Cambridge Centre for Risk Studies
Advisory Board Research Showcase – 29 January 2019

Considering Corporate Risks

Exemplars from Human Capital and Gender Risks

Dr. Michelle Tuveson
Executive Director
Cambridge Centre for Risk Studies

Centre for
Risk Studies

UNIVERSITY OF
CAMBRIDGE
Judge Business School

RISK
10

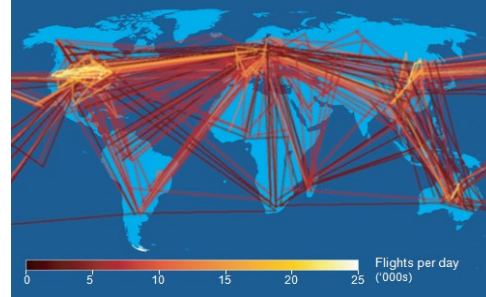# Now Applying Risk Science to Business Systems

How would [Regional War] affect [Bilateral Trade] and impact [Global Economy]?

Regional Conflict **Scenario**

System@Risk: Air Travel Network

Loss metrics

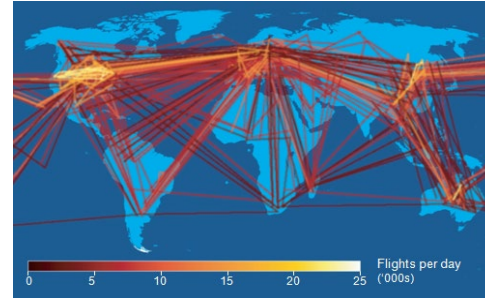# Now Applying Risk Science to Business Systems

How would [Regional War] affect [Bilateral Trade] and impact [Global Economy]?

Regional Conflict **Scenario**

System@Risk: Air Travel Network

Loss metrics

Flights per day ('000s)
0 5 10 15 20 25

Global GDP $ Trillion

GDP@Risk

2012 2013 2014 2015 2016 2017 2018 2019 2020

How would [Human Capital & Gender Risk] affect [an International Business] and impact [Expected Revenues]?

Governance Scenario

System@Risk: Business Trading Patterns

Loss metrics

Viral Posting of Gender Pay Gap

5yrEV@Risk: Future Lost Operating Profits

40 653
27 638
17 928
12 466
7 872
15 934
10 217
3 688
2 940
1 500
53 089

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Corporate Risk Disclosure Requirements

10-K Section 1A Risk Factors - United States SEC

■ Since 2005, the SEC has required all public companies in USA to disclose "the most significant factors that make the company speculative or risky"

Risk Register in Annual Reports: UK Financial Reporting Council

■ UK Corporate Governance Code – **Jan 2019 update**

  – Part 4 Audit, Risk and Internal Control, item 28, requires:

> "a robust assessment of the company's emerging and principal risks, and to confirm in its annual report the procedures in place to identify emerging risks, and an explanation of how these are being managed and mitigated"

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CRS Research into Enterprise Risk Management

■ Risk management practices of major companies - determine how they are adapting to meet future challenges and opportunities

- Interviews and workshops with Corporate ERM Directors
- Cambridge CRO Council Roundtables
- Wide ERM survey to IRM membership
- Presentations during ERM Council - Directors Roundtable
- Sector specific ERM reviews
- Launch of report "**Risk Management Perspectives of Global Corporations**" - *Nov 2018*
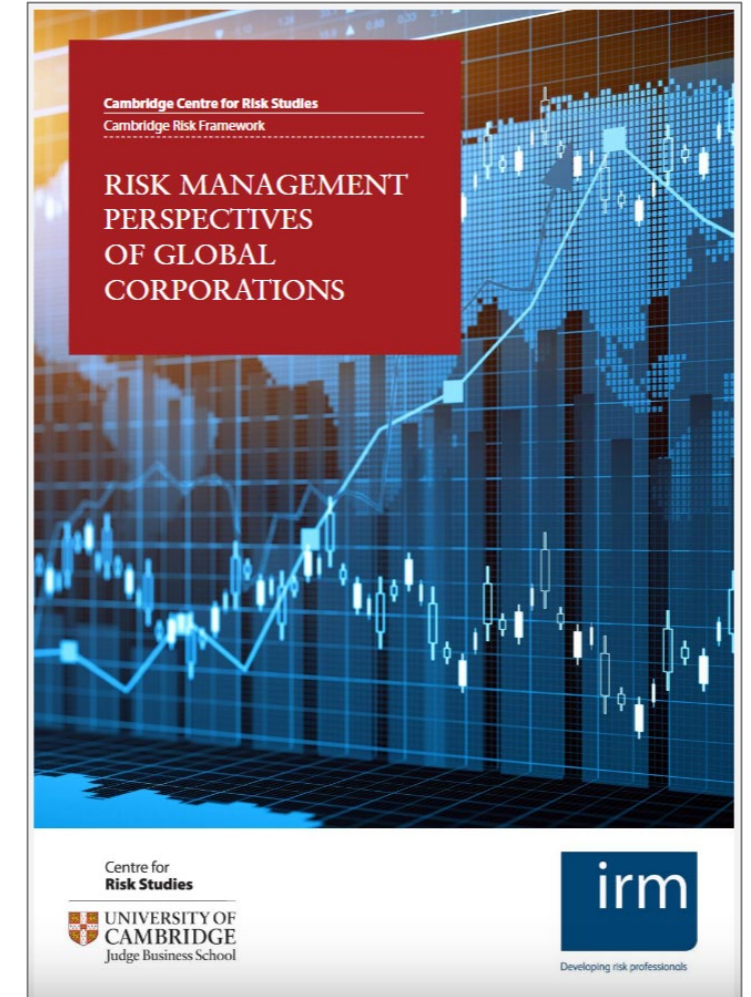
Index of Top Risks Facing Companies in Next 12 Months

Top 5 risks

- Risk Financials
- Operations
- Regulation
- Reputation
- Security including Cyber
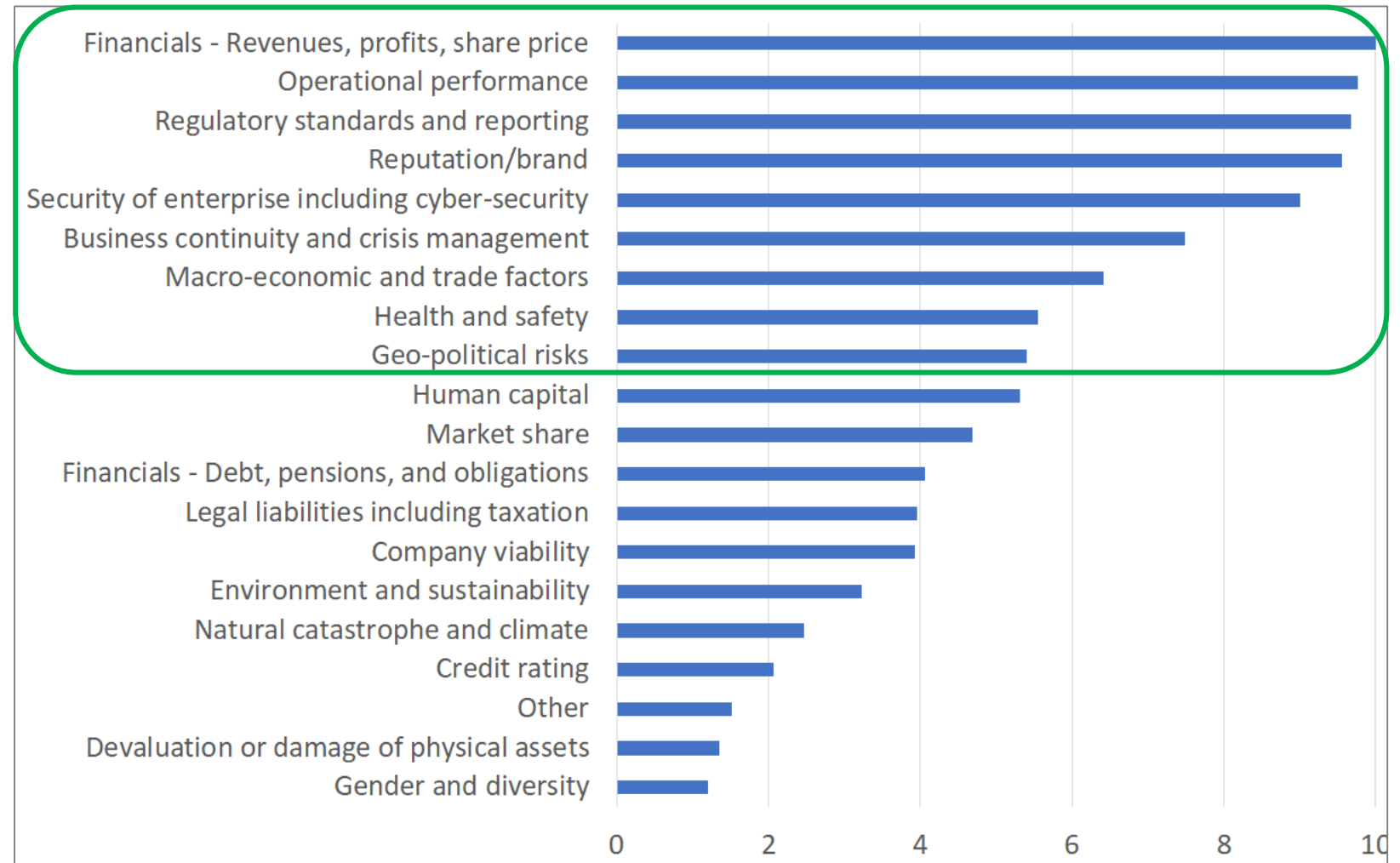
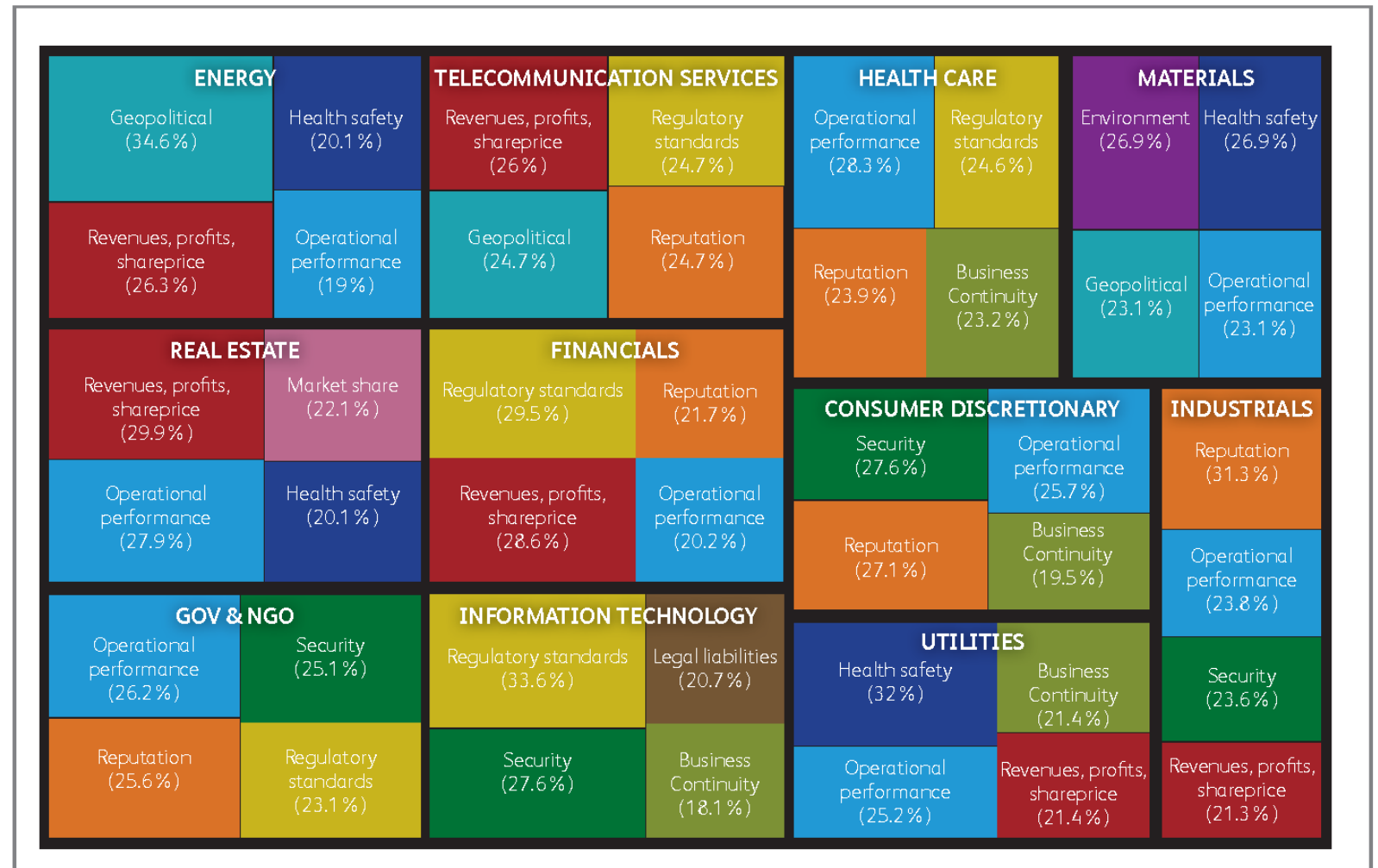Source: Cambridge Centre for Risk Studies 2018 ERM Survey

