企業風險管理趨勢

威脅與機會並存的新思維

Presented by Terence Lin 林高輝
Aon Benfield

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- **林高輝 Terence Lin**
  - 專長:
    - 風險辨識與量化、風險模型、風險管理資訊系統、專案風險管理 、企業風險管理、再保險實務
  - 簡歷:
    - Aon Benfield – Head of Hong Kong, Macau and Taiwan Reinsurance
    - Aon Benfield 合約再保險協理 與 天災/非天災風險分析人員
    - 怡安風險管理顧問公司– 企業風險管理顧問經理
    - 遠東航空總經理室法保組主任

2004 年加入 Aon 集團，Terence 目前為 Aon Benfield 台灣團隊及香港澳門團隊的主管，其在保險及風險管理相關的服務經驗迄今達 20 年。

Terence 早年為飛機工程師，曾編譯飛機維修技術手冊，與負責「引擎故障前預警診斷」等工作。投入保險及風險管理領域後，對於 (再)保險、風險督導、風險模型與量化分析、風險管理諮詢、最佳風險對策等皆有涉獵。

註:

Aon 集團為全球頂尖的保險經紀與風險顧問集團。依富比世雜誌 2017 年全球二千大企業排名，Aon 名列第 444 位。

Aon Benfield 為 Aon 集團轄下專門提供「再保險相關諮詢服務」之事業部門，擁有超過 3,200 名專業人員，其中 500 餘位為風險精算與天災分析專家，為全球最大的再保險經紀與風險顧問公司。

我們生活在一個美好的科學年代，
但我們仍面臨著眾所周知的問題 – 難以預料的未來

預測是件非常困難的事，尤其是關乎未來的預測

Prediction is very difficult, especially if it's about the future.

- Niels Bohr

註: 尼爾斯·波耳
丹麥物理學家。以「對原子結構以及從電子能量階層的輻射研究」榮獲 1922 年諾貝爾物理獎。波耳建構了原子的波耳模型，該理論並成為古典量子力學的基礎。他在哲學方面也頗有建樹。

大綱

- 風險的定義 – 威脅與機會
- 企業風險管理 – 昨日與今日
- 由全球企業風險管理調查窺探未來趨勢
- 大數據 與 對風險管理的衝擊
- 新應用之案例 – 市場對於快速、透明、及整合性精算平台的需求

什麼是“風險”?

What is definition of “Risk”?

