to the al Qaeda terrorist network (Chazan and Whalen 2002).

As of Fall, 2002, the best available comparison, which perhaps is Super Bowl XXXVI, is insufficient for all the reasons discussed earlier.<sup>54</sup> Nevertheless, recall security costs were rumored to be double that of previous years. For an information-starved CC/A facing a threat, the *ex post* Super Bowl XXXVI security costs may be of some marginal value for planning and budgeting even though they are at best a heuristic, order-of-magnitude estimate.

### **THREATS AND THE ECONOMIC ENVIRONMENT**

Conventional wisdom holds that entertainment-related expenses (i.e., luxury goods) are more severely impacted during a bad economy than required staples (i.e., necessities) (McConnell and Brue, 1993). Being aware of several key economic indicators, especially those relating to income and spending habits, may prove useful in predicting losses or gains not only in a nonthreat environment, but also in a threat environment. Consumer reaction to a threat may, for example, work synergistically with a worsening economy to worsen consequences. Conceptually, the possibility exists consumer reaction to the effects of a terrorist threat may be different depending on the value of economic indicators such as the rate of employment and median income levels. More research is needed in this area, especially with regard to establishing the elasticity between economic conditions and consumer reaction to a threat.

### **PREDICTABLE VERSUS NON-PREDICTABLE COSTS**

In addition to the event-tree concept discussed earlier, there may be additional value in sorting costs based on predictability. Upon the receipt of a threat, some costs are

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<sup>54</sup> See footnotes 13 through 15.

nascent. In other words, these are costs that did not and would not exist in the pre-threat environment. Examples of these costs are those related to acquiring intelligence and information about the source of the threat and the hiring of additional security experts and personnel. The issue of whether these costs are fixed or reoccurring is less important for this discussion than the issue of predictability. Even in an *ex ante* setting, the CC/A may be able to predict some of the nascent costs with greater precision than other costs such as revenue stream impacts. Many security-related commodities, for instance, are in a standardized product form and available at known costs.

Referring again to Appendix C, those costs in the box labeled “Education/Information/Intelligence” likely are the most predictable. All other costs depend to some degree on costs in the box labeled “Loss of Revenue”. The prediction of loss of revenue is really a prediction of consumer behavior. Consumer behavior often has been shown to be unpredictable. Therefore, for the conservative spender, there may be a tendency toward too little spending in the control of risk, defense, and contingencies. This may be less than ideal if such costs are perceived to threaten the economic health, or especially solvency, of the entity. Establishing accurate prediction of revenue impacts from a threat is perhaps the most critical and yet subjective of the cost components. Feedback from every available expert and data source is indicated.

## **SPECIFIC REVENUE IMPACTS**

### **Lost Revenue**

Lost revenue can take many forms. Perhaps the most obvious form of lost revenue is lower attendance at all or most CC/A events. Fewer bookings of conventions



likely is another problem. Lastly, there may be problems drawing professional sports teams or even local collegiate teams. All of this may work to create large blocks of time where facilities go unused. Lower attendance at existing events, fewer conventions, and fewer collegiate or professional sports teams also creates the problem of lower concession sales.

To compound problems, some security costs may not be scaleable to smaller crowds. This is especially true if the CC/A has a security firm under contract and that contract was written under the premise of full occupancy. In this circumstance, the CC/A will pay the same fees regardless of the occupancy rate.

### **Additional Advertising**

Advertising associated with a CC/A is done at several different levels, not all of which are directly orchestrated and funded by the CC/A itself. In addition to direct advertising by the CC/A, advertising may be undertaken by the public authority associated with the CC/A, affiliated sports teams, convention event sponsors, and perhaps even vendors. CC/As also are the beneficiary of free advertising as scheduled events are often mentioned by the media as part of their news service. The revenue-impacting reductions in utilization discussed in the previous section also have as a consequence a reduction in advertising. To counteract this reduction, the CC/A likely will have additional out-of-pocket advertising expense to make up for advertising typically not born directly by the CC/A.

## **Naming Rights Devaluation**

If the CC/A has not yet signed a naming rights deal, then the value of those rights likely will drop. If the rights have already been sold, then the holder of those rights likely will face a reduction in the benefits those rights produce. Part of the value from a naming rights deal, for example, includes value gained from ad impressions.<sup>55</sup> Although establishing the value of ad impressions is a complicated process involving a high degree of subjectivity, ad impressions are, nevertheless, thought to generically engender positive feelings toward the sponsor of the ads, as well as increase the likelihood of consumers purchasing their products/services. Lower attendance equates to fewer ad impressions.