Top Risks in Next 12 Months

Commonality across sectors

- Financials: Revenues, profits, shareprice (Aggregate #1)
- Reputational Risk (Aggregate #4)

Sectoral risks

- Geopolitical risk (Aggregate #9)
  - Energy #1
  - Materials #3
- Regulatory standards (Aggregate #3)
  - Financials #1
  - Information Technology #1
  - Healthcare #2

ENERGY
- Geopolitical (34.6%)
- Health safety (20.1%)
- Revenues, profits, shareprice (26.3%)
- Operational performance (19%)

TELECOMMUNICATION SERVICES
- Revenues, profits, shareprice (26%)
- Regulatory standards (24.7%)
- Geopolitical (24.7%)
- Reputation (24.7%)

HEALTH CARE
- Operational performance (28.3%)
- Regulatory standards (24.6%)
- Reputation (23.9%)
- Business Continuity (23.2%)

MATERIALS
- Environment (26.9%)
- Health safety (26.9%)
- Geopolitical (23.1%)
- Operational performance (23.1%)

REAL ESTATE
- Revenues, profits, shareprice (29.9%)
- Market share (22.1%)
- Operational performance (27.9%)
- Health safety (20.1%)

FINANCIALS
- Regulatory standards (29.5%)
- Reputation (21.7%)
- Revenues, profits, shareprice (28.6%)
- Operational performance (20.2%)

CONSUMER DISCRETIONARY
- Security (27.6%)
- Operational performance (25.7%)
- Reputation (27.1%)
- Business Continuity (19.5%)

INDUSTRIALS
- Reputation (31.3%)
- Operational performance (23.8%)
- Security (23.6%)
- Revenues, profits, shareprice (21.3%)

GOV & NGO
- Operational performance (26.2%)
- Security (25.1%)
- Reputation (25.6%)
- Regulatory standards (23.1%)

INFORMATION TECHNOLOGY
- Regulatory standards (33.6%)
- Legal liabilities (20.7%)
- Security (27.6%)
- Business Continuity (18.1%)

UTILITIES
- Health safety (32%)
- Business Continuity (21.4%)
- Operational performance (25.2%)
- Revenues, profits, shareprice (21.4%)

Source: Cambridge Centre for Risk Studies 2018 ERM Survey

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Survey of Risk Registers of Public Companies

- Growing trend and regulatory requirements for companies to declare main risks to their shareholders

- Risk registers (self-identified threats to the well-being of an organisation) are declared in Annual Reports 10-K 1A and 20-F SEC filings of public companies

- CCRS has analysed the annual reports of **56** public companies so far, and compiled a list of over **1,035** risks that these organizations identify

- Literature review incorporates other similar studies on risks reported in annual reports and 10-Ks

- This exercise reveals wide variation in the risks that companies think pose a threat to their shareholder value

- Companies do not employ a consistent methodology: no accepted standard approach or best practice

- We propose to develop a corporate risk taxonomy to help with this process

Frequency of Risks identified in Annual Reports

Risk	Frequency
Corporate finance and operations	21%
Government and regulation	18%
Capital markets and economic conditions	16%
Corporate growth strategies	5%
Litigation and legal liabilities	5%
Natural and human disruptions	5%
Cyber, physical assets and data security	4%
Supply chain and third party	4%
Innovation and competitiveness	4%
Competitive landscape	3%
Company reputation/brand	3%
Human capital	3%
Energy and natural resources	3%
Consumer power	2%
Power and communications infrastructure	1%
Governance matters	1%
Key personnel	1%
Business continuity and crisis management	1%
Devaluation or damage of physical assets	0%

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Historical Catalogue of Corporate Failure Case Studies

- There is no formal definition of 'distress' - Symptoms include
  - Corporate difficulties, ranging from profits warnings through to credit downgrades, and formal insolvency

- We are identifying causal processes and factors that led to the distress of businesses
  - We are compiling a grading and diagnostic listing of corporate difficulty and distress
  - Most case histories reveal multiple causes and factors contributing to corporate distress
  - In some cases a primary external cause is cited

Source	Description	Information Provided
Credit Risk Monitor	Post-filing analyses of public company bankruptcies	- List of public companies that went bankrupt - Companies categorised by industries
BankruptcyData	More than 500,000 bankruptcy filings in the US since 1986	- Business bankruptcy filing - Public bankruptcy filing - Bankruptcy professionals data - Bankruptcy news
UCLA-LoPucki BRD	More than 1k large public companies in the US that have filed bankruptcy cases since October 1, 1979 (monthly update)	- The Cases table (sample available) - The WebBRD - The BRD dockets - The Professional Fees study data - BRD user data
Exchange Data International	More than 500,000 companies that filed for bankruptcy in the 94 US Bankruptcy Courts	- US business filings - Original source documents - Daily news - Creditor profiling - Distressed company alert
Acadian	Financial investment analysis of 2,600 shocks from 1928 to 2015	
Library of Mistakes	Corporate history of financial and non-financial business failures	Literature on failures in business

Public Bankruptcy Rates in 2017 by Industry

Industry	Rate
Oil & Gas/Energy/Mining	30%
Other	18%
Retail	11%
Healthcare & Medical	9%
Banking & Finance	9%
Computers & Software	7%
Telecommunications	6%
Steel & Metals	4%
Chemicals & Allied Products	4%

Figure: Bankruptcy rates in 2017 by industry (Source: BankruptcyData's 2017 Corporate Bankruptcy Review)

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Cambridge Corporate Taxonomy of Risks 2019

Finance & Economics

Macroeconomic
- Market crash
  - Asset bubble
  - Financial irregularities
- Sovereign crisis default
- Commodity price fluctuation
- Trade sanctions
- Economic restrictions
- Economic recession
- Tariff war
- Investor sentiment
  - Negative market outlook
- Low carbon economy transition

Competition
- Disruptive competitor
- Aggressive competitor
  - Price war
- Counterfeit products

Consumer Power
- Shift in consumer preference/demand

Geopolitics & Security

Political & Democratic
- Political shock
  - Regime change
  - Sudden leadership change
- Nationalism
- Political corruption

Political Violence
- Civil conflict & separatism
- Assassination
- Terrorism

International Conflict
- Interstate Conflict
  - Conventional
  - Asymmetric

Criminal
- Cartel pressure
- Organised crime

Technological

Cyber Attack
- Data exfiltration
  - Intellectual property loss
- Contagious malware
- Financial Transaction Theft
- Cloud Failure
- Industrial Control Systems