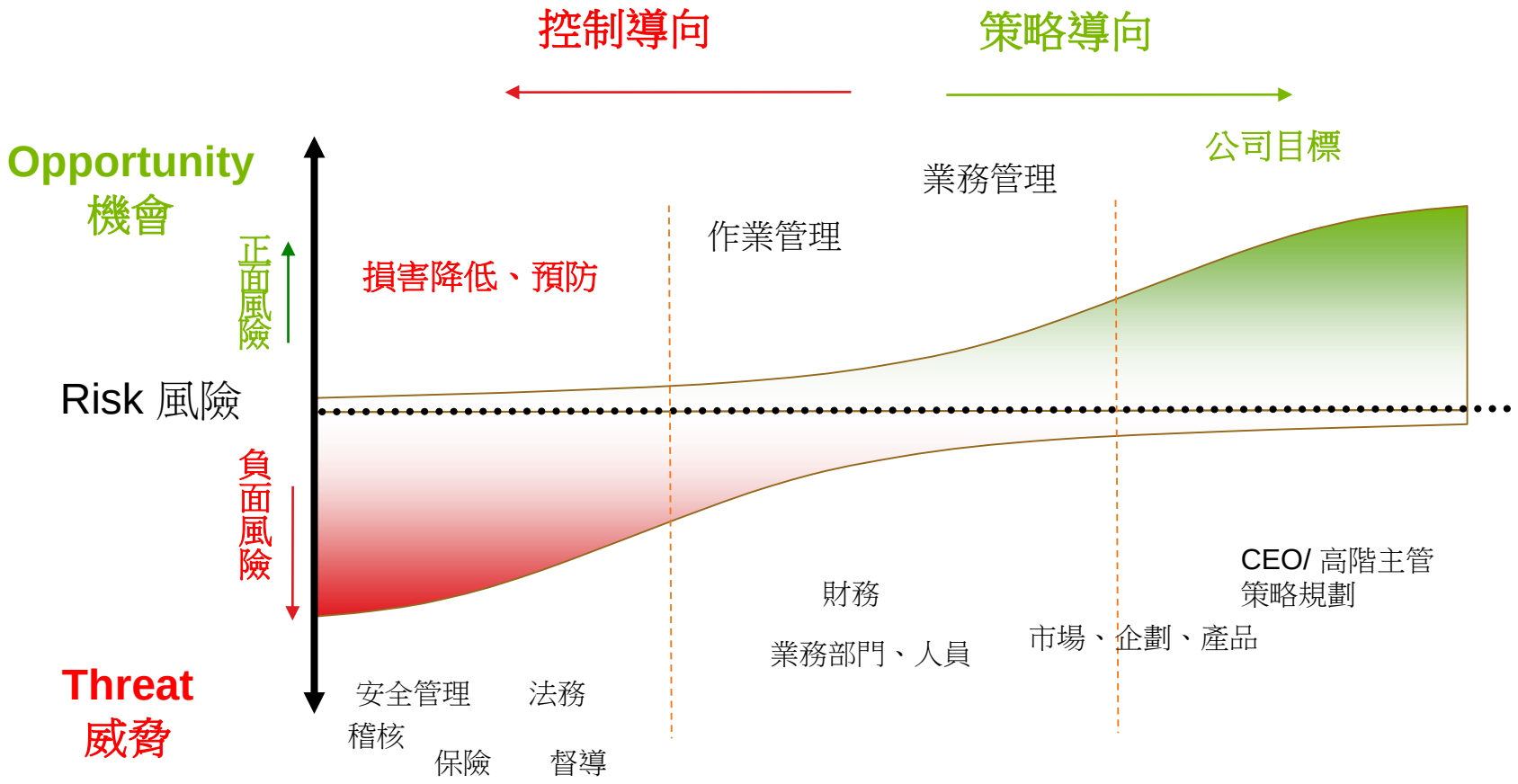
風險 =
Risk

潛在損失？
Potential Losses

vs

不確定性？
Uncertainty

“風險管理”的定義 – 不只避害，更要興利



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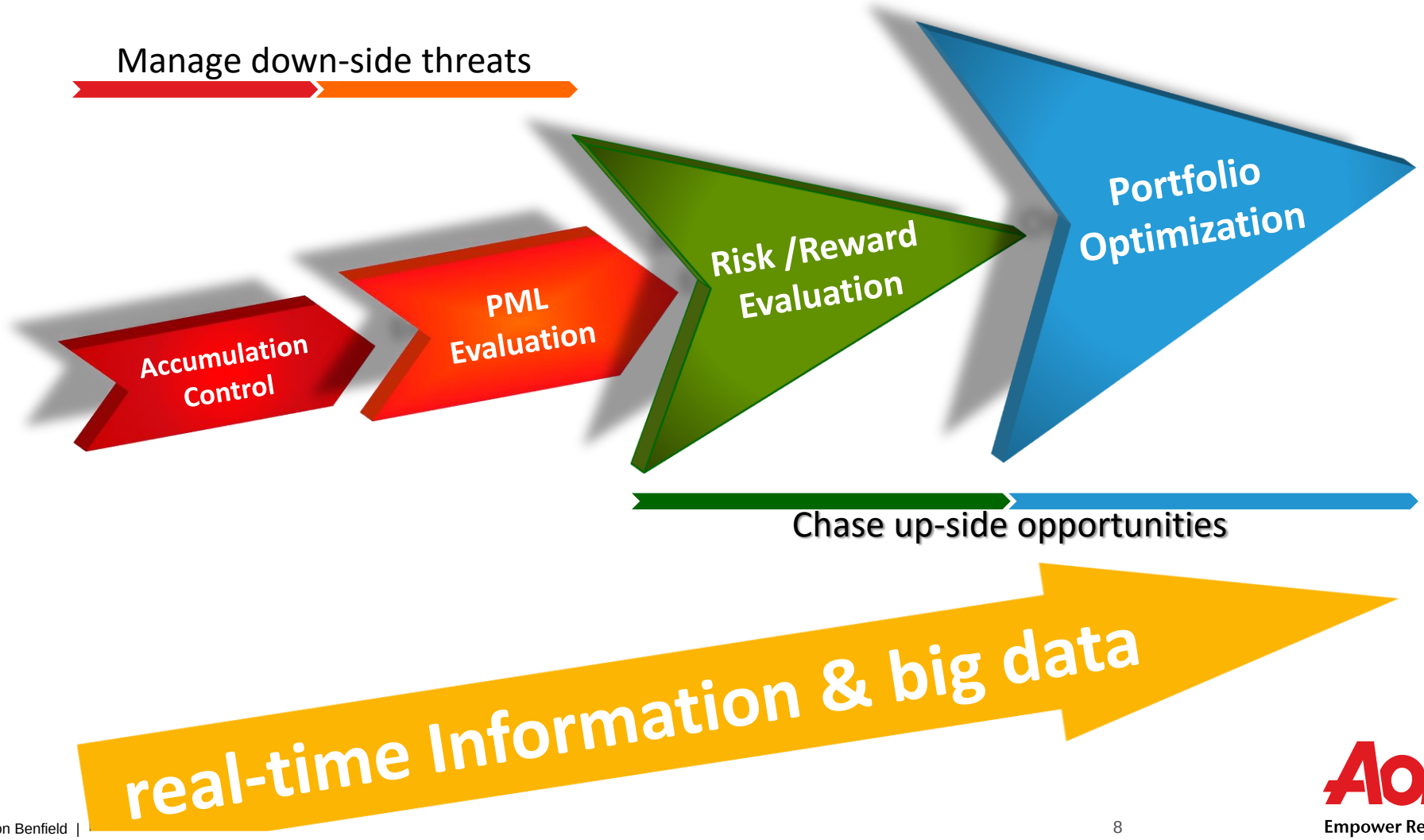
“趨勢” 是利用大數據來創造 “正面風險”



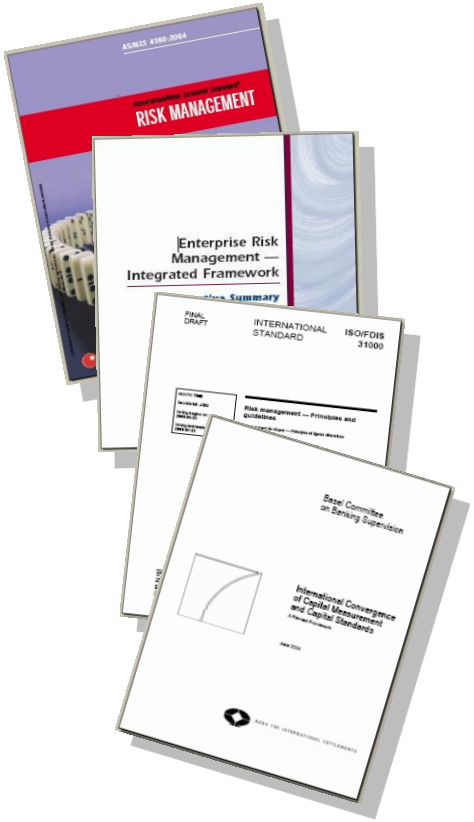
Past and Present

企業風險管理 – 昨日與今日

企業風險管理 準則 與 法規

越來越精細的風險量化要求，數據的衝擊!!

