

# **Corporate Real Estate Black Swan Strategies: Beyond Probability and Resilience**

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## **Abstract**

Corporate organisations operate in a dynamic competitive global environment where real estate decisions form an important part of a successful business operation. Fundamental considerations cover the drivers of possible disruption from core economic activity, structural change and unexpected (Black Swan) events. With documented increases in frequency and magnitude of unforeseen, rare and extreme Black Swan Events, this research examines an antifragility corporate real estate strategy which looks beyond likelihood and resilience, to opportunities to manage and embrace key adverse Known Unknown random Black Swan Events. Suggested strategies including modular locational operation units, knowledge sharing and real estate partnerships can form part of an antifragility real estate framework and assist global organisations to succeed where competitors fail in a world affected by increasingly large, highly improbable and unpredictable events.

**Key Words:** Antifragility, Corporate Real Estate, Black Swan Events, Property Asset Management, Organisations Structures

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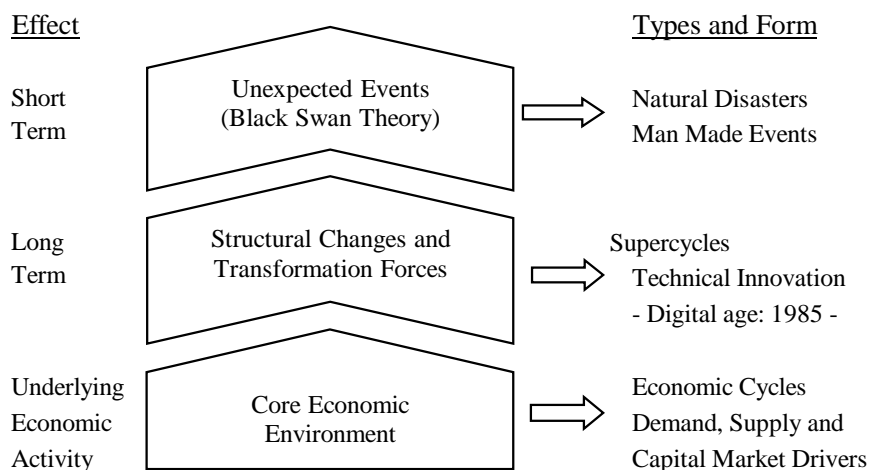
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## 1. Introduction

For a global organisation, a corporate real estate strategy forms an important part of an organisations success as it provides the operational platform for many primary functions (ie production, marketing and human resources). While some organisations explicitly consider a corporate real estate strategy, many proceed with an overall business plan and pursue real estate transactions as a secondary consideration. With a rapidly changing global environment this can lead to future challenges, leaving past passive real estate strategies helpless to manage new events which could have been foreseeable and preventable. As a consequence of poor corporate real estate decisions, global organisations can suffer major distress leading to financial ruin and failure.

To understand the external risks on global organisation’s real estate operations, key determinants can be categorised and illustrated: see Figure 1

*Figure 1*                      **Corporate Real Estate Operations: External Risk Factors**



Source: Higgins (2015)

Figure 1 identifies key external drivers that can impact on a global organisation real estate strategy. Importantly whilst past leading underlying macroeconomic indicators have provided a good guide to future economic conditions, Trahan and Krantz (2011) explained these forces do not exist in a vacuum, as emerging factors both directly and indirectly challenge these core economic activities. Long term, structural changes, often initiated by policy decisions and innovation appear to have permanent far-reaching real estate implications as to requirements of design and space. The level of technical innovation created by the modern digital age has created challenges for many global organisations to adapt or perish (Brynjolfsson and McAfee 2014).

In addition, economic cycles and structural changes are clouded by extreme, large unpredictable, short-lived events. These Black Swan Events can have enormous consequences on the wider economic environment and create uncertainty. They are often the origin of market crashes and can have a domino effect, leading to a cycle where those directly involved, and the wider community, incur considerable losses. These clusters of negative price movement can vary in time alongside extended periods of stability (Buchanan 2013, Taleb 2009).

