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## **Disaster Risk and Site Selection**

By Dennis Donovan

### **Introduction**

The issue of business continuity has assumed a far greater role in both the shaping and execution of corporate location strategy since the tragic events that took place on September 11, 2001. In this article, we examine the influence that disaster risk minimization has on the geographic deployment of office and industrial facilities.

### **Definition**

We often hear terms such as risk avoidance, business continuity, and disaster recovery used almost interchangeably. In corporate circles a new all-inclusive term has emerged that reflects the strategic importance of risk in business planning. That term is enterprise risk management (ERM).

As a corporate strategy, enterprise risk management brings together all the risk related dynamics that could affect business continuity. ERM encompasses protecting a company both from disasters (e.g., terrorist attacks) and other less catastrophic events (e.g., electric power interruption) that could disrupt business operations.

Corporate risk management plans vary, depending on business resource allocation. Interestingly, there is an international disaster planning standard that some companies follow. That is ISO 17799.

Considerations that typically comprise an enterprise risk management strategy can be aggregated into the following categories.

**Natural Disaster**

Earthquakes  
Floods  
Severe storms  
Hurricanes  
Tornadoes

**Human Induced Disaster**

Conventional weapons  
Biological weapons  
Chemical weapons  
Nuclear weapons  
Other kinds of weapons

**Political Risk**

Government stability  
Social unrest  
Currency stability  
Anti-American sentiment

**Business Continuity**

Redundant power  
Redundant telecom  
Data mirroring  
Data storage  
Supply chain vulnerability  
Multiple locations  
Flextime  
Distributed work  
Insurance

**Building Design**

Construction material  
Physical layout  
Floor height  
Floor load  
Telecommunications  
Electric power  
HVAC  
Riser capacity  
Power sizing/HVAC sizing  
Cabling support

**Physical Security**

Structural integrity/safety  
Ingress/egress  
Controlled access  
Employee identification  
Visitor Parking  
Perimeter protection  
Electronic surveillance  
Visitor parking  
Employee background checks

**Emergency Preparedness/Response**

Policies/procedures  
Evacuation of personnel  
Training  
Command centers  
Emergency notification

- Employees
- Customers
- Government

News dissemination  
Back-up work sites  
Emergency supplies  
Safety stock, especially critical parts  
Alternative transportation routes/modes  
People (intellectual capital)  
Products

### **Executive Responsibility**

The trend in most corporations is for the chief financial officer to assume overall responsibility for enterprise risk management. In several mega corporations, ERM comes under the purview of a global risk manager.

While overall direction and final approvals tend to lie with either the CFO or a global risk manager, the architect of an ERM strategy most often is the chief information officer (CIO). The corporate real estate executive (CRE) is usually a vital part of a multi-discipline team that assists the CIO in design and execution of an ERM strategy. Team members will generally include senior level personnel from the following departments

- Information technology
- Real estate/facilities
- Human resources
- Legal
- Finance
- Corporate affairs
- Business operations

The corporate real estate executive is often asked to make major contributions to the following components of enterprise risk management.

1. Building Design
2. Building/site acquisition
3. Lease terms/conditions
4. Construction/lease costs
5. Interior space design
6. Site security management
7. Location selection
8. Temporary backup space
9. Emergency preparedness
10. Building evacuation

### **Risk Minimization Measures**

Combining risk with other business imperatives, we are witnessing companies adopting combinations of the following actions pertaining to the locational configuration of corporate assets

1. Outsourcing
  - Mission critical functions (e.g., data centers)
  - Core business functions (e.g., manufacturing)
  - Non core business functions (e.g., customer service)
2. Real time data replication (mirroring)
3. Redundant operations (e.g., back-up data centers, a second manufacturing plant, multiple customer service centers)
4. Decentralization
  - To field locations
  - To new locations
5. Capping growth at existing sites and establishing new capacity elsewhere
6. Multiple, smaller operations (e.g., R&D)
7. Relocation (e.g., to achieve greater geographic balance in the supply chain)
8. Distributed work
  - Telecommuting
  - Hotelling
  - Satellite offices
  - Flexible working hours

Examples of companies adopting these various strategies for a number of business reasons, including risk diversity/minimization, are presented below.

