

Cambridge Judge Business School

Cambridge Centre for Risk Studies 2018 Risk Summit

CORPORATE RISK PROFILING – INSIGHTS FROM SECTORAL CASE STUDIES

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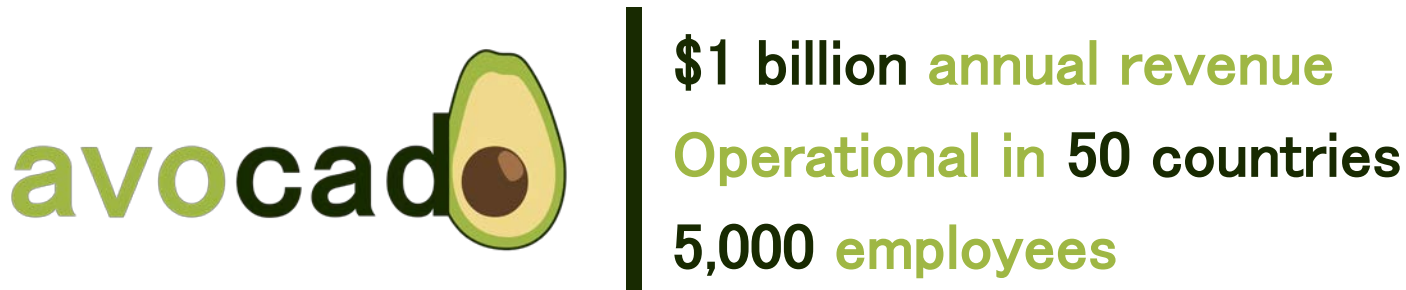
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What Is Required to Quantify a Company's Risk Premium?

- Our approach:
 - Overlays the Cambridge risk framework of threats over a company's footprint
 - To model the frequency and severity of losses and revenue disruption to a company



- Global enterprise representing real case studies from multiple sectors
- Physical products and consumables
- Site-specific assets – vulnerable to physical threats
- Business and information flows

Developing an Integrated Risk Profile

Internal Risk Register

Company-specific
identification of threats

avocado

External Risk Register

Framework of global threats
to business and economic
activity

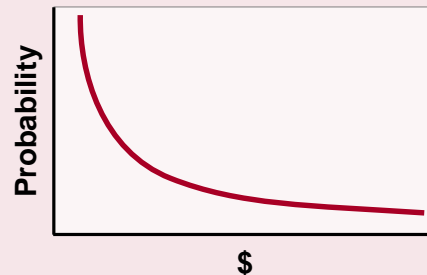
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Corporate Footprint

- Asset locations and revenue sources
- Business network & activity matrix

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Integrated Risk Profile



Outputs and Applications

- Annual report risk declarations
 - 10K and other reporting
- Regulatory risk reporting
 - Long-term viability statements
- Crisis & continuity management
 - Management stress tests
- Emergency risk monitoring & stress test design
- Monitoring of risk metrics for business units
- Insurance purchasing strategy

Corporate Internal Risk Register

Risks identified in **avocado**'s 2017 annual report

Market restrictions & indirect tax	Fiscal pressures &/or failure to address growth in anti-alcohol sentiment
Economic change	Local volatility or upheaval, uncertainty or failure to react, including Brexit
Critical industry developments	Failure to shape/participate in critical industry developments
Non-compliance with laws & regulations	Non-compliance with local laws/regulations, or breach of internal global policies & standards & internal control breakdown
Sustainability & responsibility	Failure to manage key sustainability risks or meet key sustainability goals
Business acquisitions	Failure to deliver value from acquisitions &/or integrate into company
Cyber threat	Theft, loss and misappropriation of digital assets
Political instability & terrorism	Impacts from political instability & security threats incl. terrorism in key markets
Data privacy	Breach of laws or regulations
International tax	Changes to international tax environment

Mapping Framework of Threats to a Corporate

Threats to Business Output

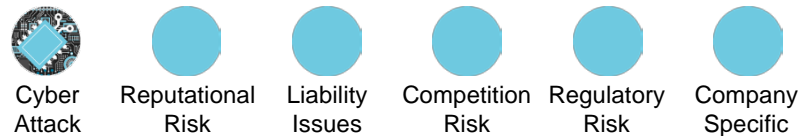
(Supply shock)

A. Site-specific threats to key facilities & assets



B. Risks that affect the whole company

Idiosyncratic – i.e. unlikely to affect other businesses at the same time



C. Systemic risks for sectors or all businesses

Will this business be affected more than average for sector?