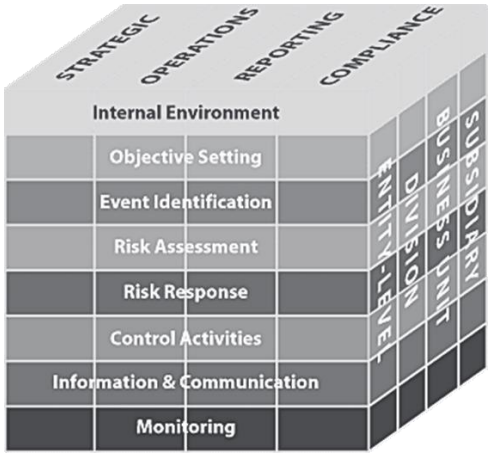
- 1999:
  - AS/NZS 4360 “Standards for “Risk Management” was announced
- 2004:
  - COSO published ERM integrated Framework
- 2005:
  - S&P issued Insurance Criteria: Evaluating the ERM practice of insurance companies
- 2006:
  - Basel II for banks
- 2010:
  - ISO 31000: Risk management — Principles and guidelines
- 2016:
  - Solvency II for insurance industries (Europe)
- 201?:
  - Rules of Risk Management for insurance industries (Taiwan)
  - and, Solvency II / RBC II (Taiwan)…….. 20XX?
  - and, IFRS 17 (Taiwan)……..20XX?



雋永的企業風險管理 ERM 定義

Enterprise-wide Risk Management (ERM):

Enterprise risk management ***is a process****,* ***effected by an entity's board of directors****, management and other personnel,* ***applied in strategy setting*** *and* ***across the enterprise****, designed to identify potential events that may affect the entity, and manage risk to be* ***within its risk appetite****, to* ***provide reasonable assurance*** *regarding the* ***achievement of entity objectives****.*



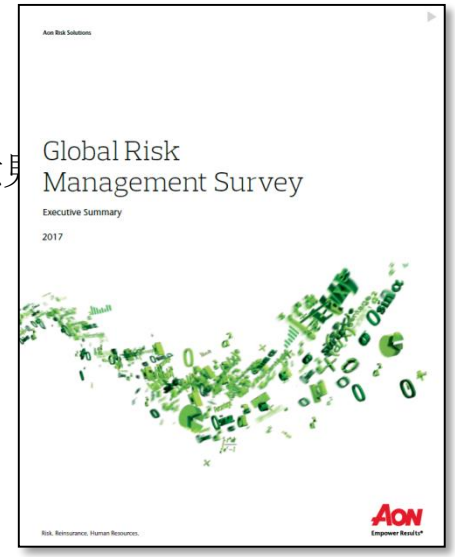
- COSO ERM Integrated Framework, 2004

由 Aon 全球風險管理調查，窺探風險管理現況 與 趨勢

ERM Trends Revealed by Aon’s Global Risk Management Survey

Aon Risk Services 2017 全球風險管理調查

- Aon Risk Services 全球風險管理調查報告:
  - 每兩年發刊乙次，2017 調查報告於2016年 第四季以11種語言發行
  - 蒐羅全球60個國家、33類產業 ，大、中、小型公司共1,843 位風險決策人員之意見
  - 由調查結果可以洞察各地域和各行業風險管理之觀念與做法



Industry	Percent
Agribusiness	3%
Aviation	1%
Banks	3%
Beverages	1%
Chemicals	4%
Conglomerate	2%
Construction	8%
Consumer Goods Manufacturing	4%
Education	2%
Energy (Oil, Gas, Mining, Natural Resources)	4%
Food Processing and Distribution	3%
Government	3%
Health Care	5%
Hotels and Hospitality	1%
Insurance, Investment and Finance	7%
Life Sciences	1%
Lumber, Furniture, Paper and Packaging	2%

Role	Percent
Chief Administration Officer	6%
Chief Counsel/Head of Legal	3%
Chief Executive	3%
Chief Financial Officer	12%
Chief Operations Officer	1%
Chief Risk Officer	7%
Company Secretary	1%
Finance Manager	7%
General Business Manager	2%
Head of Human Resources	2%
Managing Director/Partner	3%
Member of the Board of Directors	1%
President	1%
Risk Consultant	2%
Risk Manager or Insurance Manager	29%
Treasurer	3%
Other	18%

Aon Risk Services 2017 全球風險管理調查前 55 大風險

1 Damage to reputation/brand	2 Economic slowdown/slow recovery	3 Increasing competition	4 Regulatory/ legislative changes	5 Cyber crime/ hacking/viruses/ malicious codes	6 Failure to innovate/meet customer needs	7 Failure to attract or retain top talent	8 Business interruption
9 Political risk/ uncertainties	10 Third party liability	11 Commodity price risk	12 Cash flow/ liquidity risk	13 Property damage	14 Directors & Officers personal liability	15 Major project failure	16 Exchange rate fluctuation
17 Corporate social responsibility/ sustainability	18 Technology failure/ system failure	19 Distribution or supply chain failure	20 Disruptive technologies/ innovation	21 Capital availability/credit risk	22 Counter party credit risk	23 Growing burden and consequences of corporate governance/ compliance	24 Weather/natural disasters
25 Failure to implement or communicate strategy	26 Merger/acquisition/ restructuring	27 Injury to workers	28 Failure of disaster recovery plan/ business continuity plan	29 Loss of intellectual property/data	30 Workforce shortage	31 Environmental risk	32 Crime/theft/fraud/ employee dishonesty
33 Lack of technology infrastructure to support business needs	34 Inadequate succession planning	35 Product recall	36 Concentration Risk (product, people, geography)	37 Aging workforce and related health issues	38 Accelerated rates of change in market factors and geopolitical risk environment	39 Interest rate fluctuation	40 Globalization/ emerging markets
41 Unethical behavior	42 Outsourcing	43 Resource allocation	44 Terrorism/ sabotage	45 Climate change	46 Asset value volatility	47 Natural resource scarcity/ availability of raw materials	48 Absenteeism
49 Social media	50 Sovereign debt	51 Pandemic risk/ health crises	52 Share price volatility	53 Pension scheme funding	54 Harassment/ discrimination	55 Kidnap and ransom/ extortion	

Insurable	Partially Insurable	Uninsurable

Risk. Reinsurance. Human Resources.