1. Outsourcing
  - Motorola (manufacturing)
  - Microsoft (customer service)
  - Nortel (manufacturing)
  - Hewlett Packard (manufacturing)
  - Dell (manufacturing)
2. Redundant operations
  - Liberty Mutual data center, Kansas City
  - Morgan Stanley –second trading desk and back office in Westchester County, NY (headquarters in Manhattan)
  - Information Services Inc. backup data center in Loring, ME (HQ in San Marcos, TX)
3. Real time data replication
  - Allen-Bradley
  - Bombardier
  - HP/Compaq
  - Merrill Lynch
  - Reuters
  - Symbol Technologies
4. Decentralization
  - Oppenheimer

- HQ in NYC
- Remote back office operations
  - ❖ New Jersey
  - ❖ Colorado
- Citicorp
  - HQ in NYC
  - Remote operations centers in Kansas City, Tampa, Albuquerque, and elsewhere
- Remote corporate campuses of high-tech firms HQ in Silicon Valley
  - Sun Microsystems
    - ❖ Boston
    - ❖ Broomfield, CO
    - ❖ Austin
  - Oracle
    - ❖ Raleigh/Durham
    - ❖ Northern Virginia
    - ❖ Sacramento
  - Intel
    - ❖ Albuquerque
    - ❖ Phoenix
    - ❖ Salt Lake City
- Expansion away from headquarters
  - JP Morgan Chase operations and technology center in Houston
  - John Hancock IT center in Tampa
  - Federal Express IT center in Orlando
- 5. Multiple smaller R&D centers
  - Infineon Technologies (US and offshore)
  - Boeing (US and offshore)
- 6. Distributed work
  - Satellite offices (within 50 miles of HQ)
    - Intel
    - BTG
    - Dow Jones
  - Telecommuting
    - Aetna
    - Cigna
    - Siemens

Implicit from the above discussion is that risk minimization needs to include people (intellectual capital), data/systems, and facilities. Once a company fashions a location strategy predicted on business imperatives, including risk, the next challenge involves execution. Below we examine the role that risk factors exert in site selection.

## **The Location Decision-Making Process**

### **Stages**

There are typically three stages associated with site selection. They are:

<b><u>Stage</u></b>	<b><u>Outcome</u></b>
One	Screening locations to ultimately identify a shortlist (often 3-5) of the most promising locations
Two	Comprehensive evaluation of shortlisted areas to select the best location
Three	Assessing site/building alternatives and selecting a property for the new operation

### **Risk's Influence**

The emphasis placed on risk varies proportionately to an operation's mission criticality. Risk is an overarching consideration in the siting of mission critical business functions such as data centers, information technology operations including software development, web hosting and applications, research and development, critical parts manufacturing, single manufacturing plants (no other plants making the same products), and executive offices. By contrast, risk is less important for operations wherein downtime would not be disastrous for the business. Examples would be regional sales offices, one of multiple customer service centers, one of multiple distribution centers, etc.

Generally speaking, risk factors have moved up the food chain as a site selection criteria for nearly all businesses. For mission critical operations, risk-related considerations head the list of locational determinants.

### **Risk Evaluation Factors**

In stage one of the location selection process (eliminating areas on basic criteria) the following risk considerations are taken into account.

1. Natural disaster potential
2. Political risk (for international projects)
3. Redundant telecom service providers
  - o Local
  - o Long-distance
4. Electric power capacity and systemwide reliability

When evaluating shortlisted locations, (stage two) the above factors are assessed more in-depth. Additional concerns are also fully addressed. Stage two risk related evaluation factors include the following:

1. History of business downtime due to natural disaster (e.g., severe storms)
2. Political/social unrest, anti-American fervor, government stability, and potential transportation disruption (due to weather, strikes, or terrorist attacks)

3. Telecommunications
  - Infrastructure
  - Capacity
  - Reliability
  - Redundant service, preferably from two central offices
    - Availability
    - Cost
4. Electric power
  - Capacity
    - Generation
    - Transmission
  - Reliability
    - Systemwide
    - Circuits in substations serving industrial sites
  - Redundant service, preferably from two substations
    - Availability
    - Cost
  - Price
    - Current
    - Future stability
  - Alternate power sources (e.g., co-generation)
5. Presence of operations that could be high on the list for terrorism attack (e.g., major tourist complex)
6. Community emergency preparedness plans

Stage Three calls for evaluation of several sites/buildings. The above-mentioned factors are assessed in further detail. Additional variables also come into play. These include the following:

1. Geophysical characteristics (e.g., floodplain)
2. Proximity to possible terrorist targets, e.g.,
  - Tourism complexes
  - Power plants, especially nuclear
  - Water/sewer plants
  - Major shopping centers
  - Airports
  - Bridges
  - Companies intensely disliked in certain parts of the world
3. Site visibility (mission critical operations prefer minimal visibility)
4. Highway linkage connecting the area to the outside world
5. Site security
6. Building design and infrastructure
7. Utility redundancy
8. Insurance cost
9. Landlord responsibility for utility redundancy and security
10. Compatibility with nearby land-uses (e.g., residential development)

### **Guiding Principles**

A few broad precepts apply to site selection now that risk has assumed greater importance in locating new facilities.