Threats to a Company's Market

(Demand shock)

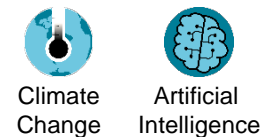
D. Threats to demand in a national market



E. Threats to demand in regional or global markets



F. Trend risks that affect the company business model



Geographical Footprint of a Corporate

INTRODUCTION

COMPANY DATA

THREAT EXPLORER

INSURANCE EXPLORER

ADVANCED

LOGOUT



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Company Data

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Data uploaded successfully

New productivity unit data detected and stored locally

No event probability data found. Please select default event probabilities

No loss process data found. Please select default loss processes

Build Company Data

UPLOAD COMPANY DATA

UPLOAD DEMO DATA

DOWNLOAD DATA

Set model parameters:

DEFAULT EVENT PROBABILITIES

DEFAULT LOSS PROCESSES

CUSTOMISE MODEL PARAMETERS

Run ERM analyses:

RUN THREAT ANALYSIS



Site A: Merak, Indonesia



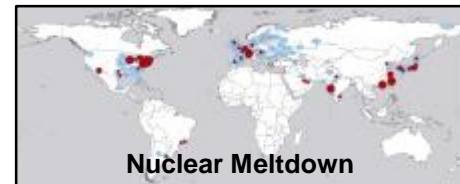
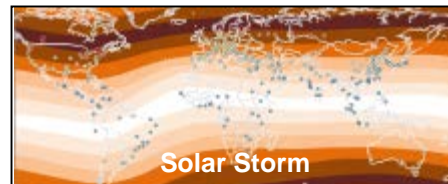
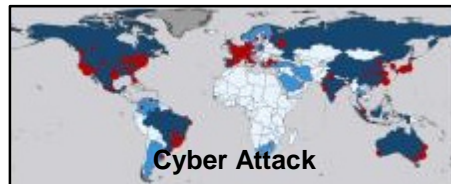
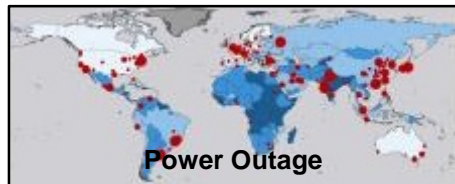
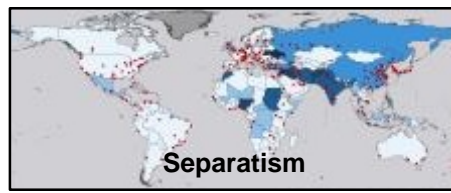
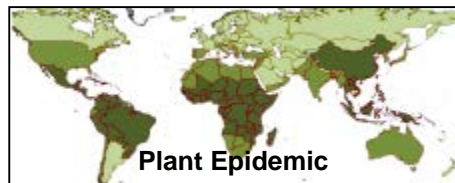
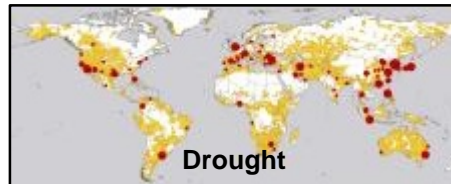
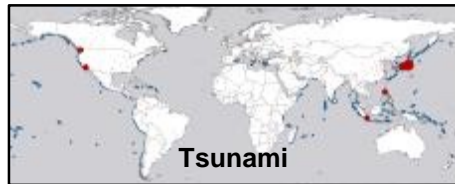
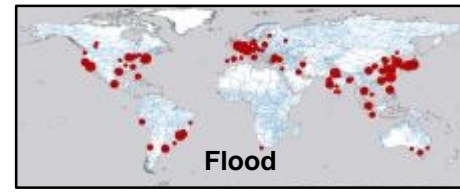
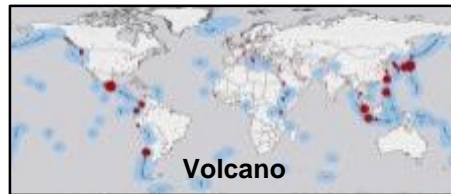
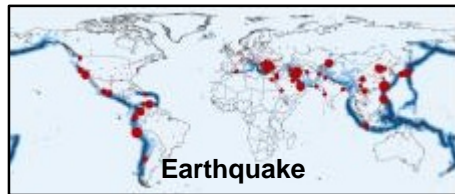
Units sized by:

Replacement cost Number of employees Annual Revenue

Dark Satellite

- Manufacturing plant for PTA
- 530,000 tons per year
- A raw material for Polyester

Global Geography of Cambridge External Risk Register



Potential Outage for Facility at Marek, Indonesia

Threat Type	Scenario	Days of Outage	Annual Probability	Return Period
1.7 Tsunami	Tsunami 6m runup	1800	0.0009	1,075
3.1 Interstate War	Strategic bombing destroys facilities	1800	0.0012	869
6.1 Accidental Fire	Accidental Large Explosion	720	0.0012	826
1.2 Volcano	1m Ash layer	360	0.0013	752
1.7 Tsunami	Tsunami 3m run-up	320	0.0043	231
1.5 Flood	Flood 6m depth, highly polluted waters	300	0.0045	221
3.3 Terrorism	Major Weapon/WMD Terrorist Attack	300	0.0046	220
1.1 Earthquake	MMI X	270	0.0046	217
6.1 Accidental Fire	Accidental Explosion (PML)	180	0.0050	198
1.5 Flood	Flood 3m depth, Moderate velocity water	120	0.0057	176
1.1 Earthquake	MMI IX	90	0.0060	166
3.2 Civil War and Separatism	Civil war heavy weaponry fighting	80	0.0064	155
1.3 Wind Storm	Cat 5 Hurricane	75	0.0067	150
4.2 Cyber	Cyber attacks on power grid	75	0.0070	143
1.2 Volcano	5cm Ash layer	60	0.0076	131
4.2 Cyber	Cyber-Physical Attack	50	0.0094	106
5.1 Human Pandemics	Pandemic with high fatality disease	48	0.0101	99
3.2 Civil War and Separatism	Sectarian fighting between private militias	40	0.0113	89
3.4 Social Unrest	Strikes prevent workers attending	36	0.0148	68
1.1 Earthquake	MMI VII	30	0.0154	65
4.3 Solar Storm	SS3	30	0.0160	62
5.1 Human Pandemics	Pandemic influenza infects 43% of pop	28	0.0183	55
4.2 Cyber	Cyber breach - major data exfiltration	25	0.0363	28
2.2 Sovereign Default	Country defaults	24	0.0382	26
1.3 Wind Storm	Cat 3 Hurricane	21	0.0396	25
3.1 Interstate War	Missile attack or aerial bombardment	21	0.0400	25
3.2 Civil War and Separatism	Civil Unrest riots and protests	20	0.0400	25
4.1 Electrical Power Outage	All power lost for 10 days	20	0.0412	24
6.1 Accidental Fire	Accidental Fire (EML)	20	0.0562	18
1.5 Flood	Flood 1m depth, low velocity water	14	0.0581	17
5.1 Human Pandemics	Localized epidemic of new emergent disease (e.g. SARS)	14	0.0587	17
1.3 Wind Storm	Cat 1 Hurricane	10	0.0639	16
3.3 Terrorism	2 ton truck bomb Terrorist attacks	10	0.0679	15
4.1 Electrical Power Outage	All power lost for 5 days	10	0.0702	14
4.3 Solar Storm	SS2	10	0.0722	14