## **SPECIFIC EXPENSE IMPACTS**

The Building Owners and Managers Association (BOMA) recently conducted two surveys of their members regarding various issues concerning security.<sup>56</sup> Both surveys are related to the terrorist threat.

### **Insurance Survey**

This survey identifies a serious insurance problem related to terrorism. One quarter of the respondents were unable to obtain insurance at any cost. Of the remaining

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<sup>55</sup> An ad impression is the presumed positive response gained when a marketer presents a company or product in an advertising context. This context may include ad exposure generated through radio, television, newspaper, signage, etc. Many ad impressions, for example, are generated by having a company's name or logo displayed on in prominent places within the CC/A.

<sup>56</sup> BOMA is a real estate organization whose stated purpose is to enhance the human, intellectual and physical assets of the commercial real estate industry through advocacy, education, research, standards and information. Information in this section borrows heavily from these surveys. The survey relating to security is available at the BOMA website. The survey relating to insurance is not available at the site but was available via a subscription email from *Elevator World*. *Elevator World* is an international news provider for issues relating to vertical transportation. The BOMA website is located at:

<http://www.boma.org/index.htm>

The *Elevator World* website is located at:

<http://www.elevator-world.com>

respondents who were able to obtain insurance, 80% reported higher premiums, caps on coverage, higher deductibles, cancellation clauses, and exclusions for chemical, biological, and radiological acts.

Even though a CC/A may be paying higher premiums, a direct terrorist threat may trigger a cancellation clause and force the CC/A to self insure. Public knowledge of this situation may further reduce attendance as public perception develops that the CC/A is unable to bear the cost of risk.

### **Security Survey**

The respondents to the security survey indicated a greater concern for overall emergency preparedness than with terrorism.

Survey respondents indicated far more concern with overall emergency preparedness than with terrorism. For instance, 56.9 percent of the respondents indicated security concerns over fire safety; 34.7 percent were concerned with civil unrest; and 32.7 percent identified power disruptions as a major concern. In comparison, only 11.9 percent acknowledged terrorist attacks as a potential threat, and 6.9 percent had concerns regarding biohazards. "Being prepared in general ... appears to be more important than concern over 'one time' or 'unlikely' events," the report says (The Building Owners and Managers Association and Institute 2002).

Presumably, the 6.9% of managers concerned with biohazards is a subset of the 11.9% who consider terrorist attacks as a potential threat, or else a question is raised as to the expected source of the biohazards. An interesting additional survey question would have been to ask respondents about these issues within the context of a direct, credible threat.

The BOMA report also provides typical examples of expense as a result of the 9-11 threat, as shown in Table 3.

**Table 3: Security Measures in Place Before and After 9-11**

<b>Security Measures</b>	<b>Had in Place Prior to 9-11</b>	<b>Added After Events of 9-11</b>	<b>Did Not Have in Place or Add After 9-11</b>	<b>No Answer</b>
Lobby Security Controls	74.3%	6.9%	18.3%	0.5%
ID Cards For All Tenants	41.1%	6.9%	48.0%	4.0%
Perimeter Barriers	14.9%	5.9%	74.3%	5.0%
Surveillance Cameras	64.9%	5.4%	28.7%	1.0%
Garage Security	42.6%	5.0%	50.5%	2.0%
Vendor Security Protection	52.0%	15.8%	30.7%	1.5%
Alarm Monitors	80.2%	5.9%	13.4%	0.5%
Employee Background Checks	60.9%	5.9%	32.2%	1.0%
Other	1.5%	4.0%	69.3%	25.2%

Adapted from a BOMA security report (The Building Owners and Managers Association and Institute 2002)

The same BOMA survey goes on to list the ten major categories of likely 2002 new/expanded security expenses:

- Increasing the number and/or upgrading the quantity of security cameras throughout the interior and surrounding the exterior of the buildings.
- Increasing the number and/or upgrading the quantity of security cameras throughout the interior and surrounding the exterior of the buildings.
- Reviewing, updating and/or expanding emergency planning and evacuation procedures.
- Increasing the number of security personnel.
- Adding identification cards for vendors and tenants.
- Adding, expanding and/or enforcing key card access systems.
- Implementing a more rigorous security system (i.e., "no more exceptions").
- Eliminating loading-dock parking and after-hours deliveries.
- Expanding security training for all property employees.
- Restricting access to various building areas to all but authorized personnel.
- Implementing new security procedures in and around the mail room/mail center area(s).