1. Areas with high natural disaster risk potential will have a more difficult time recruiting new businesses
2. Countries with substantial political/financial risk will witness a downturn in reverse investment
3. Telecom and electric power redundancy will exert greater influence over final site selection
4. Companies will shy away from sites in close proximity to recognizable complexes at the greatest risk of terrorist attack
5. A community's emergency response plan will be more closely scrutinized in site selection
6. Buildings will need to be designed to reflect the additional emphasis on risk factors
7. Building/site security will need to be enhanced by landlords
8. Terrorist insurance is expensive, difficult to obtain, and could force some companies in large metro areas to disperse their workforce. The cost of coverage ranges from 25 cents per SF (small rural areas) to \$5.00 per SF (Manhattan).
9. Global companies will need to maximize geographic diversity in their supply chain, both for in-house facilities and outsourced operations
10. Risk diversity/minimization will continue to assume more importance in corporate location strategy
11. Corporate real estate executives will need to become more well versed in enterprise risk management
12. Economic development agencies will need to better understand how their areas and industrial/commercial sites stack-up on risk/security dynamics

### **Data Sources**

In the early stages of site selection, there are a number of valuable informational sources/services, which can bring efficiency to the analytical process. A sampling of pertinent data sources follows.

1. Natural disaster potential
  - o Geological hazards by the US Geological survey [www.usgs.gov](http://www.usgs.gov)
  - o Online hazard maps by the Federal Emergency Management Agency and Environmental Systems Research Institute [www.esri.com/hazards](http://www.esri.com/hazards)
  - o CDS Business Mapping [www.cdsys.com](http://www.cdsys.com)
2. Telecommunications
  - o CDS Business Mapping, [www.cdsys.com](http://www.cdsys.com)
  - o KMI Corp. [www.kmicorp.com](http://www.kmicorp.com)
  - o Atlas of cyberspace. [www.geog.ucl.ca.uk/casa/martin/atlas/](http://www.geog.ucl.ca.uk/casa/martin/atlas/)
3. Electric power
  - o North American reliability council [www.nerc.com](http://www.nerc.com)
  - o CDS Business Mapping [www.cdsys.com](http://www.cdsys.com)
  - o Edison Electric Institute [www.eei.org](http://www.eei.org)
  - o American Public Power Association [www.appanet.org](http://www.appanet.org)
4. Site/neighborhood features
  - o National mapping information (including topographic) by the US Geological Survey [www.usgs.gov](http://www.usgs.gov)



- Topographic maps from DeLorme [www.delorme.com](http://www.delorme.com)
- Maptech.com (65,000 top maps, aerial photos, and satellite images)
- Vistainfo maps of radii around a selected site. [www.vistainfo.com](http://www.vistainfo.com)
- Enviromapper services form USEPA. [www.epa.gov/economics/](http://www.epa.gov/economics/)
- 5. Country risk
  - Political Risk Services Group. [www.prsgroup.com](http://www.prsgroup.com)
  - Global Risk Assessments Inc. [www.grai.com](http://www.grai.com)
  - The Economic Intelligence Unit [www.eiu.com](http://www.eiu.com)
  - Control Risks Group. [www.ergonline.com](http://www.ergonline.com)
  - Global Insights Subsidiary, DRI-WEFA. [www.dri-wefa.com](http://www.dri-wefa.com)
- 6. Journals covering Enterprise Risk Management
  - Disaster Recovery Journal
  - Information Week
  - Chief Information Officer (CIO)
  - The Tech Mag.com
  - Building Operating Management
  - Facilities Design & Management
  - Optimize
  - Business 2.0
  - Red Herring
  - Wired
  - Global Continuity.com
  - Disasterrecoveryworld.com

### **About the Author**

Dennis J. Donovan is the global site selection director for The Wadley-Donovan Group, *A Grubb & Ellis Company*, based out of New York City and Edison, NJ. With over 28 years experience in site selection, Mr. Donovan has helped corporations across the industry spectrum to resolve locational challenges. Over the last twelve months, The Wadley-Donovan Group has worked with several major corporations to re-examine locational strategy in light of the additional emphasis placed on risk minimization and business continuity.