In identifying a Black Swan World as a key risk, it is often overlooked by global organisations when making major corporate real estate decisions. These unexpected random events now form an important area of corporate real estate research as a consequence of several recent large scale global shocks (superstorms, tsunamis, pandemics (SARS) and acts of terrorism etc). These events can severely challenge economic activity, social cohesion and political stability and cascade across global systems, irrespective as to whether or not they arise within health, climate, social or financial systems. Critically a key element of an organisation supply chain, real estate can receive serious long term damage from Black Swan Events.

In developing the research agenda, Aven (2015) and Taleb (2012) detail a recent change from a rather narrow risk perspective, based on probabilities and expected loss, to a broader non-probability based analysis with a sharp distinction between risk as a concept and how this concept is measured. This difference leads to the antifragility concept, where rare and unforeseen events are beyond defined probability parameters and resilience only limits the impact. At the expense of probability analysis, a non-predictive decision making under uncertainty can offer organisations opportunities from disorder to exposing others to downside risk and extensive financial loss.

In summary, Nassim Taleb elegantly explained the concept:

*“ I’d rather be dumb and antifragile than extremely smart and fragile .....”*

(Taleb 2012, p4)

To understand the antifragility concept and the application to corporate real estate, this research paper peels back the elements and explains the types of Black Swan Events and how a framework can be constructed around the categories. Furthermore, with the emergence of new digital technologies, there is increased vulnerability to damaging corporate real estate obsolescence with reference to place (physical location) and space (organisation that occupy the space). Antifragility risk management is reviewed as part of the research with suggested approaches for corporate real estate strategies.

Following this introduction, Section two provides a framework for defining and recording Black Swan Events. Section three covers the impact of Black Swan Events on corporate real estate. Section four looks at antifragility theory with Section 5 linking the concept to a real state strategy for global organisations. The last section provides the concluding comments.

## **2. Black Swan Event Framework**

In broad terms, Black Swan Events theory captures large-scale unpredictable and irregular events of massive consequence. Although these disasters have been classified as natural, unnatural man-made,

purely social, technological, and hybrid, it has been established that Black Swan Events can be grouped into three types: natural, man-made and hybrid disasters (Shaluf 2007). The following literature elaborates causation and characteristics of each type of disaster.

**Natural disasters** are catastrophic events resulting from natural forces which are an unplanned and socially disruptive event with a sudden and severe disruptive effect. This is often termed as Acts of God where there is no human control. The impact of a natural disaster is localized to a geographical region and specific time period. The disaster can be a high-impact disaster that has a greater direct effect on the community over a longer period (Higgins 2014, Shaluf 2007, Turner & Pidgeon 1997).

**Man-made disasters** are those catastrophic events that result from human decisions. These non-natural disasters can be sudden or over a longer period of time. Sudden man-made disasters include socio-technical disasters which due to the interaction between internal and external factors and due to the accumulated unnoticed facts. The impact of a socio-technical disaster sometimes transcends geographical boundaries and can even have trans-generational effects (e.g. Chernobyl). Therefore, proper disaster management should be in place. On the other hand, long-term man-made disasters tend to refer to national and international conflicts either conventional, or unconventional warfare (Higgins 2014, Richardson 1994, Shaluf 2007, Turner & Pidgeon 1997).

**Hybrid disasters** result from both human error and natural forces such as deforestation resulted in soil erosion and subsequent heavy rain causing landslides, floods ravage community built on known floodplain, locating residential premises, factories, etc., at the foot of an active volcano, or in an avalanche area (Shaluf 2007).

Table 1 tabulates natural and man-made disasters by types and forms.

