

Insurer's Capital Management using Reinsurance: Regulatory Issue and Suggestion



January 18, 2019



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Change in Regulatory Environment and Demand for Use of Reinsurance

Change in Regulatory Environment and Demand for Use of Reinsurance

Korea to introduce prudential regulation based on mark-to-market accounting standards for insurance liabilities

- IFRS 17 to be introduced from 2022
- New RBC standards (K-ICS) to be introduced from 2022

Liabilities to increase due to low interest rate environment and introduction of mark-to-market accounting for insurance liabilities



Decrease in Capital and Solvency Margin Ratio

Insurer is in need of efficient risk management by proper use of reinsurance

- Traditional reinsurance, coinsurance and finite reinsurance etc.

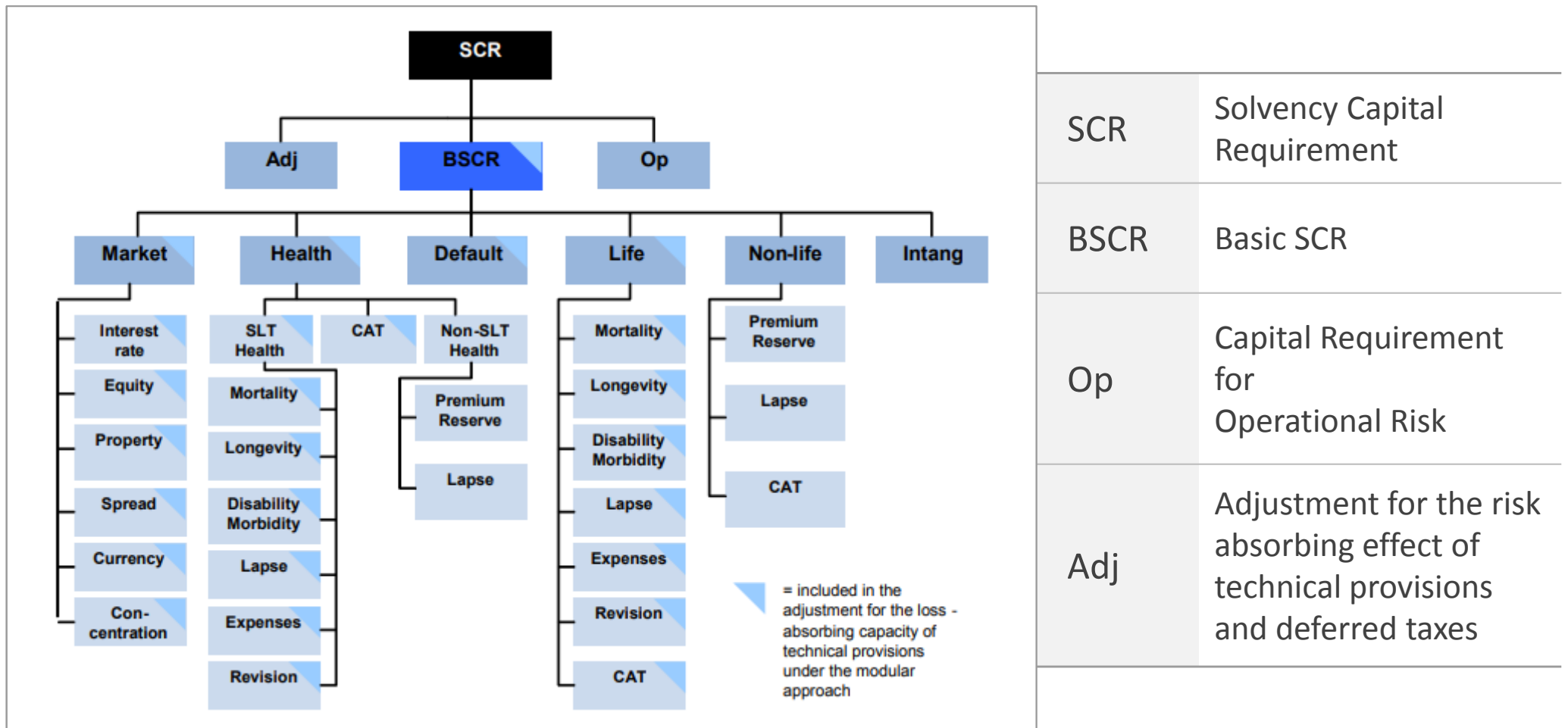
Access to wide range of reinsurance by Korean insurers has been limited compared to other jurisdictions