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前十大風險趨勢 – 策略導向的風險 以及 數位科技風險 越來越受重視

	2017	2015	2013	2011	2009	2007
1	Damage to reputation/ brand	Damage to reputation/ brand	Economic slowdown/ slow recovery	Economic slowdown	Economic slowdown	Damage to reputation/ brand
2	Economic slowdown/ slow recovery	Economic slowdown/ slow recovery	Regulatory/ legislative changes	Regulatory /legislative changes	Regulatory/ legislative changes	Business interruption
3	Increasing competition	Regulatory/ legislative changes	Increasing competition	Increasing competition	Business interruption	Third-party liability
4	Regulatory/ legislative changes	Increasing competition	Damage to reputation/ brand	Damage to reputation/ brand	Increasing competition	Distribution or supply chain failure
5	Cyber crime/hacking/ viruses/malicious codes	Failure to attract or retain top talent	Failure to attract or retain top talent	Business interruption	Commodity price risk	Market environment
6	Failure to innovate/ meet customer needs	Failure to innovate/meet customer needs	Failure to innovate/ meet customer needs	Failure to innovate/ meet customer needs	Damage to reputation/ brand	Regulatory/ legislative changes
7	Failure to attract or retain top talent	Business interruption	Business interruption	Failure to attract or retain top talent	Cash flow/liquidity risk	Failure to attract or retain staff
8	Business interruption	Third-party liability	Commodity price risk	Commodity price risk	Distribution or supply chain failure	Market risk (financial)
9	Political risk/ uncertainties	Computer crime/ hacking/viruses/ malicious codes	Cash flow/liquidity risk	Technology failure/ system failure	Third-party liability	Physical damage
10	Third party liability (including E&O)	Property damage	Political risk/ uncertainties	Cash flow/liquidity risk	Failure to attract or retain top talent	Merger/acquisition/ restructuring Failure of disaster recovery plan

前十大風險趨勢 – 傳統控制導向的風險排名日趨下降

	2017	2015	2013	2011	2009	2007
1	Damage to reputation/ brand	Damage to reputation/ brand	Economic slowdown/ slow recovery	Economic slowdown	Economic slowdown	Damage to reputation/ brand
2	Economic slowdown/ slow recovery	Economic slowdown/ slow recovery	Regulatory/ legislative changes	Regulatory /legislative changes	Regulatory/ legislative changes	Business interruption
3	Increasing competition	Regulatory/ legislative changes	Increasing competition	Increasing competition	Business interruption	Third-party liability
4	Regulatory/ legislative changes	Increasing competition	Damage to reputation/ brand	Damage to reputation/ brand	Increasing competition	Distribution or supply chain failure
5	Cyber crime/hacking/ viruses/malicious codes	Failure to attract or retain top talent	Failure to attract or retain top talent	Business interruption	Commodity price risk	Market environment
6	Failure to innovate/ meet customer needs	Failure to innovate/meet customer needs	Failure to innovate/ meet customer needs	Failure to innovate/ meet customer needs	Damage to reputation/ brand	Regulatory/ legislative changes
7	Failure to attract or retain top talent	Business interruption	Business interruption	Failure to attract or retain top talent	Cash flow/liquidity risk	Failure to attract or retain staff
8	Business interruption	Third-party liability	Commodity price risk	Commodity price risk	Distribution or supply chain failure	Market risk (financial)
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10	Third party liability (including E&O)	Property damage	Political risk/ uncertainties	Cash flow/liquidity risk	Failure to attract or retain top talent	Merger/acquisition/ restructuring Failure of disaster recovery plan

按地區探討 – 對於某些風險類別，全球一致重視

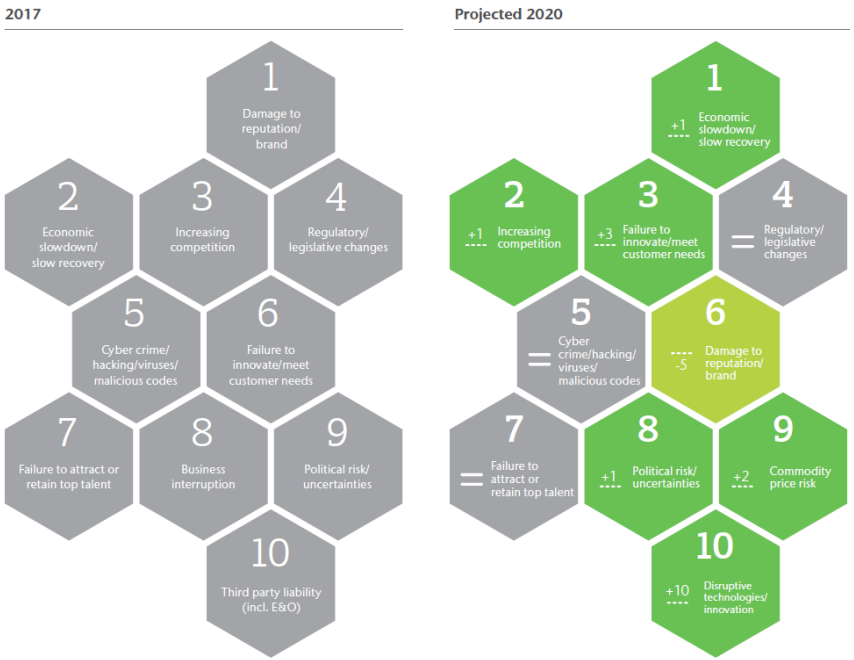
	Asia Pacific	Europe	Latin America	Middle East & Africa	North America
1	Damage to reputation/brand	Economic slowdown/ slow recovery	Damage to reputation/brand	Economic slowdown/ slow recovery	Cyber Crime/hacking/viruses/ malicious codes
2	Regulatory/legislative changes	Damage to reputation/brand	Business interruption	Political risk/undertainties	Damage to reputation/brand
3	Increasing competition	Increasing competition	Economic slowdown/ slow recovery	Failure to innovate/meet customer needs	Failure to attract or retain top talent
4	Failure to innovate/meet customer needs	Regulatory/legislative changes	Third party liability (including E&O)	Failure to attract or retain top talent	Regulatory/legislative changes
5	Economic slowdown/ slow recovery	Failure to innovate/ meet customer needs	Social responsbility/ sustainability	Damage to reputation/brand	Economic slowdown/ slow recovery
6	Business interruption	Cyber crime/hacking/viruses/ malicious codes	Political risk/undertainties	Regulatory/legislative changes	Failure to innovate/meet customer needs
7	Cyber crime/hacking/viruses/ malicious codes	Commodity price risk	Regulatory/legislative changes	Increasing competition	Increasing competition
8	Failure to attract or retain top talent	Counter party credit risk	Exchange rate fluctuation	Cyber crime/hacking/viruses/ malicious codes	Business interruption
9	Major project failure	Business interruption	Environmental risk	Exchange rate fluctuation	Weather/natural disasters
10	Political risk/undertainties	Directors & Officers personal liability	Cash flow/liquidity risk	Directors & Officers personal liability	Property damage