*Table 1:* **Black Swan Events: Types and Forms**

<b>Type</b>	<b>Types</b>	<b>Form</b>
<b>Natural</b>	Geophysical phenomena	Earthquakes, Tsunamis, Volcanic eruptions
	Topographical phenomena	Landslides, Avalanches
	Meteorological, Hydrological, Climatological phenomena	Windstorms, Tornadoes, Hailstorms and snowstorms, Sea surges, Floods Droughts, Famine, Heat waves/cold waves
	Biological phenomena	Infestations, Epidemics
<b>Man-made</b>	Socio-technical	
	Technological disasters	Fire, Explosions, Leakage, Toxic release, Pollutions, Structural collapse
	Transportation disasters	Air disasters, Land disasters, Sea disasters
	Other	Digital Threats, Financial Threats, Computer system breakdown, Distribution of defective products
	Warfare	
	National	Civil war, Civil strikes, Civil disorder, Bomb threats/terrorist attack
	International	
Conventional war	War between two armies from different countries, Sieges, Blockades	
Non-conventional war	Nuclear, Chemical, Biological	

Source: Higgins (2014), Munich Re (2015b), Shaluf (2007), Turner and Pidgeon (1997)

In defining the types and coverage, the extent of Black Swan Events can highlight the impact. The changes can be demonstrated by comparing the most recent natural catastrophes in the first half of 2015 to the historical long term average. Table 2 compares the number of natural catastrophes against the average and the highest year over the last 30 years. The number of events consists of all the loss events irrespective of the size of the event. Amount of losses in 2015 is lower than the average but there is an increasing number of events. The highest amount of losses is marked in 2011 caused by the earthquake in Japan whereas the earthquake in Haiti in 2010 resulted in the highest number of fatalities (Munich Re, 2015b).

*Table 2* **Comparison of World Natural Catastrophes**

	<b>2015 Jan-June</b>	<b>Average of the last 10 years 2005-2014</b>	<b>Average of the last 30 years 1985-2014</b>	<b>Top Year 1985-2014</b>
<b>Number of all the events</b>	510	440	330	620 (2012)
<b>Overall losses (USD m)</b>	35,000	95,000	64,000	302,000 (2011)
<b>Insured losses (USD m)</b>	12,000	27,000	15,000	82,000 (2011)
<b>Fatalities</b>	16,200	46,000	27,000	230,000 (2010)

Source: Munich Re (2015a)

In the recording the increase in Black Swan events, many of the natural disasters occur in defined locations. For instance, though timing and intensity if unknown, seismic activities occur with the movements of earth's tectonic plates. This is differ from the pandemic events which have no boundaries and can spread rapidly across continents (Higgins, 2015).

Understanding the parameters of measurement is important as catastrophe is identified in the sigma database when insured losses, total economic losses or the number of casualties exceed a certain threshold which can vary across types of catastrophes. Table 3 tabulates the thresholds as per the year 2014 (Swiss Re, 2015).

*Table 3* **Sigma Event Selection Criteria, 2014**

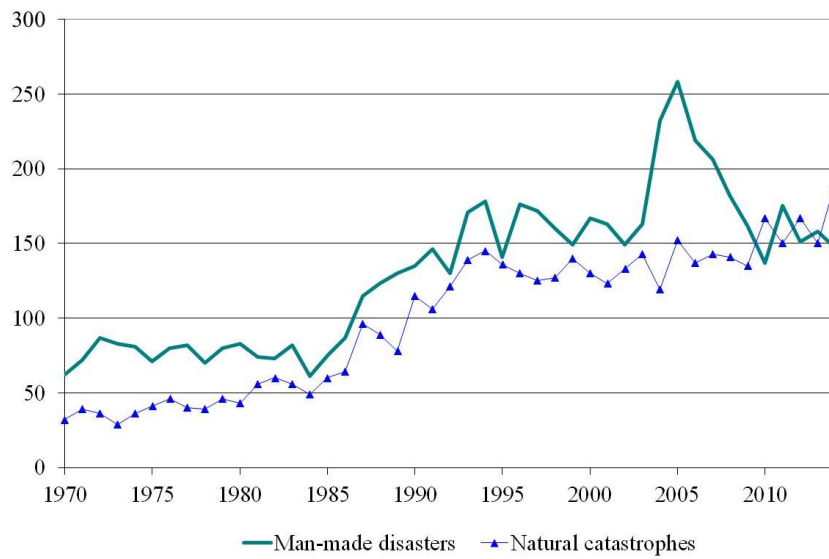
Insured losses thresholds	
Maritime disasters	US \$19.6 million
Aviation	US \$39.3 million
Other losses	US \$48.8 million
or Total economic losses threshold	US \$97.6 million
or Casualties	
Dead or missing	20
Injured	50
Homeless	2,000