Likely, this list was generated without the specific precondition of a direct threat, and consequently would be expected to grow in such a circumstance. Note too, establishing cost for these categories of expense is heavily influenced by the scale and architectural design of the facility. Cost also may be impacted by the speed of implementation required. The “rush job” that a threat necessitates likely will drive up implementation costs.

## **OFFSETS**

In the event a threat is successfully carried out, many costs will undoubtedly be partially offset through the contributions and volunteerism of the community and charitable organizations, and perhaps government. This was demonstrated after the 9-11 event. Unfortunately, the amount of these offsets can not be predicted in advance, and will not be fully known until long after the incident.

This kind of cost offset is not widely available before an incident occurs. Law enforcement may be one of the few “free” material sources of help available prior to a threat being carried out. For obvious reasons, the terrorist threat does not lend itself to the same kind of proactive volunteerism that, say, a hurricane does.

Minor adjustments to the marketing plan also may be helpful. Presumably, organizations, like people, differ as to their risk tolerance of terrorism. Focusing a marketing plan to those who are less risk averse may increase the percentage of successful sales contacts. Historically, risk aversion is not a typical trait marketers seek to quantify.

For that segment of convention business expressly leaving because of a threat, the CC/A may be able to offer one of several cyber solutions. For example, Software Management, Inc. has filed for a patent for a system purported to conduct conventions, events, conferences, trade shows, and meetings via internet-based facilities.<sup>57</sup> This kind of hosting can be completely virtual or allow the convention sponsor's programs, held within a real CC/A, to be viewed remotely. Although margins for this kind of solution are predictably much lower than a face-to-face convention experience, some profit may be better than no profit.

In the recent aftermath of 9-11, the hospitality industry ran many ads appealing to the courage and patriotism of USA citizens with the goal of restimulating demand. Such an ad campaign may work to offset losses, however, often it is unclear in advance whether ad expense is greater than revenue from restimulated demand.

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<sup>57</sup>[http://www.conventionnet.com/about\\_help.cfm](http://www.conventionnet.com/about_help.cfm)

## CONCLUSION

Predictability of cost of a terrorist threat *ex ante* involves a number of subjective inputs. The amount of actual cost that unfolds depends on many factors which are primarily, but not exclusively, functions of source of threat, directness of threat, and consumer response to threat. There is a lack of structure in the linkage of these functions in the sense no hard rules have been found (e.g., if A, then B) to aid in the process of quantification.

Part of the quantification problem undoubtedly stems from a lack of experience in handling terrorist problems, especially from foreign sources. Historically, the USA has been shielded from foreign-based terrorist events because of two surrounding oceans and the logistical problems that causes for terrorists. The relative declining costs of transportation and communication, however, as well as an expanding openness in society has reduced this shielding affect. If a large number of terrorist events had occurred, then perhaps cost patterns would emerge, thus enhancing predictability of cost. If counterterrorism measures are successful, as would obviously be the preferred case, then experience may never be gained.

The lack of terrorist events inspires a cost-related discussion to note several areas where more research is needed. First among these is consumer reaction to threat. What are the typical drivers of behavior for consumers facing a threat? Can they be predicted with sufficient accuracy, especially in the context of varying economic conditions? In addition, if terrorist events increase, then will a pattern of diminishing marginal returns evolve for the terrorist, or will consumer response increase drastically in a more direct

relationship? What is ideal ratio of public versus private funding to handle terrorist threats?

The cost issue is not just an academic problem, but also has policy-related components. Can changes in public and private economic/political policy, for example, impact the number of occurrences of terrorist events and reduce the need for large security budgets? On October 11, 2002, the USA Congress voted overwhelmingly to authorize U.S. military operations against Iraq, granting broad new powers to the president to confront and disarm Iraqi President Saddam Hussein (Kelly and Thompson 2002).<sup>58</sup> As of this writing, a war is not yet imminent, but if a war does ensue, what consequences can be expected as related to the domestic terrorist threat?

Despite the lack of available terrorist events to study, one fact appears obvious. Terrorist threats are expensive and represent a substantial economic threat to those who face them. An increase in terrorist events will undoubtedly require a broader public policy plan for dealing with the economic consequences.