Infrastructure Failure
- Satellite system failure
- Power outage
- Network disruption

Industrial Accident
- Fire
- Explosion
- Nuclear
- Pollution

Artificial Intelligence (AI)
- Technological advancement
- Technological accident
- 4th Industrial Revolution

Environmental

Natural Catastrophe
- Earthquake
- Tsunami
- Volcanic eruption

Extreme Weather
- Flood
- Tropical windstorm
- Temperate windstorm
- Tornado/Hail
- Freeze
- Heatwave
- Drought
- Wildfire

Climate Change
- Weather pattern change
- Sea level rise
- Ocean system change

Space Event
- Solar storm (CME)
- Asteroid or space impact

Natural resources
- Resource deficiency
  - Food Security
  - Raw materials
  - Fossil fuels

Social & Humanitarian

Human Capital
- Labour disputes & strikes
- Labour shortages
- Ageing population

Infectious Disease
- Human epidemic
- Human pandemic

- Plant epidemic
- Animal epidemic

Humanitarian
- Famine
- Refugee crisis
- Welfare system failure

Human Resources
- Loss of key personnel
- Failure to attract talent
- Gender & diversity
- Negative media coverage

Governance & Liability

Regulation & Legislation
- Tightening monetary/fiscal policy
  - Tax
- Revised accounting standards
- Non-compliance
  - Worker health & safety
  - Internal corruption
- Licence revocation

Contingent liabilities
- Consumer/shareholder class actions

Strategic
- Hostile takeover
- Counterparty failure
  - Customer/client
  - Creditor
  - Government
  - Supplier
- Failure of:
  - Mergers & acquisitions
  - Divestitures
  - Restructuring
  - Joint ventures
- Asymmetric board
  - Rogue CEO

Products & Services
- Defect/failure
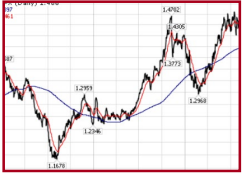- Innovation (R&D) failure

The Analytics We Apply to Derive Scenario Consequences

 Databases of precedent business case studies of the consequences of events and trends
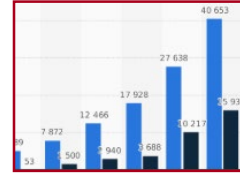
 Company financial data relationships to macro economic variables (e.g. interest rates, inflation, labour costs)

 Time series data on historical patterns of economic and financial market response to shock events

 Engineering models of the damage, repair costs, human injury, and business interruption duration from destructive scenarios
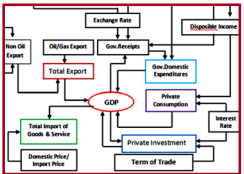
 Macroeconomic models of shocks on the economy
(Global Vector Autoregressive [GVAR} model)

 Liability and legal settlement models for court outcomes from mass torts, and regulatory compensation levels

 Consumer demand elasticity models by class of product in discretionary and non-discretionary consumables

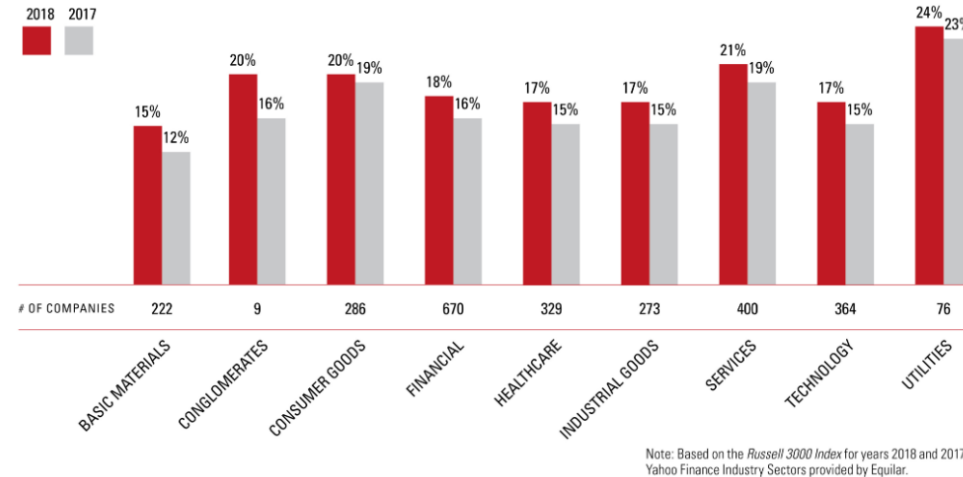 Social and demographic trends in changing attitudes and behavioural economics

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Deconstructing a Business: Profit-Weighted Components

Key Facilities

Products and Markets
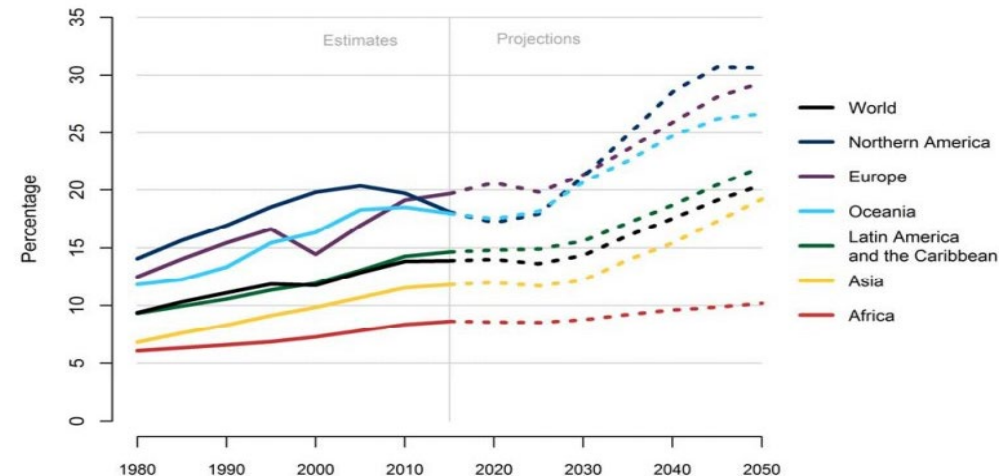

Supply Chains

Counterparty Network
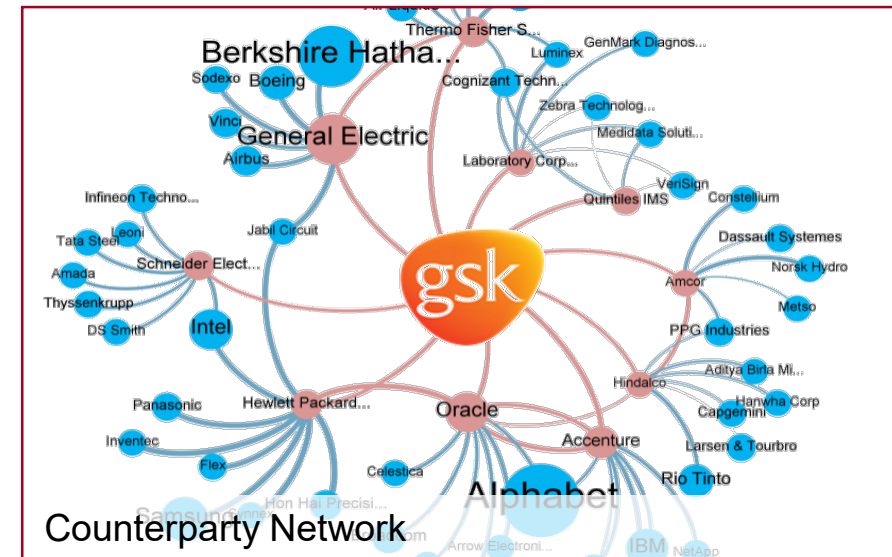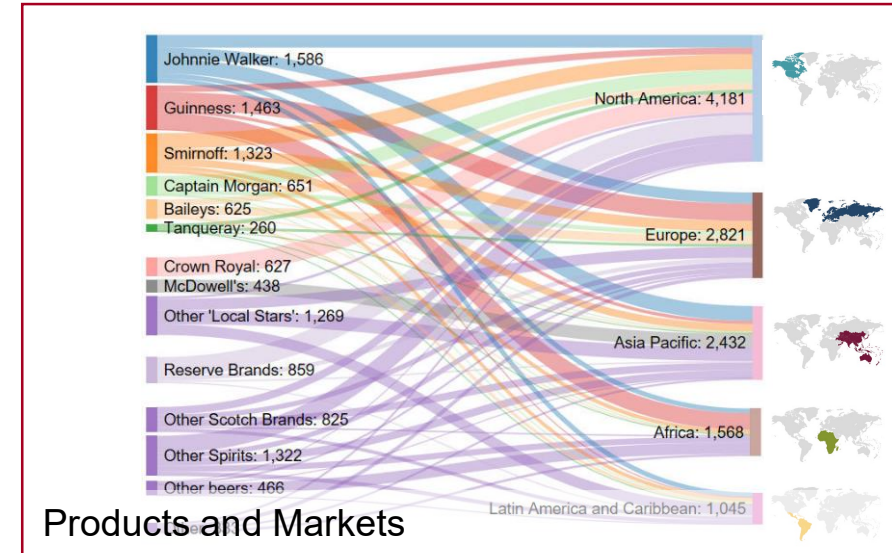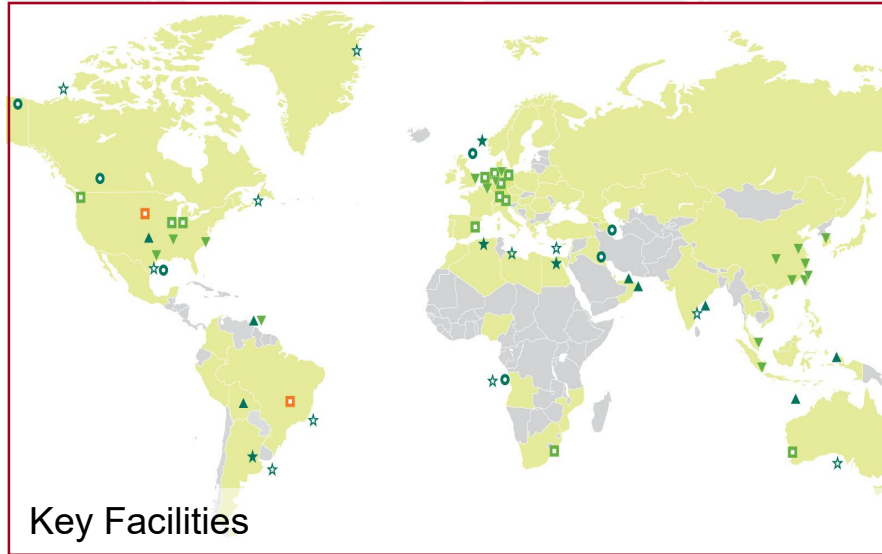
Brainstorming Key Issues - Human Capital and Gender Risks