Source: Swiss Re (2015)

Black Swan events are increasingly dominating the global environment with an increasing complexity of a tangled web of relationships and other interdependent factors. This complexity not only increases the incidence of Black Swan Events but also makes forecasting even ordinary events impossible (Taleb *et al.* 2009). Based on the sigma criteria, Figure 2 shows the level of recorded natural catastrophes and man-made disasters during 1970-2014 period.

Figure 2

**Natural Catastrophes and Man-Made Disasters: Number of Events 1970-2014**



Source: Swiss Re (2015)

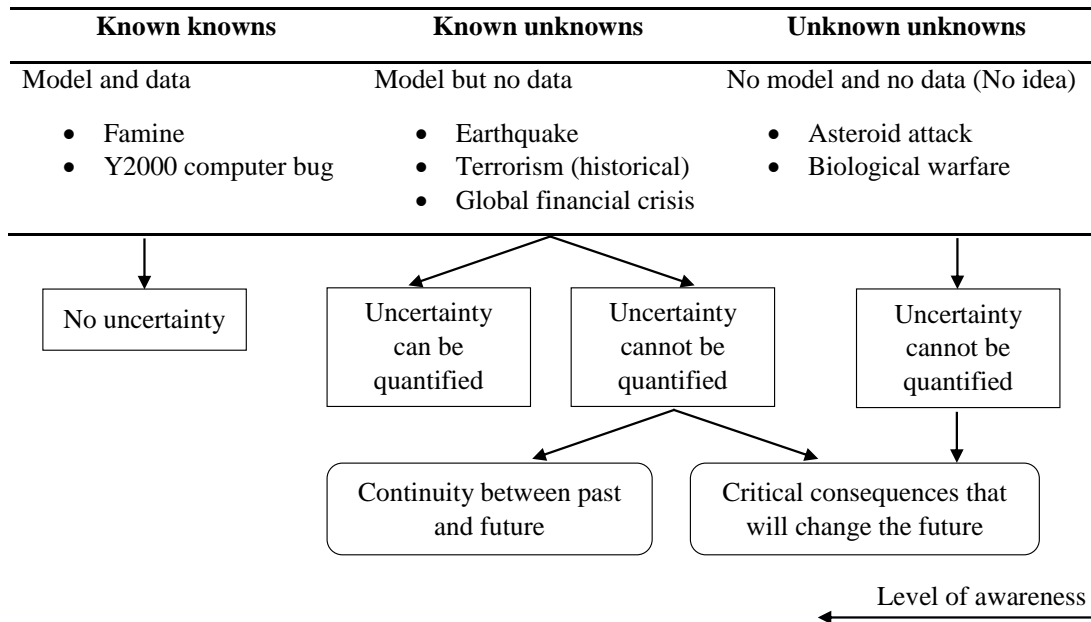
Figure 2 clearly shows an upward trend, where the number of recorded events has increased from 94 to 336 in the past 40 years. There were 336 catastrophic events in year 2014 with 189 natural disasters while 147 are manmade disasters. The highest reading of the upswing in the man-made disasters in 2005 is related to the fires and explosions in the industrial operations and in the oil and gas industry facilities (Swiss Re 2015).