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<sup>58</sup> Evidence has been widely presented by the USA, Israel, and England showing Saddam Hussein to be a supporter of terrorism and be in the possession of chemical and biological weapons of mass destruction. The status of Hussein's nuclear capability is not known as of this writing.



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### Appendix A: Terrorist Attack Statistics<sup>59</sup>

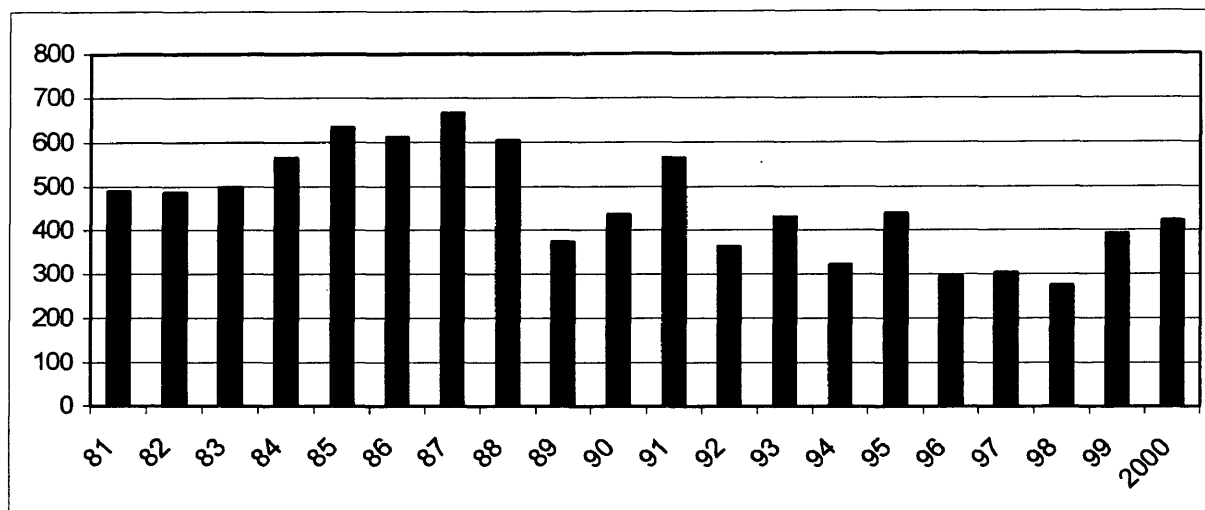


Figure 1: Total International Terrorist Attacks, 1981 – 2000