按地區探討 - 某些風險具有地域特性

	Asia Pacific	Europe	Latin America	Middle East & Africa	North America
1	Damage to reputation/brand	Economic slowdown/ slow recovery	Damage to reputation/brand	Economic slowdown/ slow recovery	Cyber Crime/hacking/viruses/ malicious codes
2	Regulatory/legislative changes	Damage to reputation/brand	Business interruption	Political risk/undertainties	Damage to reputation/brand
3	Increasing competition	Increasing competition	Economic slowdown/ slow recovery	Failure to innovate/meet customer needs	Failure to attract or retain top talent
4	Failure to innovate/meet customer needs	Regulatory/legislative changes	Third party liability (including E&O)	Failure to attract or retain top talent	Regulatory/legislative changes
5	Economic slowdown/ slow recovery	Failure to innovate/ meet customer needs	Social responsbility/ sustainability	Damage to reputation/brand	Economic slowdown/ slow recovery
6	Business interruption	Cyber crime/hacking/viruses/ malicious codes	Political risk/undertainties	Regulatory/legislative changes	Failure to innovate/meet customer needs
7	Cyber crime/hacking/viruses/ malicious codes	Commodity price risk	Regulatory/legislative changes	Increasing competition	Increasing competition
8	Failure to attract or retain top talent	Counter party credit risk	Exchange rate fluctuation	Cyber crime/hacking/viruses/ malicious codes	Business interruption
9	Major project failure	Business interruption	Environmental risk	Exchange rate fluctuation	Weather/natural disasters
10	Political risk/undertainties	Directors & Officers personal liability	Cash flow/liquidity risk	Directors & Officers personal liability	Property damage

按產業探討 – Insurance, Investment, and Finance

Key Risk 1	Key Risk 2	Key Risk 3
Top 3 risks in 2017		
Damage to reputation/brand	Regulatory/legislative changes	Cyber crime/hacking/viruses/malicious codes
Top 3 risks in the next 3 years		
Failure to innovate/meet customer needs	Regulatory/legislative changes	Cyber crime/hacking/viruses/malicious codes



FinTech 與 InsurTech 帶來的風險與挑戰

Driving the growth of FinTech / InsurTech

按產業探討 – Insurance, Investment, and Finance

InsurTechs are adopting new, innovative technology faster especially within Pricing & Underwriting

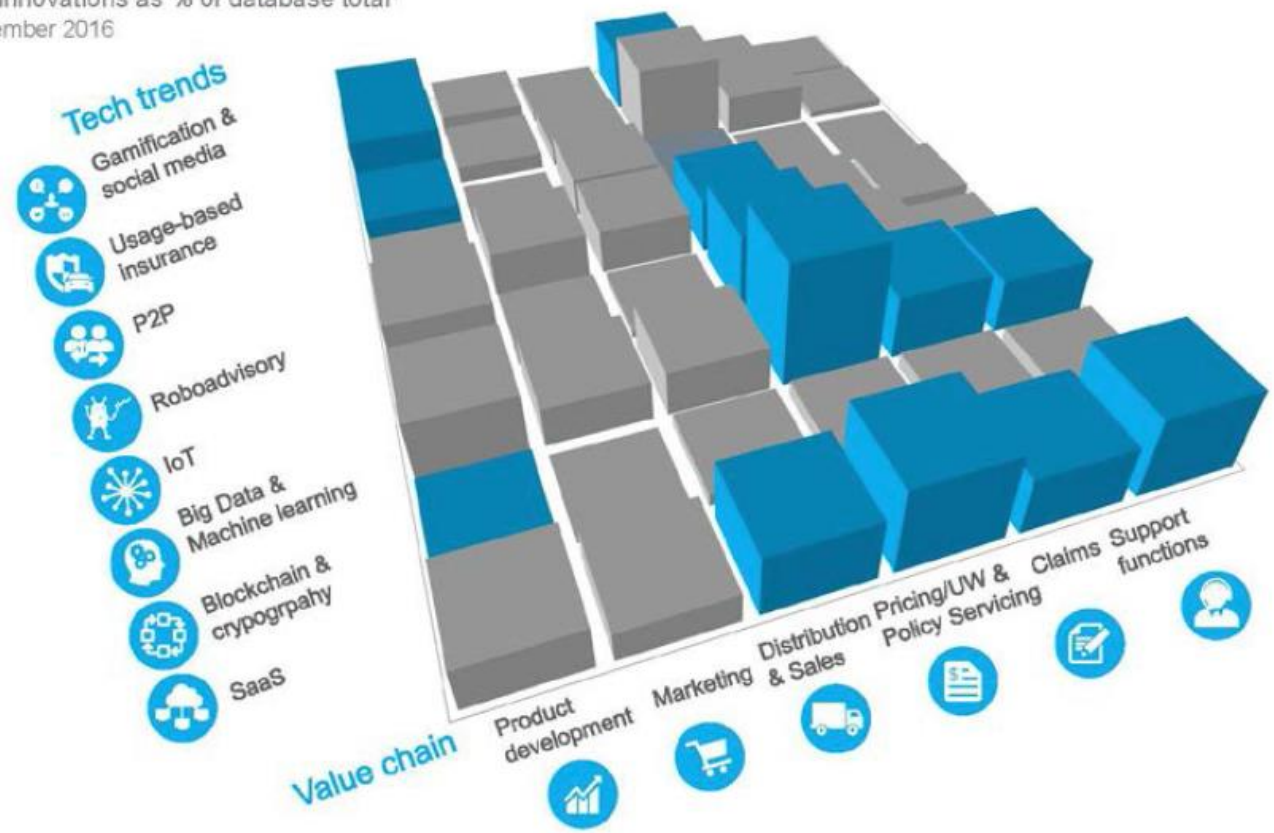
Share of innovation in McKinsey InsurTech database