To distinguish the risk between Black Swan Events, a quote from Donald Rumsfeld, the former US Secretary of Defense in relation to the presence of weapons of mass destruction in Iraq has become the hallmark to define the differences between unpredictable extreme events. The defined categories being Known Knowns, Known Unknowns and Unknown Unknowns events (Rumsfeld 2002).

Taking these categories, a framework can be constructed to provide a better understanding of uncertainty surrounding Black Swan Events, see Figure 3.

Figure 3

**Distinguishing the Knows and Unknowns:  
Black Swan Event Framework**



Source: Higgins (2014)

Figure 3 illustrates Black Swan Events separated into three categories: Known Knowns, Known Unknowns and Unknown Unknowns. The Known Known event is where we know what could happen and when, for example: Y2000 computer bug. These events can be measured and the disruption (worst case) forecasted. For the Known Unknown events, these may be quantifiable even though we may not know when they will occur, for example: earthquakes.

The Unknown Unknown event is difficult, if not impossible, to model. It is hard to imagine what kinds of events might fit into this category (Asteriod attack), although when related to an individual, there is the concern about mistaking the unfamiliar for the unlikely. For example, there were many signals that pointed towards the World Trade Centre terrorism attack on the 11 September 2001. The aftermath 9/11 Commission report identified three types of systemic failures that contributed to the ability to appreciate the importance of these signals, including failures of policy, capabilities and management (Silver 2012).

In defining Black Swan categories, relevant information can be sourced on known known events for decision making purposes. This compares to unknown unknown events which are difficult for individuals to even identify and therefore quantify. This leaves the known unknown category, where there is known information although there needs to be corporate property strategies and a development of probability theory, as past events may be random and vary in magnitude (Evans 2012).

### 3. Corporate Real Estate and Black Swan Events

For Corporate Real Estate Executives the impact of Known Unknown Black Swan Events can be twofold. Firstly, on a specific location (for example, earthquakes, hurricanes) which can damage the physical building. Secondly, economic loss for the space occupier, as operational risk (for example, global financial crisis, cyber-attacks) may spread across several unrelated locations at different timelines. The unpredictability of these Black Swan Events can have major ongoing implications and produce the concerning “fat tail” distribution on the classical Gaussian bell curve. This is where outlier risks - extreme events occur (Posner 2010, Taleb 2012).

Table 4 details Black Swan Events in the Known Unknown category relating to impact on place (physical location) and space (organisation that occupier the space).

Table 4

**Black Swan Known Unknown Events and Corporate Real Estate Impact**

Form	Place (locational risk)	Space (operational risk)	Comments on Vulnerability
Natural Disasters			
Seismic Activity	√		Locational with factors of urban growth and limited planning and building policies
Weather Related	√		Highly localised impact, coastal areas (hurricanes) and low lying areas (floods)
Infectious Virus	√	√	Variations in relation to disease, environ. condition and treatment capability
Man Made Disaster			
Investment Strategies		√	Insecurity of scientific approaches within unpredictable markets
Armed Conflicts	√		Interwoven with religion, social instability and economic poverty
Violence (Terrorism)	√		Normally, specifically focused relating to perceived compensation and rewards
Technical (Infrastructure)	√	√	Failures in design, operation and management can lead to major disaster
Cyber Attack		√	Critical internet infrastructure can be attacked providing failure of systems

Source: Higgins (2015)

Table 4 shows Black Swan Events divided into “Place” locational risk and “Space” operational risk categories. In the decision making process, corporate real estate managers need to capture and analyse the “Place” component, alongside the “Space” elements which can be widespread and unrelated. In addition, advances in digital technology can lead to increased connectivity, making secondary “Space” impact significantly more after a major Black Swan Event.

Interestingly, in recognising Black Swan Events, the pricing of real estate is based on conventional real estate valuation techniques which appear to overlook these “Place” outliers, as risks are commonly pooled to provide a measurement of value. The difficulty is compounded by the fact that value is often interconnected by limited comparison analysis and so the risks can reach systemic dimensions. Real estate decisions should incorporate sufficient understanding of possible occurrence of known Black Swan events to make an astute corporate real estate decision.