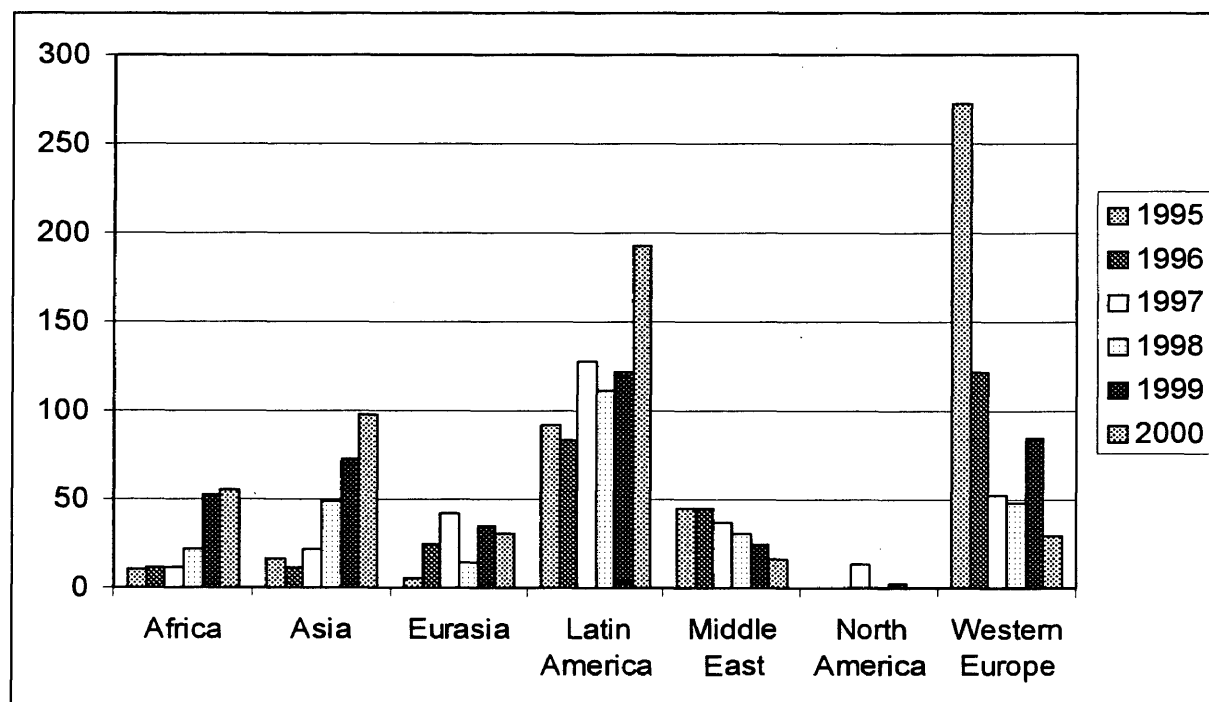


Figure 2: Total International Attacks by Region, 1995 – 2000. (Note: North America had casualties only in 1997 and 1999.)

<sup>59</sup> All figures in Appendix A were adapted from material produced by the United States Department of State located at:  
<http://www.state.gov/s/ct/rls/pgtrpt/2000/2451.htm>

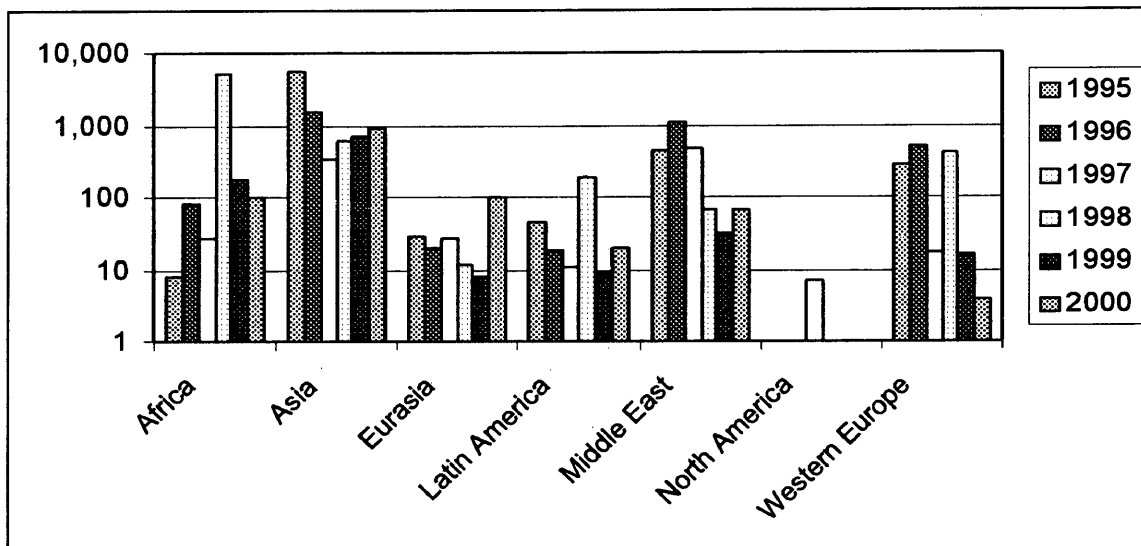


Figure 3: Total International Casualties by Region. (Note: North America had no casualties during the period except for 1997.)