PRELIMINARY ESTIMATES

<3%
3%-6%
>6%

Insurtech technology innovations

of innovations as % of database total[1]
November 2016



1 ~500 commercially most well-known cases registered in the database (excluding wealth management related innovations)

SOURCE: McKinsey Panorama InsurTech database

大數據 與 對風險管理的衝擊

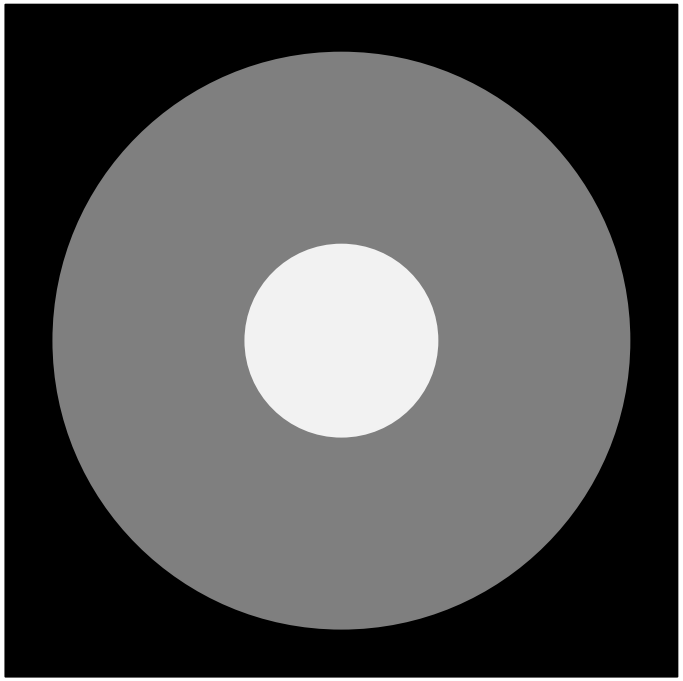
Big Data and its impact to Risk Management

越來越多的數據如何衝擊 風險移轉策略 與 保險？

Unknown, ignorance, no insurance

Partial knowledge, uncertainty, risk, insurance

Complete knowledge, certainty, managed, retained



Incomplete understanding creates insurance markets

部分 (不完全) 的理解創造了保險市場

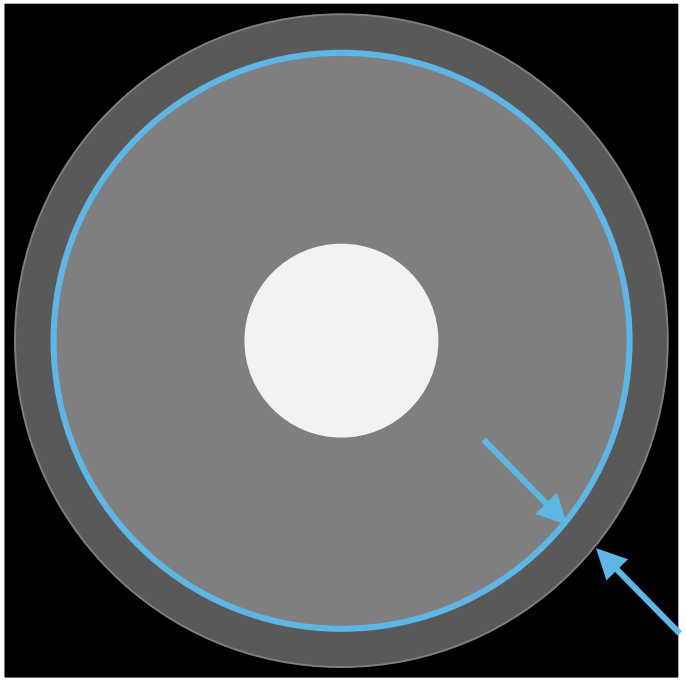
- Ignorance and certain knowledge generally rule out insurance

  “無知” 和 “確知”

  一般而言摒除了保險的適用性

越來越多的數據如何衝擊 風險移轉策略 與 保險？ - 更多觀測值

Insurance gain from decreased ignorance



更多的觀測，可以將不可保風險變成可保風險

More observations can transform un-insurable risks to insurable

更多的觀測可以將不可保風險變成可保風險

- Risk measured by risk owners
  風險由風險持有者度量
- Measurement begets management
  “度量”引致”管理”
- Risk more quantifiable for insurers
  更能讓保險公司量化風險

✓ Property cat. 財產巨災
✓ Cyber 網路風險
✓ Business interruption 營業中斷
✓ Terrorism 恐怖主義
✓ Giga liability 鉅額責任
✓ Brand 品牌

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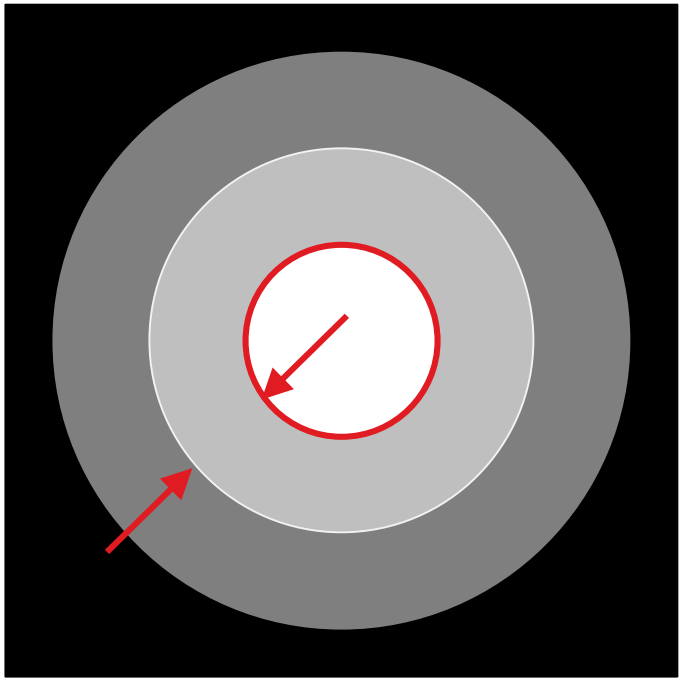
越來越多的數據如何衝擊 風險移轉策略 與 保險？ 更多觀測參數