#### 4. Risk Management and Antifragility

According to Aven (2015, p.183), it is easier to figure out if something is fragile (being ‘easily broken’, ‘damaged’ or ‘destroyed’) than to predict the occurrence of an event that may harm. In understanding this concept, the goal of risk management is not to accurately estimate rare event probabilities but to reveal and assess uncertainties, and make adequate decisions under uncertainty. This represents a serious challenge to global organisations on how to handle deep uncertainty such as



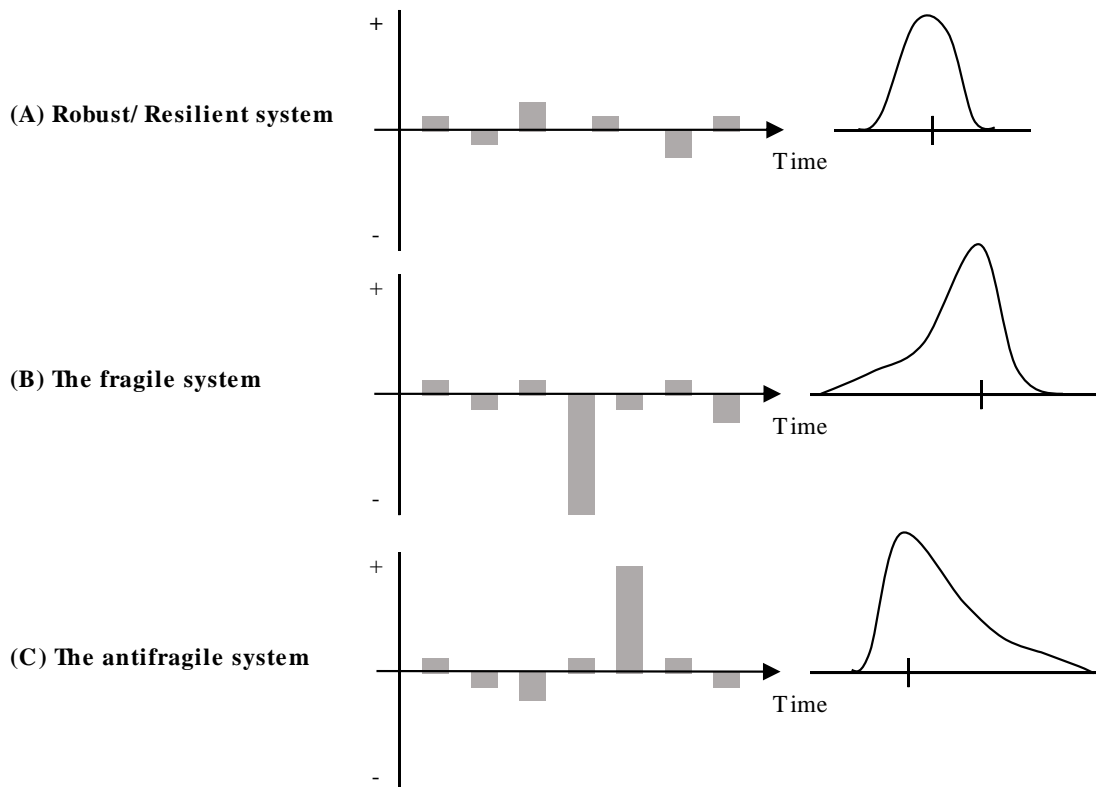
preparing for climate change and managing emerging pandemic diseases. In every domain, an antifragile system is rewarded with long term benefits with protection from adverse events. For corporate real estate, this is especially relevant as being the organisations operational platform and should form an important element in the risk management process.