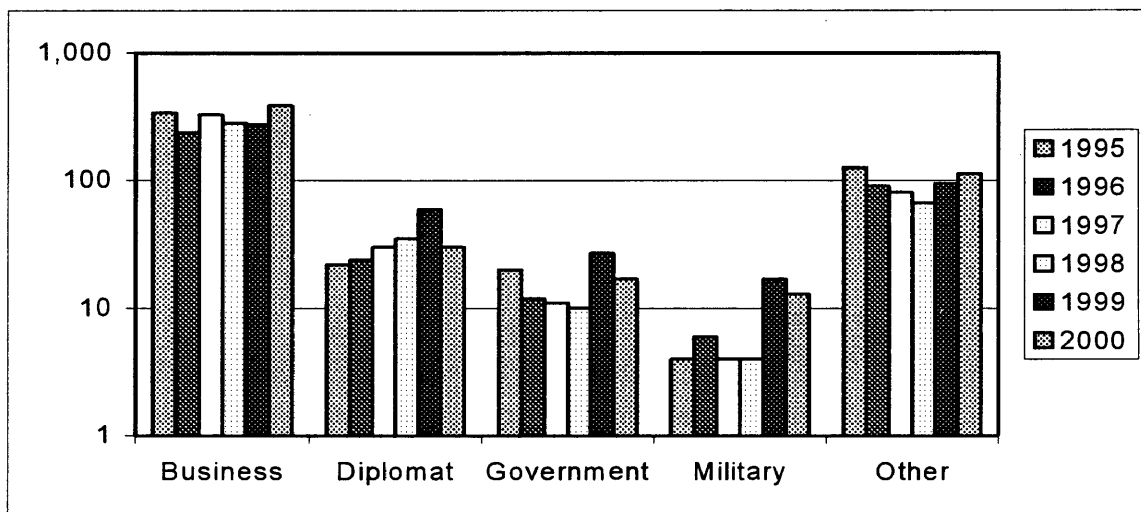


Figure 4: Total Facilities Struck by International Attacks.

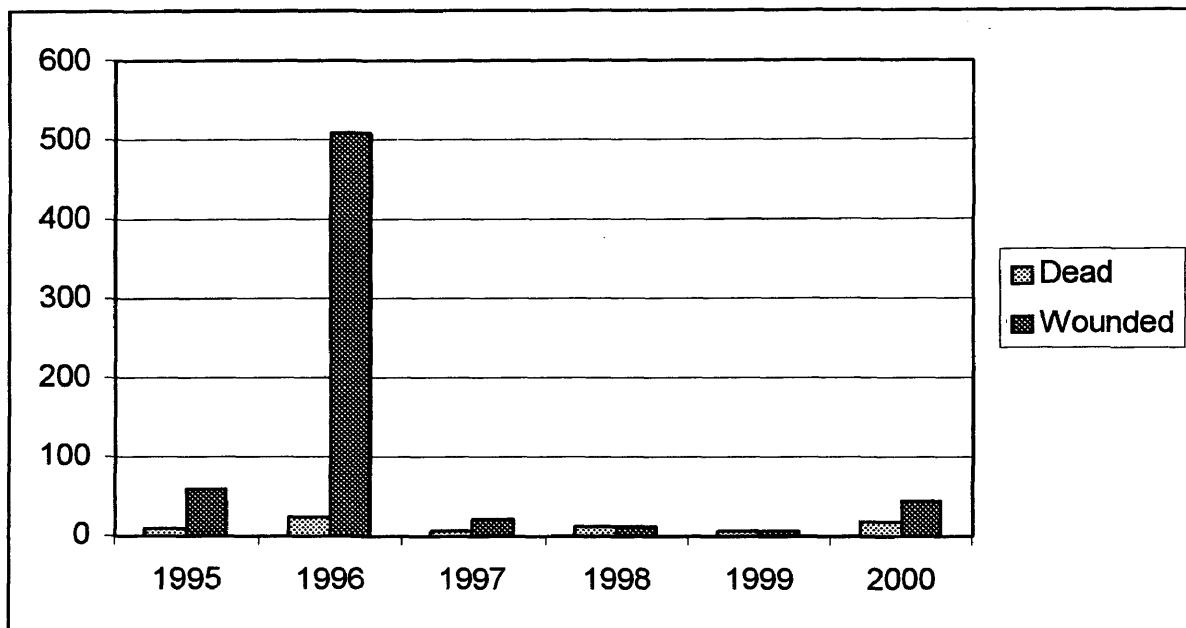


Figure 5: Total US Citizen Casualties Caused by International Attacks.

## **Appendix B**

### **Acronyms Defined**

9-11	September 11, 2001 and its consequences
ABC	American Broadcasting Corporation
BOMA	The Building Owners and Managers Association
C&C	command and control (also C <sup>2</sup> )
CC/A	Convention Center/Arena
ELF	Earth Liberation Front
FASB	Federal Accounting Standards Board
FDA	U.S.A. Food and Drug Administration
GDP	Gross Domestic Product
HAMAS	Islamic Resistance Movement
IMF	International Monetary Fund
IP	intellectual property
IRR	internal rate of return
ISO	Insurance Services Office
IT	information technology
NFL	National Football League
NPV	net present value
NSSE	National Special Security Events
NYC	New York City
PETA	People of the Ethical Treatment of Animals
PRA	probability risk assessment
PTSD	Post-Traumatic Stress Disorder
URL	Universal Resource Locator
USA	United States of America
WTC	former World Trade Center in New York



## Appendix C

### Cost Event Tree