- Maintaining good organisational culture free of harassment, good judgment/break-up group think. Positive morale

- Meeting staffing needs for key roles, key skills gap, succession planning; Lost opportunities for talent

- Liability
  - Class action from shareholders to board for failing to create an environment that supports good businessbreach of fiduciary duty, abuse of control, unjust enrichment, and waste of corporate assets.
  - Board members were "knowing and direct enablers of sexual harassment and discrimination".
  - Management responsibility for individual employee actions & misconduct
  - Labour strikes; e.g. Massive protest by employees
  - Product boycotts by customers
  - Biases in hiring/advancement
  - Compensation practices - Past gender pay reconciliations

2018-2017 PERCENTAGE OF BOARD SEATS HELD BY WOMEN BY INDUSTRY SECTOR

2018 2017

# OF COMPANIES	222	9	286	670	329	273	400	364	76
2018	15%	20%	20%	18%	17%	17%	21%	17%	24%
2017	12%	16%	19%	16%	15%	15%	19%	15%	23%

BASIC MATERIALS / CONGLOMERATES / CONSUMER GOODS / FINANCIAL / HEALTHCARE / INDUSTRIAL GOODS / SERVICES / TECHNOLOGY / UTILITIES

Note: Based on the *Russell 3000 Index* for years 2018 and 2017
Yahoo Finance Industry Sectors provided by Equilar.

Percentage aged 80 years or over among the population aged 60 years or over for the world and regions, 1980-2050

Estimates | Projections

Legend:
- World
- Northern America
- Europe
- Oceania
- Latin America and the Caribbean
- Asia
- Africa

Data source: United Nations (2017). *World Population Prospects: The 2017 Revision.*

Researching Relevant Data – Liability Claims for Human Capital and Gender Risks

Company	Potential Cost	Legal Action	Date
Boston Symphony[1]	Not disclosed	Gender pay gap	July 2018
Facebook[2]	Not disclosed	Race and gender based discrimination	March 2015
Ford[3]	$10M	Sexual and racial harassment	August 2017
Fox News[4]	$90M	Sexual harassment	Nov 2017
Goldman Sachs[5]	Not disclosed	Gender bias and gender pay gap	March 2018
Google[6]	Not disclosed	Gender pay gap	January 2018
Home Office[7]	Not disclosed	Equal pay/race and age-based discrimination	April 2017
Lloyd's Banking Group[8]	$669M	Equal pension payments	July 2018
Lord Chancellor (UK Supreme Court)[9]	Total tribunal fees paid by all claimants	Economic discrimination	July 2017
Nike[10]	Not disclosed	Discrimination/gender pay gap	August 2018
Salk Institute[11]	Not disclosed	Discrimination/gender pay gap	August 2018
Tesco[12]	£4B	Gender pay gap	Feb 2018
Twitter[13]	Not disclosed	Gender based discrimination	March 2015
Uber[14]	$10M	Discrimination/hostile environment	Mar 2018

Retaliation (All Statutes & Title VII) Claims Filed with the EEOC
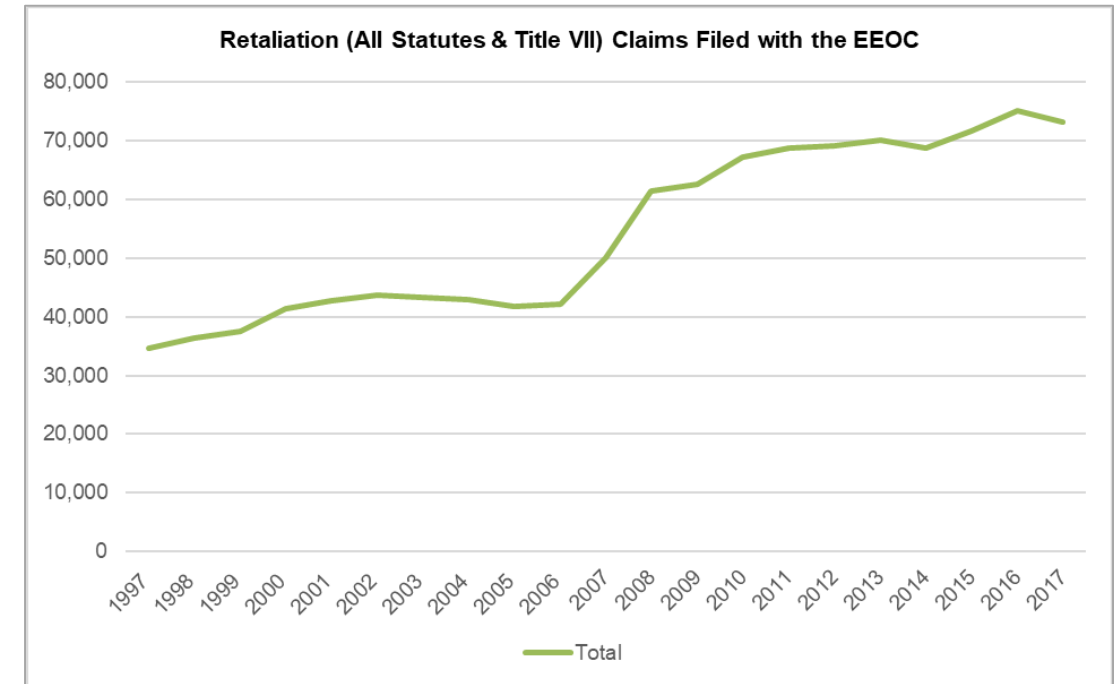
Data Source: US EEOC Office. Note: Employees can file a wide variety of claims with the EEOC, based on different forms of discrimination, such as colour, equal pay, genetic information, harassment, national origin, pregnancy, race, religion, retaliation and sex. From 2006 onwards, a greater number of claims have been made, based on religion, colour and disability.

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Building Risk Scenarios - Human Capital and Gender Risks

Mapping to Cambridge Corporate Risk Taxonomy

Validation via Historical Catalogue

Triggers

- Gender paygap via social media
- Employee harassment litigation movements
- Rogue employee actions
- Culture of hostility

Risks

- Labour shortages -Failure to recruit, can't make key products
- Labour disputes & strikes - disrupts production
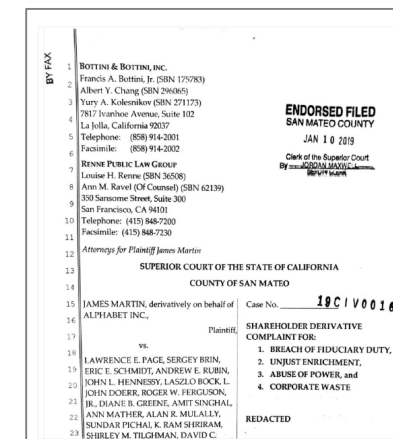- Consumer/shareholder class actions
- Shift in consumer preference/demand
- Investor sentiment Negative market outlook

HAPPY TO QUIT FOR $90M — NO SEXUAL HARASSMENT REQUIRED

Google employees walked out of offices in San Francisco and around the globe to protest what organizers describe as "a workplace culture that's not working for everyone."

Matt Rosoff | CNBC

BY FAX

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Attorneys for Plaintiff James Martin

ENDORSED FILED
SAN MATEO COUNTY

JAN 1 0 2019

Clerk of the Superior Court
By JORDAN MAXWC
DEPUTY CLERK

SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF SAN MATEO

JAMES MARTIN, derivatively on behalf of ALPHABET INC.,

Plaintiff,

vs.

LAWRENCE E. PAGE, SERGEY BRIN, ERIC E. SCHMIDT, ANDREW E. RUBIN, JOHN L. HENNESSY, LASZLO BOCK L. JOHN DOERR, ROGER W. FERGUSON, JR., DIANE B. GREENE, AMIT SINGHAL, ANN MATHER, ALAN R. MULALLY, SUNDAR PICHAI, K. RAM SHRIRAM, SHIRLEY M. TILGHMAN, DAVID C.