Insurance loss from greater certainty



更多可用參數，能降低對傳統保險的依賴

- More parameters may reduce the use of traditional insurance in the long run
  長遠來看，更多可用參數, 能降低對傳統保險的依賴
- More granular underwriting
  更精細的核保
- Less risk sharing
  較少的風險分出
- Affordability and availability issues
  承擔能力和可及性問題

✓ Genomics in health insurance
基因學在健康保險的應用

✓ Vitality Program in health insurance
保險公司結合健康產業合作夥伴在健康保險的應用

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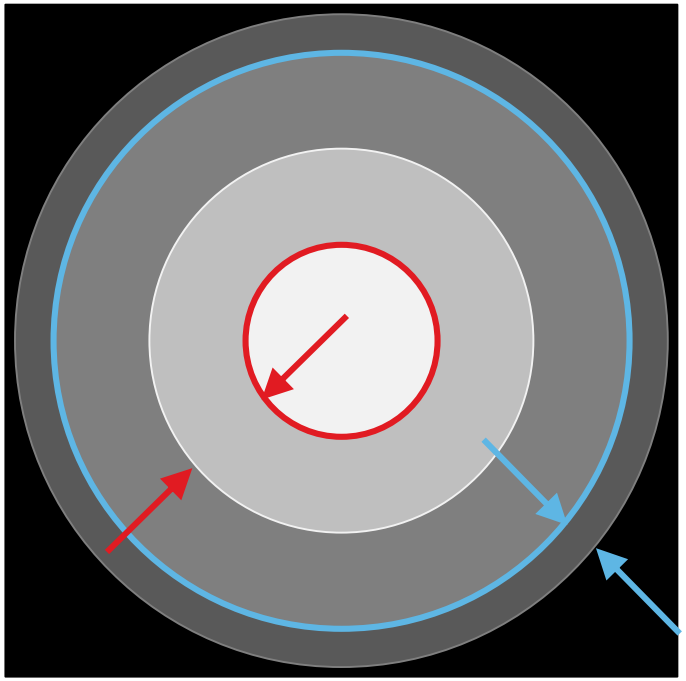
越來越多的數據如何衝擊 風險移轉策略 與 保險？

Indeterminate net growth effect



- Net growth impact on risk-transfer insurance indeterminate
  淨增長 對 風險轉移型保險的影響不定
- Different data models apply in different markets
  不同的數據模型適用於不同的市場
- **Disruption is certain**
  擾亂一池春水卻是肯定的

大數據將對 "企業風險移轉策略" 的思維帶來變革

新應用之案例

– 市場對於快速、透明、及整合性精算平台的需求

- PathWise – 對沖、定價、準備金和資本適足性計算平台

全球監管動態

加拿大
監管機構對公司內部控制及合
槼上的要求繼續增強，ORSA
實施中
歐洲
Solvency II 實施中，很多公司
依然面臨挑戰。公司內部模型
批准和資本優化是重點
亞洲
對保險公司償付能力、資本
及風險管理的監管已到了最
重要的決定期
美國
在衆多的繁雜的監管中，PBR
是很多公司關注的重點
全球
IFRS 9，IFRS 17即將啓動