Materiality of Potential Shocks to avocado

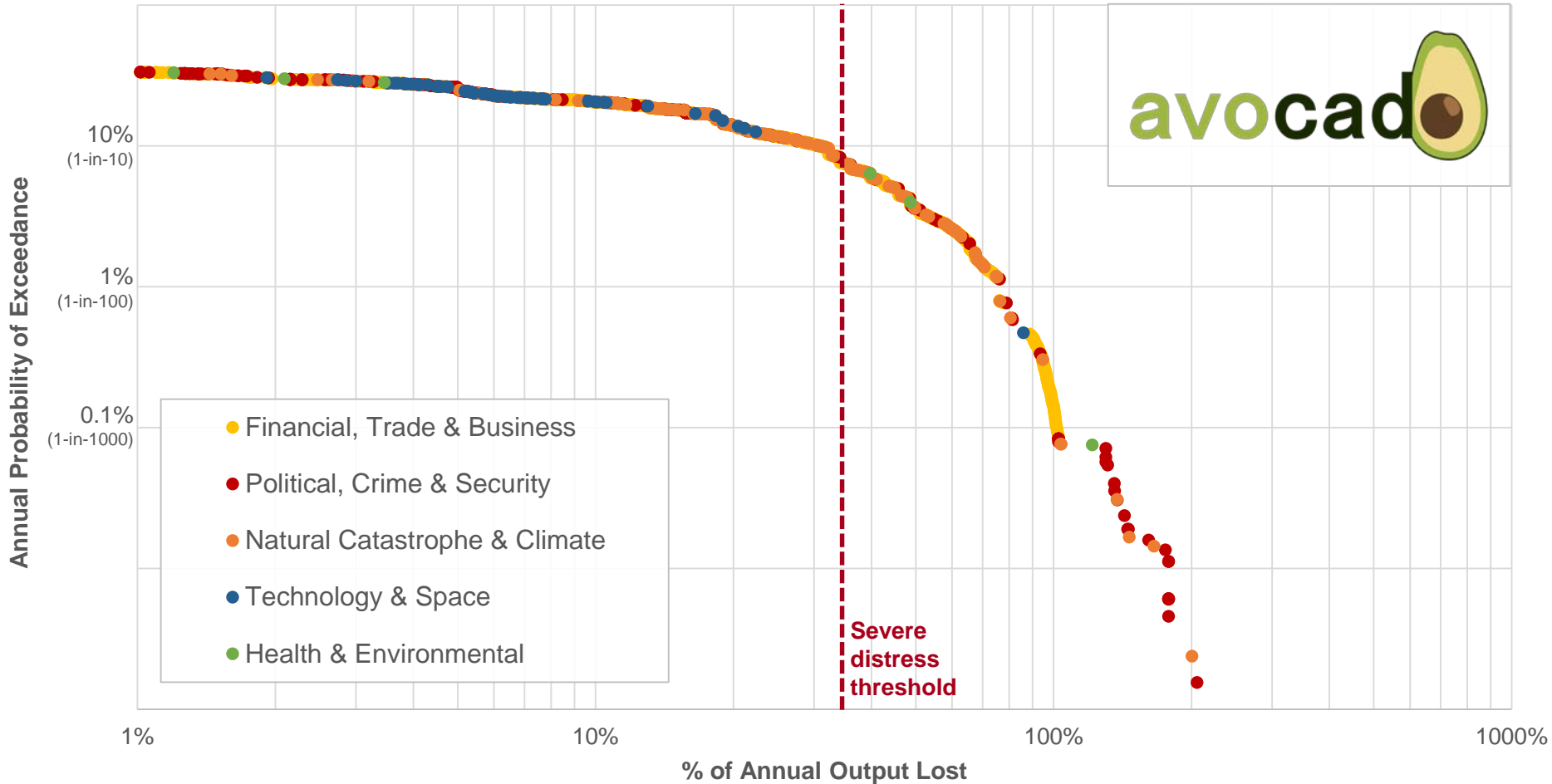
Consider examples of shocks exceeding a **severe distress threshold**:

- In this case, loss of around 25% of its annual revenue

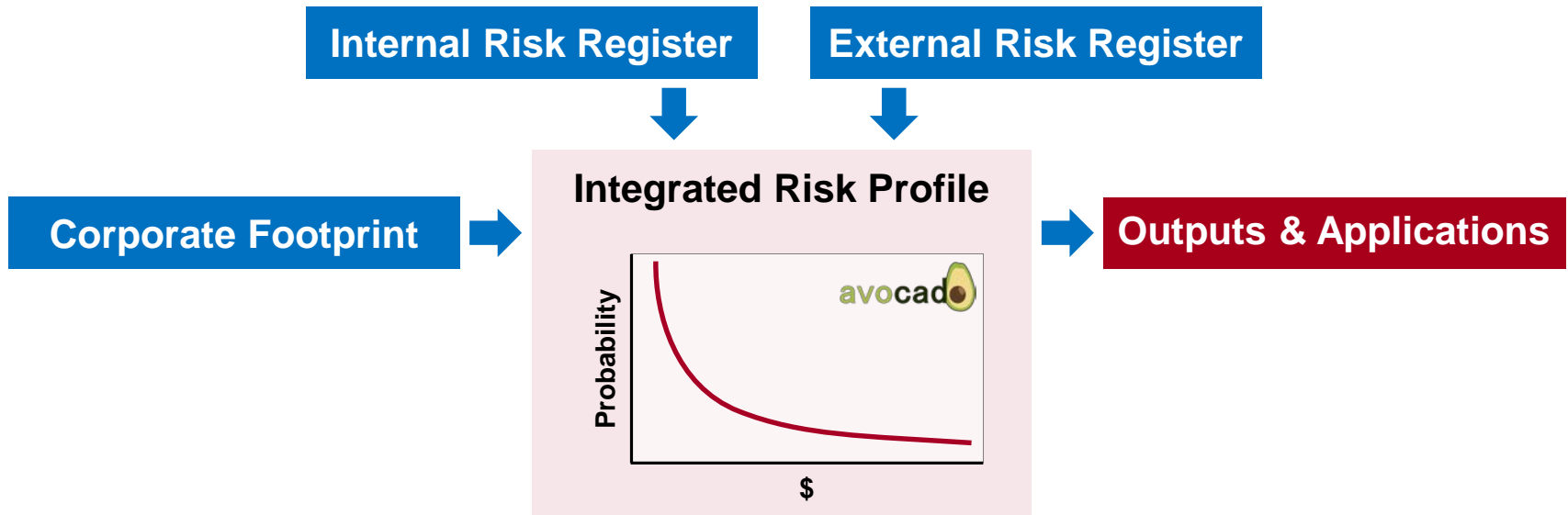
	Shock	% of Annual Revenue
	Miss Quarterly Earnings by 10%	0.1%
	Total Earnings for a Quarter	1.5%
	Cancellation of Annual Dividend	2.9%
	Credit Rating Downgrade	10.0%
	Destruction of all Property	16.0%
	50% Reduction of Investment Portfolio	19.6%
Severe distress threshold	Loss of 25% of Revenue	25.0%
	Loss of 50% of Revenue	50.0%
	Loss Exceeds Total Assets	55.3%

Supply Shock Exceedance Probability Curve

Disruption to output due to external shock scenarios



Key Takeaways



- Corporate valuations are not holistic, and undervalue external risks
- An integrated risk profile allows:
 - A comprehensive assessment of probability and loss severity of all risks a corporate is exposed to
 - Development of management/mitigation strategies to make a company more resilient
- Application to corporates in variety of other sectors

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