Case No.   18CIV00104

SHAREHOLDER DERIVATIVE COMPLAINT FOR:
1. BREACH OF FIDUCIARY DUTY,
2. UNJUST ENRICHMENT,
3. ABUSE OF POWER, and
4. CORPORATE WASTE

REDACTED

Cambridge Corporate Taxonomy of Risks 2019 ▪ Human Capital & Gender

Finance & Economics

Macroeconomic
- Market crash
  - Asset bubble
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  - Government
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  - Divestitures
  - Restructuring
  - Joint ventures
- Asymmetric board
  - Rogue CEO

Products & Services
- Defect/failure
- Innovation (R&D) failure

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5yrEV@Risk: Cambridge Metric for Enterprise Risk

- Our engagement with organisations suggests that senior managers are highly focused on share price

- The most meaningful metric for a risk is the potential reduction in share price – or loss of fundamental value of the business

- There are several ways of estimating the value of a business, e.g.:
  - Market comparables (benchmarking to similar businesses with known market capitalisation)
  - Calculation of present value of future cashflows minus debts to estimate the theoretical acquisition value (Enterprise Value)

- We have adapted a standard calculation method for Enterprise Value for use as a risk metric
  - Our variant includes the next 5 years, and ignores anything beyond 5 yrs (it ignores any Terminal Value at 5yrs)

- We are interested in the change in 5yrEV that would occur from a scenario **5yrEV@Risk**
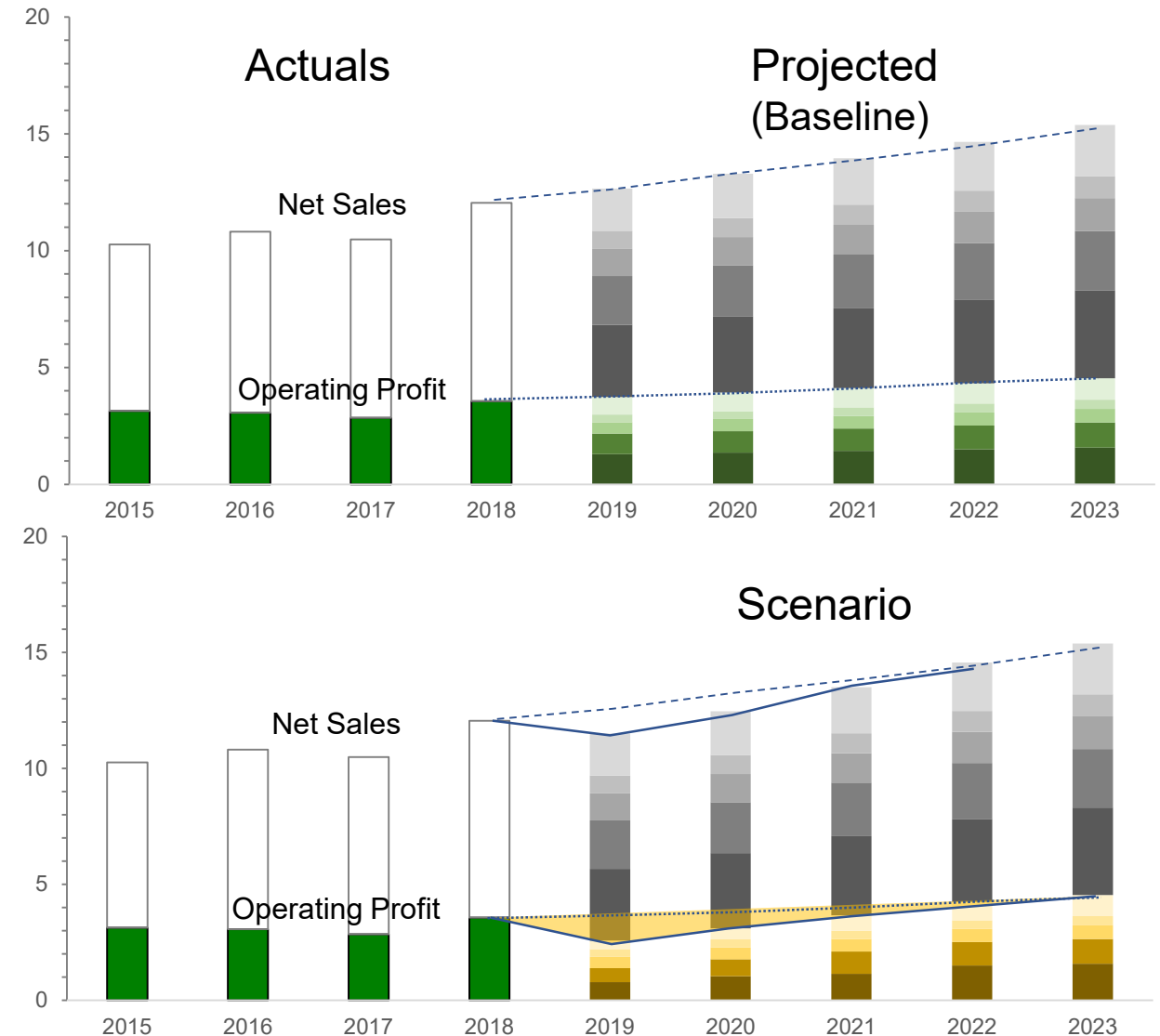
5yr EnterpriseValue@Risk - Lost profits over next 5 years (NPV)

Scenarios to Evaluate Corporate Risk

- Apply loss modelling disparate causes of risk

- We apply representative scenarios of different major classes of risk:
  - <u>Finance, Economics & Trade</u>
    - Disruption to cross-border business flows through new tariffs
    - Business based in UK, major markets in Europe & US
  - <u>Geopolitics & Security</u>
    - Regional markets depressed & global disruption to business operations
    - Militarised conflict in India – a significant revenue stream
  - <u>Natural Catastrophes & Climate</u>
    - Major flood affects critical facilities in UK supply chain
    - Incorporates destruction of capital assets & inventory
    - Compare physical losses to impact on revenue
  - <u>Governance</u>
    - Human Capital & Gender Scenario

Scenario stress test results – impact on company fundamental value

5yr EnterpriseValue@Risk

Trade war between US & Europe

S1	10% tariff on products	1.1%
S2	20% tariff on products	3.6%
S3	40% tariff on products	7.2%
X1	140% tariff on products	18.7%

Geopolitical conflict between India & Pakistan

S1	Countries on war footing, minor skirmishes	0.5%
S2	Military conflict, low consumer confidence	2.0%
X1	Loss of all Indian subsidiary business	10.1%

Floods damage key facilities in supply chain

S1	0.8 m depth, 2 weeks, clean	2.7%
S2	1.3 m depth, 3 months, moderate contamination	6.3%
X1	>1.5 m depth, 12 months, high contamination	17.7%

Human Capital & Gender

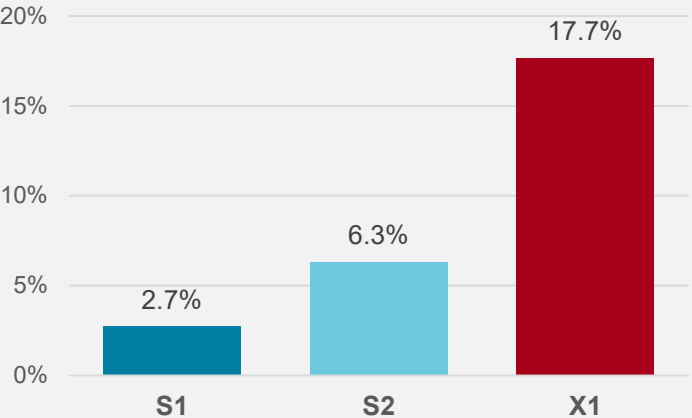|		
S1	Labour shortages affect product development	0.4%
S2	Class action litigations filed; employee morale impacted	1.6%
X1	Long term consumer sentiment reduces product demand and devalues share price	7.8%