Taleb (2012), explained the knowledge mechanism required by which the antifragile strategy regenerates itself continuously by using, rather than suffering from random events, unpredictable shocks and volatility. The focus on improvements leads to the concept being beyond robustness or resilience. The resilient resists Black Swans and remains the same but the antifragile knowledge gets better and better. Hence, antifragility is defined as a convex response to a source of harm and so can lead to a positive response to increase in volatility as opposed to fragility which suffers from the variability of its environment beyond a certain pre-set threshold. A capital market example is to research and buy options that provide substantial returns in the likelihood of catastrophic stockmarkets events.

Furthermore, Aven (2015) highlighted the robust/ resilient application and the changes from a fragile to an Antifragile system. The robust/ resilient situation is characterised by stable frequency distributions where uncertainties are small. A fragile system contains large uncertainties where events can have large negative values which could lead to serious failure. This compares to an antifragile system which is rewarded by good results and protected from adverse events. See Figure 4 to illustrate these concepts.

Figure 4

**Illustration of the Robust/ Resilient, Fragile and Antifragile systems**



Source: Aven (2015a) p.478

In Figure 4, the diagrams display applications, for each situation, there can be a corporate real estate example. The diagram (A) shows a robust/resilient system which is characterised by relatively small consequences of shocks and stressors. On a minor scale, think of an air conditioning system in which failure of unit is fixed quickly in order to resume cooling. Diagram (B) shows a fragile system where

the frequency distribution of the events has large negative consequences. In the air conditioning example, plant room failure could result in a complete shutdown of the system lasting several months. Finally, diagram (C) shows an antifragile system which is rewarded with good results and protected from adverse events. The frequency distribution places heavy weight on large positive value. In the air conditioning example, failures are fixed, but there is also an improvement process with secondary fresh air ventilation leading to better comfort and performance.

In the context of corporate real estate decision making no locational operations can be fully antifragile. It is the understanding and the possible application that can improve global organisations competitive performance. The message is that achievable positive returns from uncertainties and surprises need to be incorporated at the decision stage. Concepts and measurements of fragility, vulnerability and resilience are valuable and offer benefits in a practical context. This looks beyond the approach that it is sufficient to use frequency of distribution and insurance to limit the described impact of a Black Swan Event.

## **5. Antifragility Real Estate Strategy for Global Organisations**

To consider antifragility concepts, there is this requirement to bridge the theoretical models of decision science and those risks outside the realms of regular expectations. Buhl (2011) and Flyvbjerg and Budzier (2011) research on IT project planning can assist as to identify requirements for more precise analysis of the outliers, and suggested establishing risk management tools to reduce the complexity and decrease the variability of performance in quantitative decision making. This can be demonstrated by the following real estate examples within the antifragile outlook.

### *Designing for Flexibility*

Both Flyvbjerg and Budzier (2011) and Taleb (2012) suggests risk management tools that reduce complexity, size and duration of planned projects with the objective to simplify the payback function of endeavours and simultaneously thinning out the fat tails of extreme risks. This can be achieved by modularity, agile planning approaches and limiting the project financing multiplier.

Likewise, Brynolfsson and McAfee (2014) when examining advances in digital technology linked decreased international restrictions on trade, with the rise of global superstar organisations that can more easily compete with, and drive out local competitors with a “winner-take-all” strategy. Whilst digital technology can lower production costs, it has also lowered the cost of searching for information and so opens up specialisation as a source of differentiation. Several of these start-up organisations are attractive to global organisations as they offer innovation and growth opportunities.

These modes of excellence in defined industries (communication and pharmaceutical etc) can challenge traditional workplace practices, leading to new corporate space strategies with design hubs and campus style office accommodation. For Black Swan Events, the key is mobility, as technical innovations can lower fixed costs thereby allowing many functions to operate independently and digital networks providing access to similar operations in different locations. This can lower the impact of “Place” (locational risk), although increases the impact of “Space” (operational risk) failures from both the initial and as a secondary feature of a Black Swan Events.

### *Implementing Safety Barriers*

For global organisations, PwC (2012) consider their resilience to external shocks by detailing an organisation’s preparedness and adaptive capacity. Simple approaches to standardise language and reporting, offers a framework to better inform the operators in different locations. Imposed globally, the one framework toolset and single vocabulary can improve knowledge sharing across multinational organisations.