主要挑戰

對大數據量運算的管理

監管的增加帶來了運算量的急速增加，很多公司缺少有效的數據管理機制

運算時間上的限制

如何在短時間內完成監管要求的計算

模型管理和核准

很多企業不能有效地管理衆多的模型，造成核准上的困難

公司層面管理

新的監管要求如ORSA要求有公司層面的整合和總體的風險管理系統

The PathWise™ Story

透明度

No more black box models

PathWise™裡的所有計算都是透明公開的。

大數據解決方案

No more Data Safaris

PathWise™的數據庫提供格式優化，儲存和高速計算。可以支持超過一億張保單的運算。

程序，模組，報表和自動化

管控

An Integrated Solution

PathWise™具備版本控管和審計監控的功能。

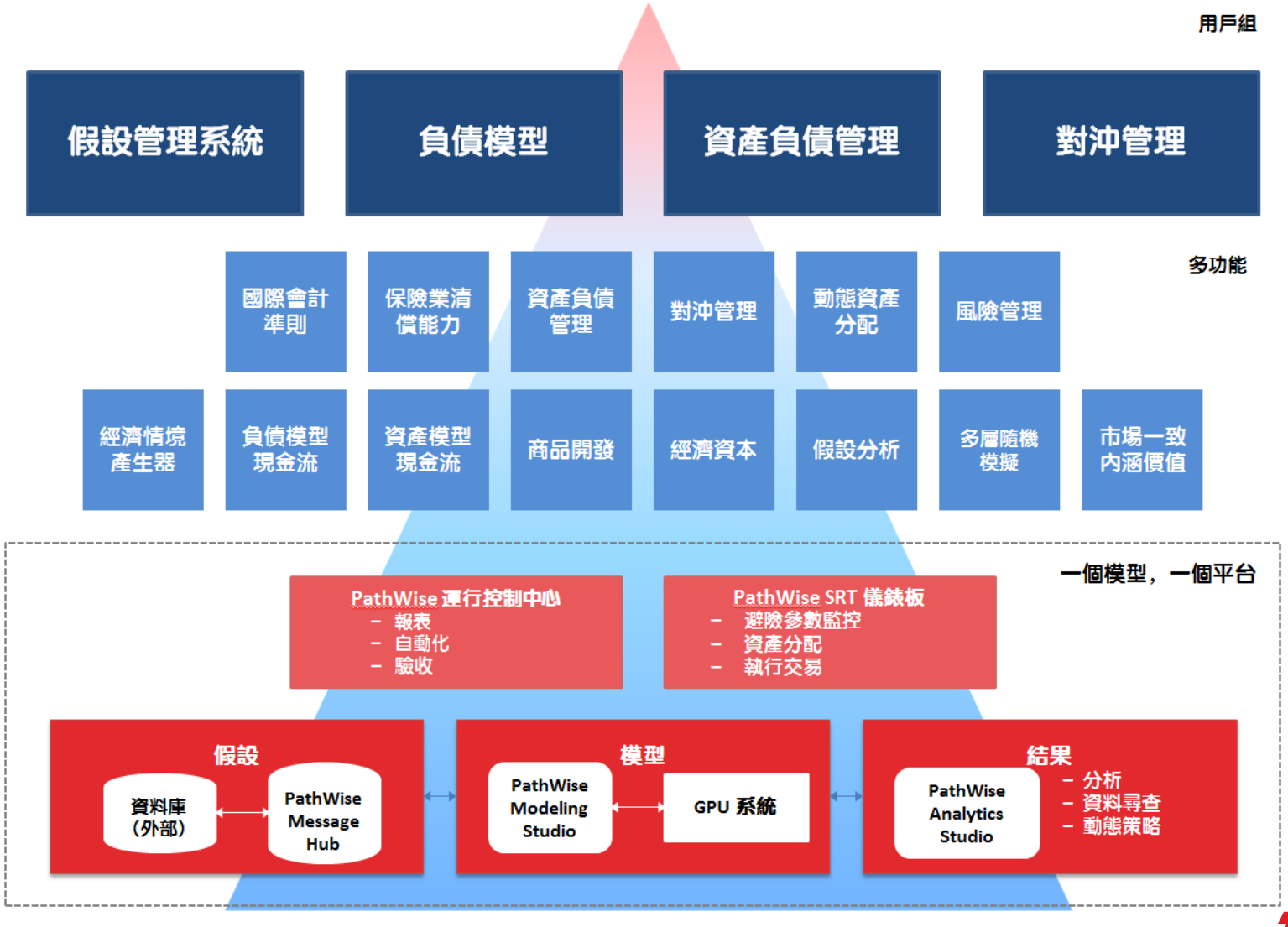
靈活性

An Adaptable Solution

產品，法規和財務報告要求始終在變化，軟體的靈活性至關重要。

PathWise™ - 軟體總體架構

“一個模型，一個平台”是貫穿整個開發項目的核心理念



IFRS17 作業支援

自動化 – 資料管理

PathWise Offer Full Platform for IFRS Management

IT 系統
- 從IT資料庫讀取新的保單資料
- 將其資料傳送到檔案傳輸資料夾

檔案傳輸資料夾
- 確認檔案格式
- 觸發 ETL 程序

ETL 腳本
- 執行轉檔程序
- 將數據轉換為Python數據格式
- 上傳數據到Message Hub

Message Hub
- 儲存到Message Hub的資料可以被任何其他PathWise的應用程式讀取

自動化 – 生成報表

Message Hub
- 假設和市場數據的數據庫

Job Scheduler
- 自動檢測所有文件是否準備就緒
- 運行模型和報表程序

GPU 伺服器
- 將PWMS轉換為GPU代碼
- 在GPU服務器中執行計算

報表
- 責任準備金，國際會計準則現金流，資本適足率計算
- 商品利潤測試

市場趨勢

亞洲市場監管趨勢.

IFRS 17 已經正式發佈，將于2021年起實施。IFRS 17要求按情景折扣率計算相關現金流。這將影響到負債的計算，及ALM等相關項目。 Solvency II要求用市場無風險折扣率計算。內部模型是滿足不同監管的最佳方案。

資本

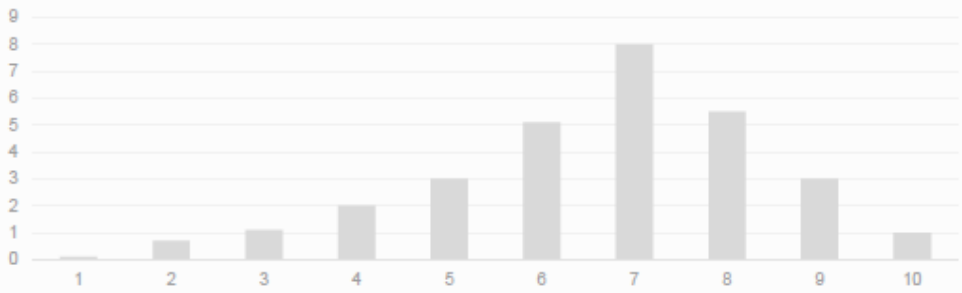
內部模型提供公司最準確的風險指標。另外還有可能減少公司準備金和資本的數額。

資產分配

決策資產分配需要通過情景模擬來測試不同的策略。

風險評估

風險指標如VaR、CTE更適合來評估公司的真實風險。



統計分析往往是從了解數據的基本特徵開始的描述數據分佈特徵的統計量可分為兩類：一類表示數量的中心位置，另一類表示數量的變異程度（或稱離散程度）兩者相互補充，共同反映數據的全貌。分佈分析將提供有關數值變量分佈的信息該分析中可使用諸如直方圖，概率圖和分位數 – 分位數圖等各種圖。

PathWise™ – 全球領先的經驗

- 全球第一IFRS 17採用: 韓國第三大壽險公司 Kyobo 使用 PathWise 以應對 IFRS17。 PathWise 被公司各部所利用，包括大數據處理、假設管理、債務管理、資產債務管理、風險對沖。

- 我們的經驗還包括以下的全球排名前端的公司:

KYOBO 교보생명

MetLife®

Sun Life Financial

AIG

Standard Life

“Risk is the only real key to outrageous success ”

風險是達成重大成功真正唯一的的關鍵

Jack Welsh
Former Chairman & CEO, GE

Questions