Impact of Scenarios on Balance Sheet
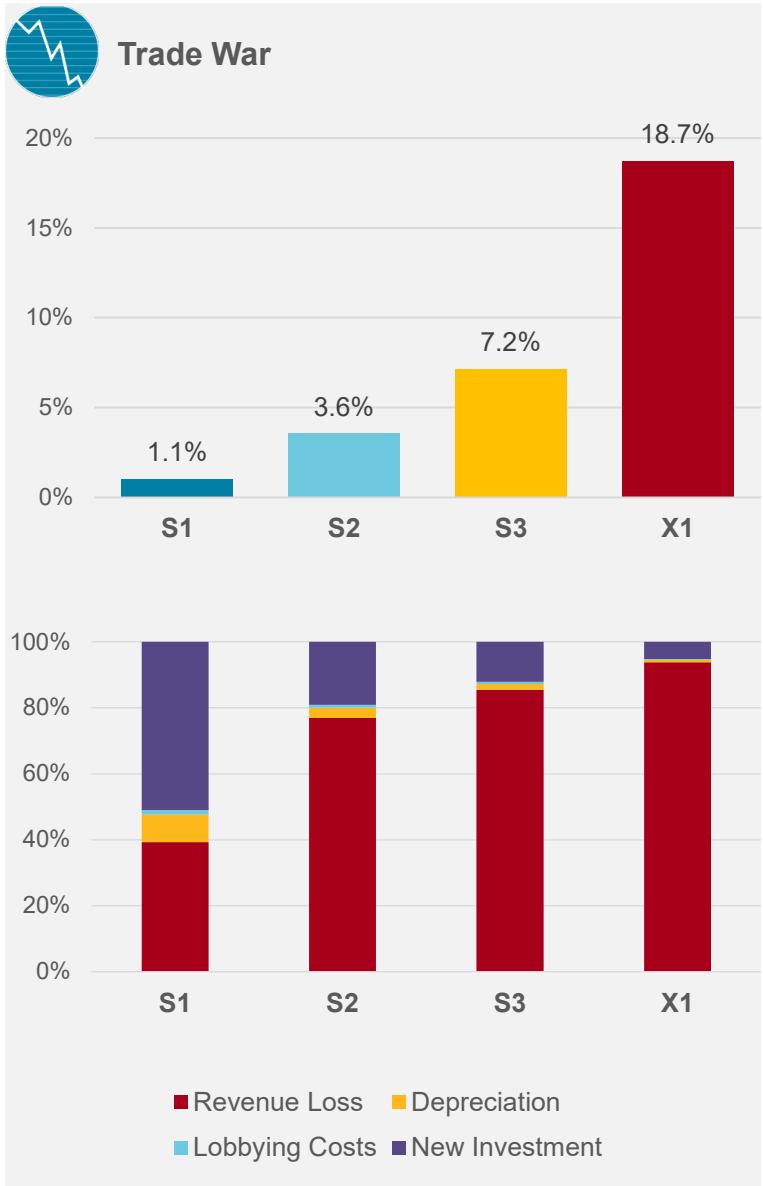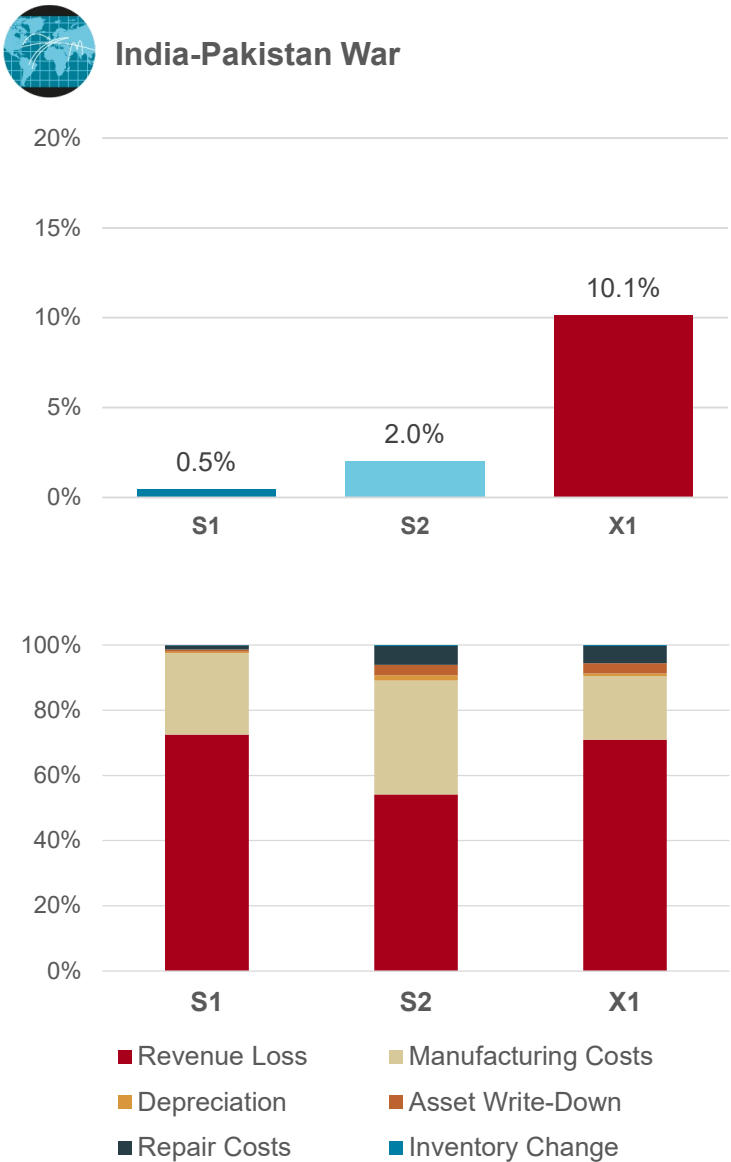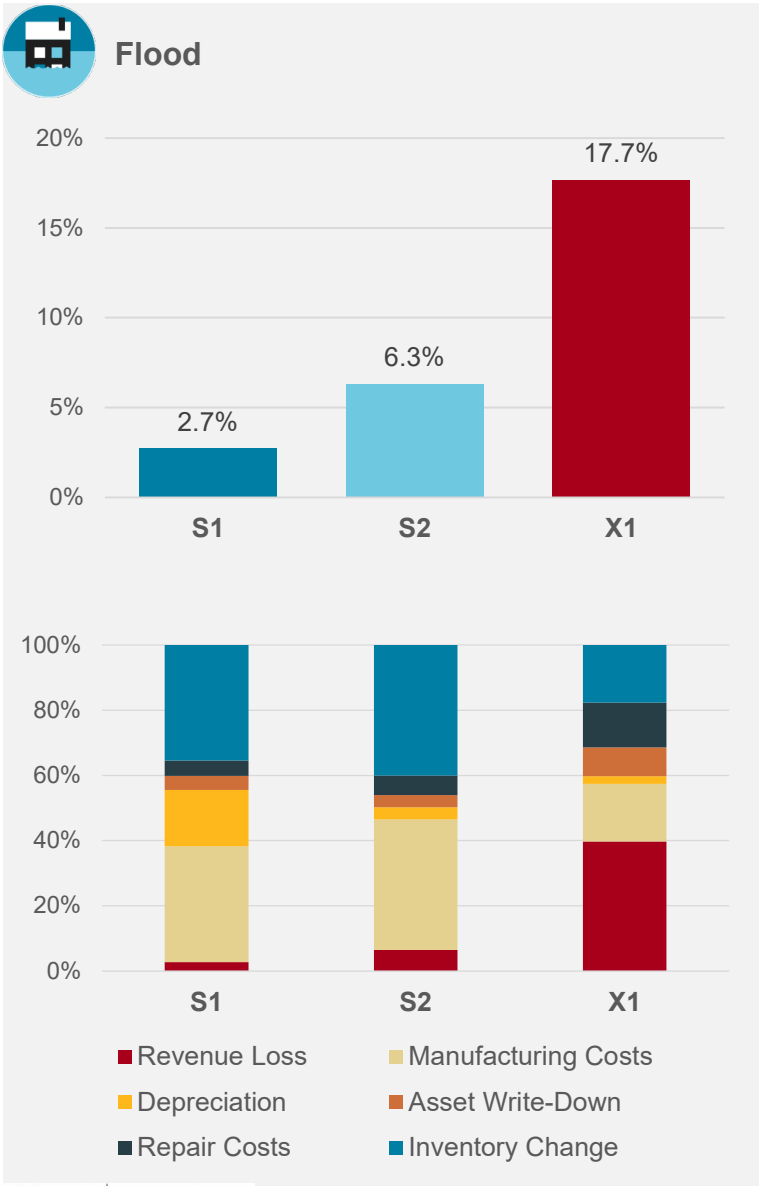
Risk Scenario Comparisons and Prioritisation on Balance Sheet
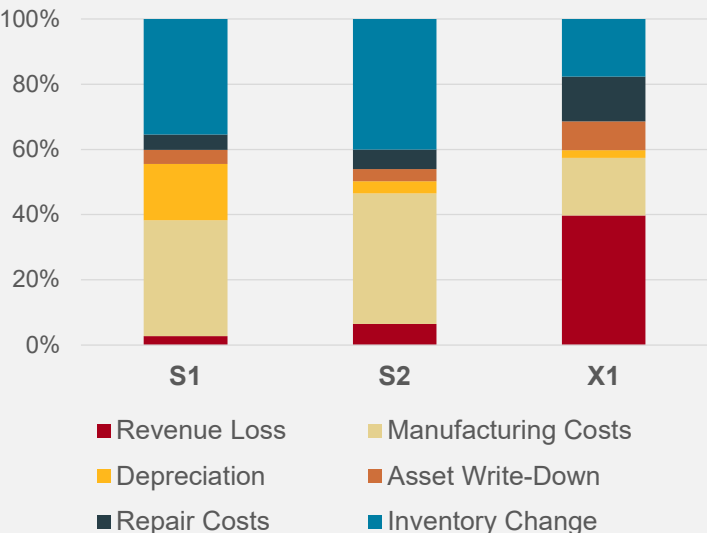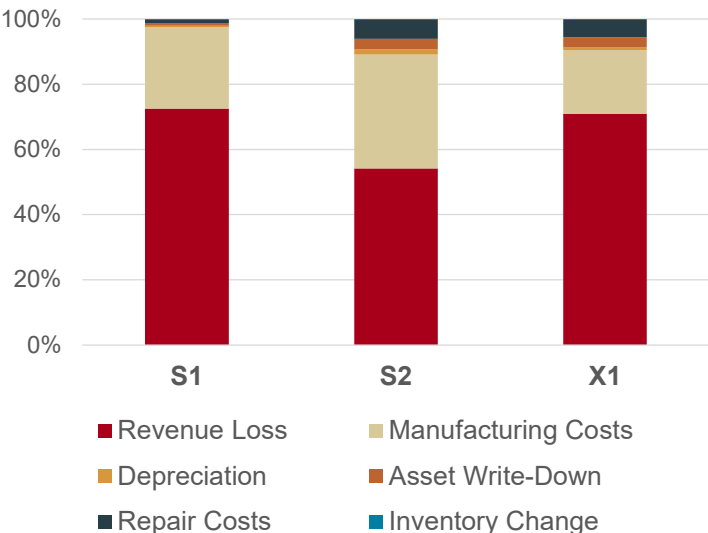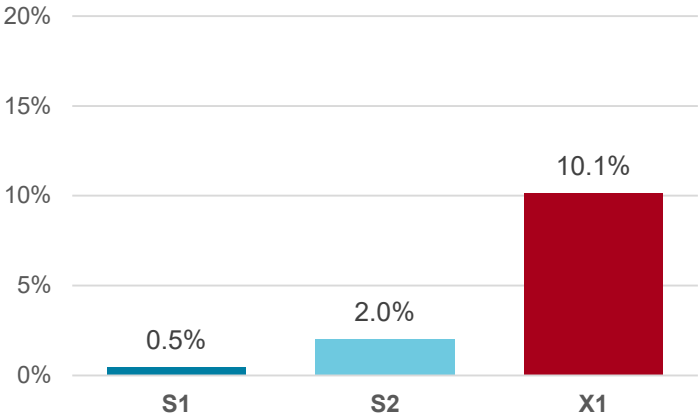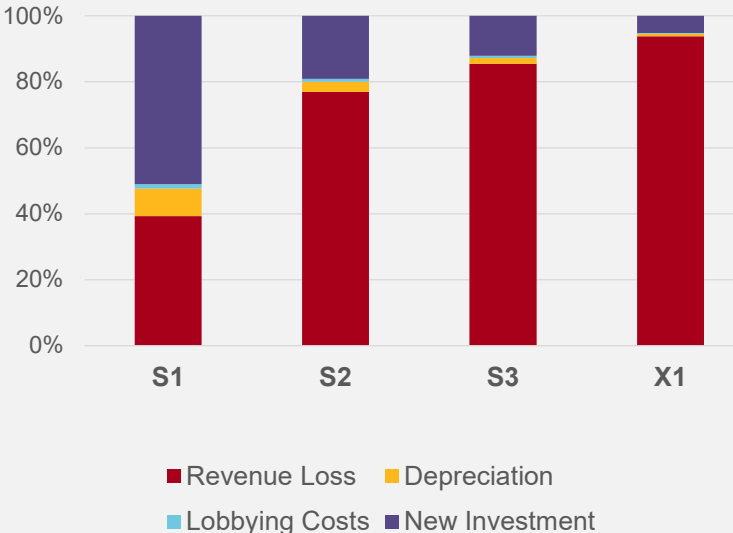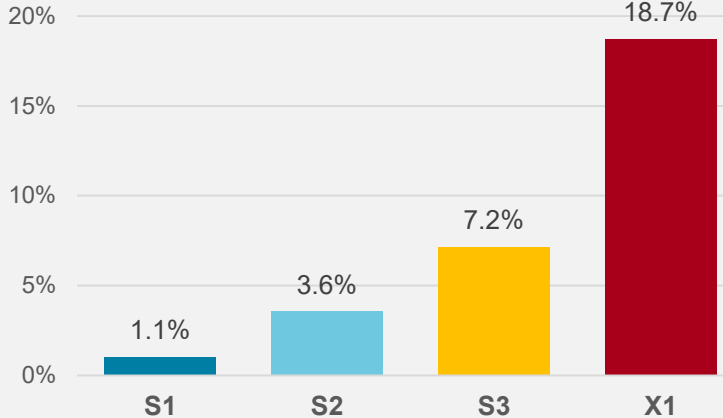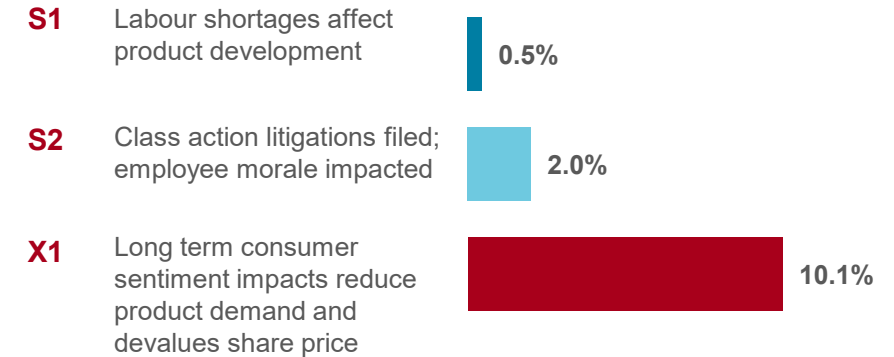
Indicative Profile - Scenario Stress Tests to Evaluate Corporate Risk