In developing this research area, more information on the impact of Black Swan Events would be a valuable tool for those seeking information for a global corporate real estate strategies. Recognition of leading cities resilience to adverse events forms part of Grosvenor (2015) report on Resilient Cities. Adaptive capacity to levels of vulnerability is a key research feature and shows recognition by a prominent global commercial owner to look beyond classic definitions of property risk measurements.

Harnessing information and examining the advancement of new technologies place additional pressures on corporate real estate managers to effectively execute corporate real estate policies. New risk fields need standard operational frameworks to strengthen the foundation of the corporate real estate discipline. By achieving this, new insights into the relationships between surprising events, probability and uncertainty would lead to improve risk assessment and broaden the contribution of corporate real estate executives in a global organisations operational strategy.

### *Corporate Real Estate Partnerships*

Advancement in communication technology can assist with risk management. Similar to 24-hour call centres, professional based organisations, such as project managers and architectural practices, can operate in global locations sharing knowledge and clients. The creation of operational teams that transcend geographic and temporal boundaries can offer lower costs and turnaround times. The shared information is also advantageous with improved management knowledge, and if unexpected shocks occur in one location, the services can be maintained in the alternative locations and offer a continuity of business.

For many global organisations leading real estate service providers are better placed to offer the consistent integrated service delivery with sophisticated real estate management information technology for worldwide coverage (for example: ANZ Bank, Bayer Pharmaceutical, DB Schenker and Microsoft). These real estate partnerships can develop to provide a key component in a global organisations real estate strategy, to an extent that they are part of the response to changing operational space requirements.

The challenge for global organisations is to look beyond real estate service providers to form corporate real estate relationships with real estate organisations offering complete global space solutions. Strong corporate links are being established providing preferred status for development and long term ownership (for example: Goodman Group developing and owning Amazon occupied warehouse properties across different continents). The challenge is with operational and logistic barriers which appear to limit these large real estate organisations providing solutions to corporate real estate risk management. Offering flexibility in space and location is a key global real estate model for an organisations risk management strategy to an increasingly challenging Black Swan World.

## **6. Conclusion**

Black Swan Events (natural catastrophes and man-made disasters) represent low predictable occurrences which have extensive impact across different risk categories. In recording recent increases in the number and magnitude of Black Swan Events, the types and forms can be placed into a framework covering Known Knowns, Known Unknowns and Unknown Unknowns categories. Whereas, Known Knowns can be managed and Unknown Unknowns are difficult to even identify, those Black Swan known unknowns events (for example, earthquakes and pandemics) that impact on a corporate real estate decisions. In addition, to the focus on signals and early warning, there is a strong argument that a global organisation should be prepared for uncertainty and embrace adverse events.

Risk management tools can offer an approach to include those Known Unknown Black Swan Events in corporate real estate decision making. The antifragility concept can provide a blueprint for living in a Black Swan World, were a global organisation recognises and embraces exposure to levels of

variation and uncertainty and is prepared to manage the opportunities and so enhance comparative performance to competing organisations.

For global organisations, the creation of modular operational teams that transcend geographic boundaries can offer solutions to locational Black Swan Events. These need to form networks which share common management language and knowledge, to limit the possible impact from Space (operational risk) events. The challenge is to link real estate decisions with corporate strategy. For many global organisations, partnerships with leading real estate service providers offer the consistent integrated service delivery and sophisticated information technology systems for the necessary worldwide coverage.

For corporate real estate managers, this Black Swan research attempts to identify, record and include those outlier events that directly impact on their real estate decision making. This can be undertaken by looking beyond predictions to embrace an antifragile strategy that protects and ever rewards from adverse Black Swan Events. Knowledge of these extreme events and effective strategies need to form an important part of a corporate real estate manager's decision making tool kit. If overlooked, Black Swan Events can have significant supply chain consequences for global organisations.

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