- Applies loss modelling to business from variety of disparate causes of risk

- We apply representative scenarios of different major classes of risk:
  - Governance
    - Human Capital & Gender Scenario
  - Finance, Economics & Trade
    - Disruption to cross-border business flows through new tariffs
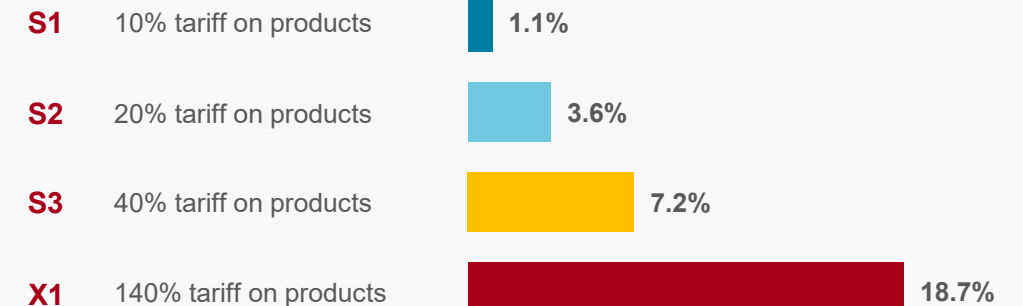   - Business based in UK, major markets in Europe & US

Scenario stress test results – Impact on company fundamental value
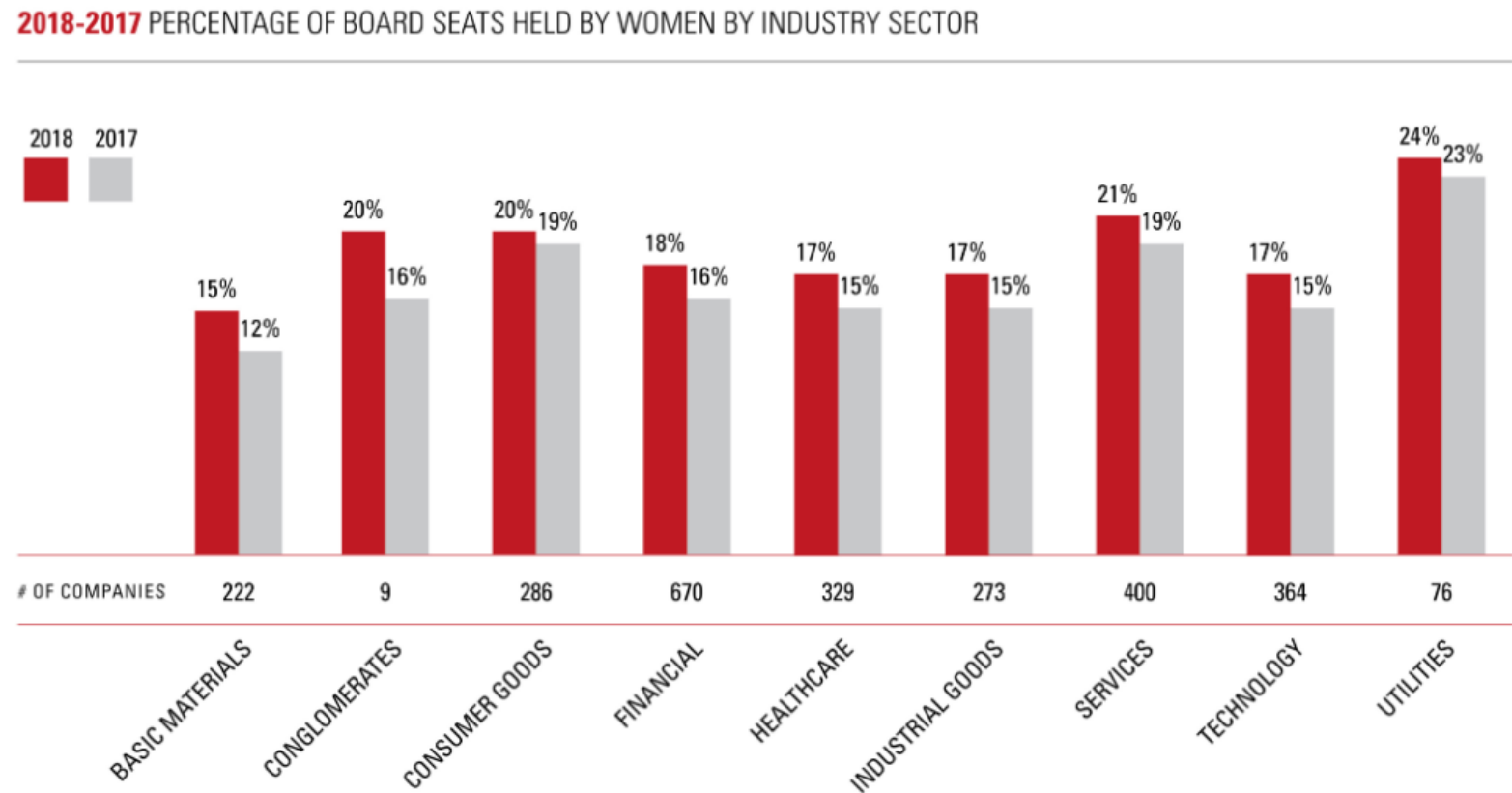
5yr EnterpriseValue@Risk

Human Capital & Gender

S1	Labour shortages affect product development	0.5%
S2	Class action litigations filed; employee morale impacted	2.0%
X1	Long term consumer sentiment impacts reduce product demand and devalues share price	10.1%

Trade war between US & Europe

S1	10% tariff on products	1.1%
S2	20% tariff on products	3.6%
S3	40% tariff on products	7.2%
X1	140% tariff on products	18.7%

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20% by 2020 (Women on Boards – U.S. based campaign)

Breakdown by sector:

2018-2017 PERCENTAGE OF BOARD SEATS HELD BY WOMEN BY INDUSTRY SECTOR

2018   2017

| # OF COMPANIES | 222 | 9 | 286 | 670 | 329 | 273 | 400 | 364 | 76 |

BASIC MATERIALS — 2018: 15%, 2017: 12%
CONGLOMERATES — 2018: 20%, 2017: 16%
CONSUMER GOODS — 2018: 20%, 2017: 19%
FINANCIAL — 2018: 18%, 2017: 16%
HEALTHCARE — 2018: 17%, 2017: 15%
INDUSTRIAL GOODS — 2018: 17%, 2017: 15%
SERVICES — 2018: 21%, 2017: 19%
TECHNOLOGY — 2018: 17%, 2017: 15%
UTILITIES — 2018: 24%, 2017: 23%

Note: Based on the *Russell 3000 Index* for years 2018 and 2017
Yahoo Finance Industry Sectors provided by Equilar.
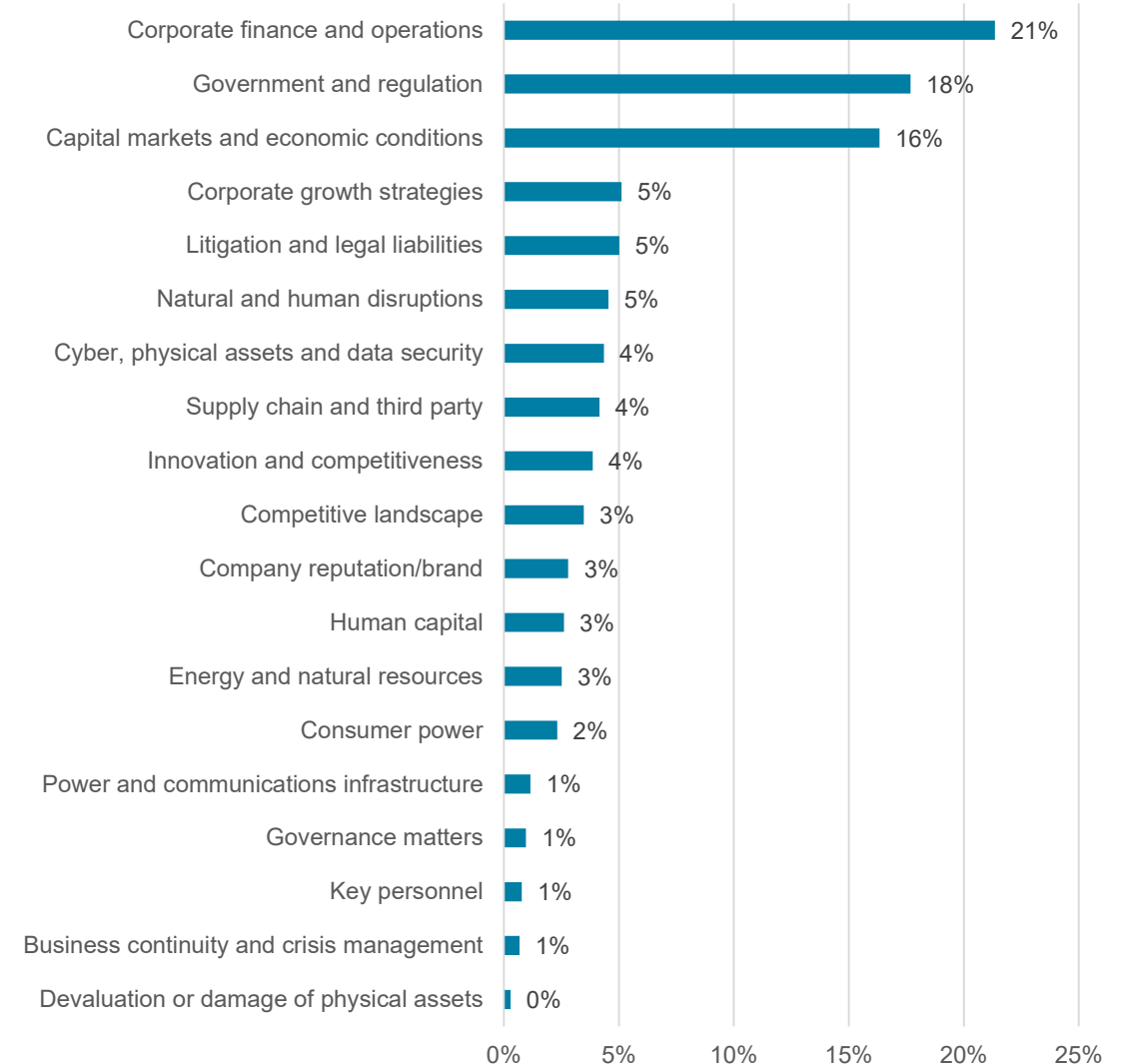
Towards a Taxonomy of Business Risk

- These applications require a structured approach to estimating business loss from widely different causes
    - Objective 1: Identify a data structure describing organizations as a standard input to analysis
    - Objective 2: Model the losses that occur to the organisation from a hypothetical scenario
    - Objective 3: Demonstrate an ability to model the loss on a business from a wide range of different types of threats
- A taxonomy of business risk identifies a representative suite of loss causes for most organisations
    - Review of risk registers from annual reports
    - Historical review of causes of business distress
    - Other literature on business failures

Threats
- External events that potentially inflict damage on the firm. These can be trend threats, such as climate change or technology advancement or shock events like recession, natural catastrophes or cyber attacks.
- Internal threats such as business model failure, fraud, management inertia etc.

Consequences
- Ensuing outcomes of threats, either tangible or intangible.
- Examples include credit downgrade, reputational damage, property damage etc.

Corporate Attributes
- Strategic and executive practices in operation, investment and financing that adds to the firm's vulnerability or resilience against threats.

Key Business Environment Variables
- Macroeconomic parameters that channel and substantiate threats.
- Examples include GDP growth, inflation, unemployment etc.

Key Corporate Impact Metrics
- Encompassing business performance measures, either represented on the financial statements or not.
- Examples include production, sales, share price etc.

Mitigations
- Internal senior decisions that alleviate or reduce the effects of threats via attributes.

Survey of Risk Registers of Public Companies

- Growing trend and regulatory requirements for companies to declare main risks to their shareholders

- Risk registers (self-identified threats to the well-being of an organization) are declared in Annual Reports 10-K 1A and 20-F SEC filings of public companies

- CCRS has analysed the annual reports of **56** public companies so far, and compiled a list of over **1,035** risks that these organisations identify

- Literature review incorporates other similar studies on risks reported in annual reports and 10-Ks

- This exercise reveals wide variation in the risks that companies think pose a threat to their shareholder value

- Companies do not employ a consistent methodology: no accepted standard approach or best practice

- We propose to develop a corporate risk taxonomy to help with this process

Frequency of Risks identified in Annual Reports

Risk	Frequency
Corporate finance and operations	21%
Government and regulation	18%
Capital markets and economic conditions	16%
Corporate growth strategies	5%
Litigation and legal liabilities	5%
Natural and human disruptions	5%
Cyber, physical assets and data security	4%
Supply chain and third party	4%
Innovation and competitiveness	4%
Competitive landscape	3%
Company reputation/brand	3%
Human capital	3%
Energy and natural resources	3%
Consumer power	2%
Power and communications infrastructure	1%
Governance matters	1%
Key personnel	1%
Business continuity and crisis management	1%
Devaluation or damage of physical assets	0%

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Corporate Taxonomy of Risks

- Shock   - Trend

Finance, Economics & Markets

Macroeconomic
- Market crash
  - Asset bubble
  - Financial irregularities
- Sovereign crisis default
- Commodity price fluctuation
- Trade sanctions
- Economic restrictions
- Economic recession
- Tariff war
- Investor sentiment
  - Negative market outlook
- Low carbon economy transition

Competition
- Disruptive competitor
- Aggressive competitor
  - Price war
- Counterfeit products

Consumer Power
- Shift in consumer preference/demand

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Geopolitical Violence

National Violence
- Civil conflict & separatism
- Assassination
- Terrorism

International Conflict
- Interstate Conflict
  - Conventional
  - Asymmetric

Technological

Cyber Attack
- Data exfiltration
  - Intellectual property loss
- Contagious malware
- (Others)

Infrastructure/System Failure
- Satellite system failure
- Solar storm
- Power outage
- Network disruption

Industrial Accident
- Fire
- Explosion
- Nuclear
- Pollution

Artificial Intelligence (AI)
- Technological advancement
- Technological accident

Environmental

Natural Catastrophe & Climate
- Earthquake
- Tsunami
- Volcanic eruption
- Tropical cyclone
- Temperate windstorm
- Tornado
- Electrical storm
- Hail
- Flood
- Freeze
- Drought
- Heatwave
- Wildfire
- Astronomical impact event
- Climate change
- Sea level rise

Infectious Disease
- Plant epidemic
- Animal epidemic
- Human epidemic/pandemic
  - Zoonosis

Natural resources
- Resource deficiency
  - Raw materials
  - Fossil fuels

Social & Political

Human Capital
- Labour disputes & strikes
- Labour shortages
- Ageing population

Political & Criminal
- Political shock
  - (Brexit)
  - Sudden leadership change
- Nationalism
- Political corruption
- Cartel pressure
- Organised crime

Humanitarian
- Famine
- Refugee crisis
- Welfare system failure

Governance

Regulation & Legislation
- Tightening monetary/fiscal policy
  - Tax
- Revised accounting standards
- Non-compliance
  - Worker health & safety
  - Internal corruption
- Licence revocation

Contingent liabilities
- Consumer/shareholder class actions

Strategic
- Hostile takeover
- Counterparty failure
  - Customer/client
  - Creditor
  - Government
  - Supplier
- Failure of:
  - Mergers & acquisitions
  - Divestitures
  - Restructuring
  - Joint ventures
- Asymmetric board
  - Rogue CEO

Products & Services
- Defect/failure
- Innovation (R&D) failure

HR & PR
- Loss of key personnel
- Failure to attract talent
- Gender & diversity
- Negative media coverage

Only 24 Female CEOs At Fortune 500 Companies

Female CEOs of Fortune 500 companies by rank in March 2018

Rank	CEO		Revenue
8	Mary Barra	GENERAL MOTORS	$157.3bn
29	Gail Boudreaux	Anthem	$90.0bn
32	Ginni Rometty	IBM	$79.1bn
44	Indra Nooyi	PEPSICO	$63.5bn
56	Marillyn Hewson	LOCKHEED MARTIN	$51.1bn
81	Safra Catz	ORACLE	$37.7bn
90	Phebe Novakovic	GENERAL DYNAMICS	$31.0bn
120	Tricia Griffith	PROGRESSIVE	$26.8bn
121	Lynn Good	DUKE ENERGY	$23.2bn
150	Michelle Gass	KOHL'S	$19.1bn
157	Geisha Williams	PG&E Corporation	$17.1bn
219	Barbara Rentler	ROSS DRESS FOR LESS	$14.1bn
185	Margaret Keane	synchrony FINANCIAL	$13.5bn
278	Vicki Hollub	OXY	$13.2bn
246	Anna Manning	RGA	$12.5bn
218	Deanna Mulligan	GUARDIAN	$10.7bn
296	Kathryn Marinello	Hertz	$8.8bn
331	Mary Laschinger	Veritiv	$8.3bn
369	Michele Buck	HERSHEY	$7.5bn
479	Beth Mooney	KeyCorp	$6.9bn
399	Joey Wat	YumChina	$6.8bn
420	Kathy Mazzarella	GraybaR	$6.6bn
419	Patricia Poppe	CMS ENERGY	$6.6bn

statista

https://www.statista.com/chart/13995/female-ceos-in-fortune-500-companies/ STATISTA CHARTS:

SOURCE: FORTUNE

Risk Drivers for Creditworthiness by Profession