- This session will cover regulatory issue for use of diverse reinsurance, including coinsurance



Change in Regulatory Environment and Demand for Use of Reinsurance

Risk classification under Solvency II

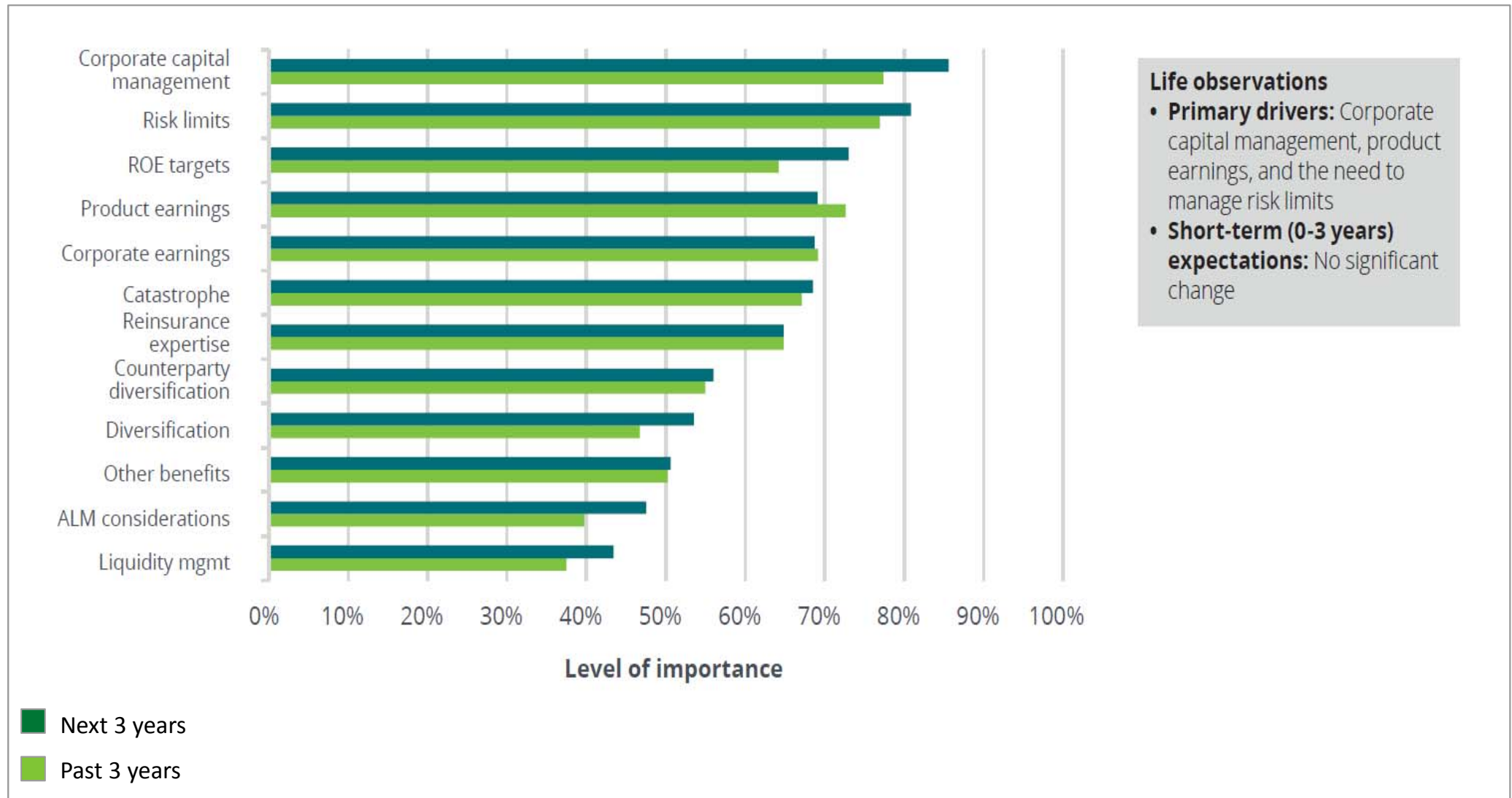


Change in Regulatory Environment and Demand for Use of Reinsurance

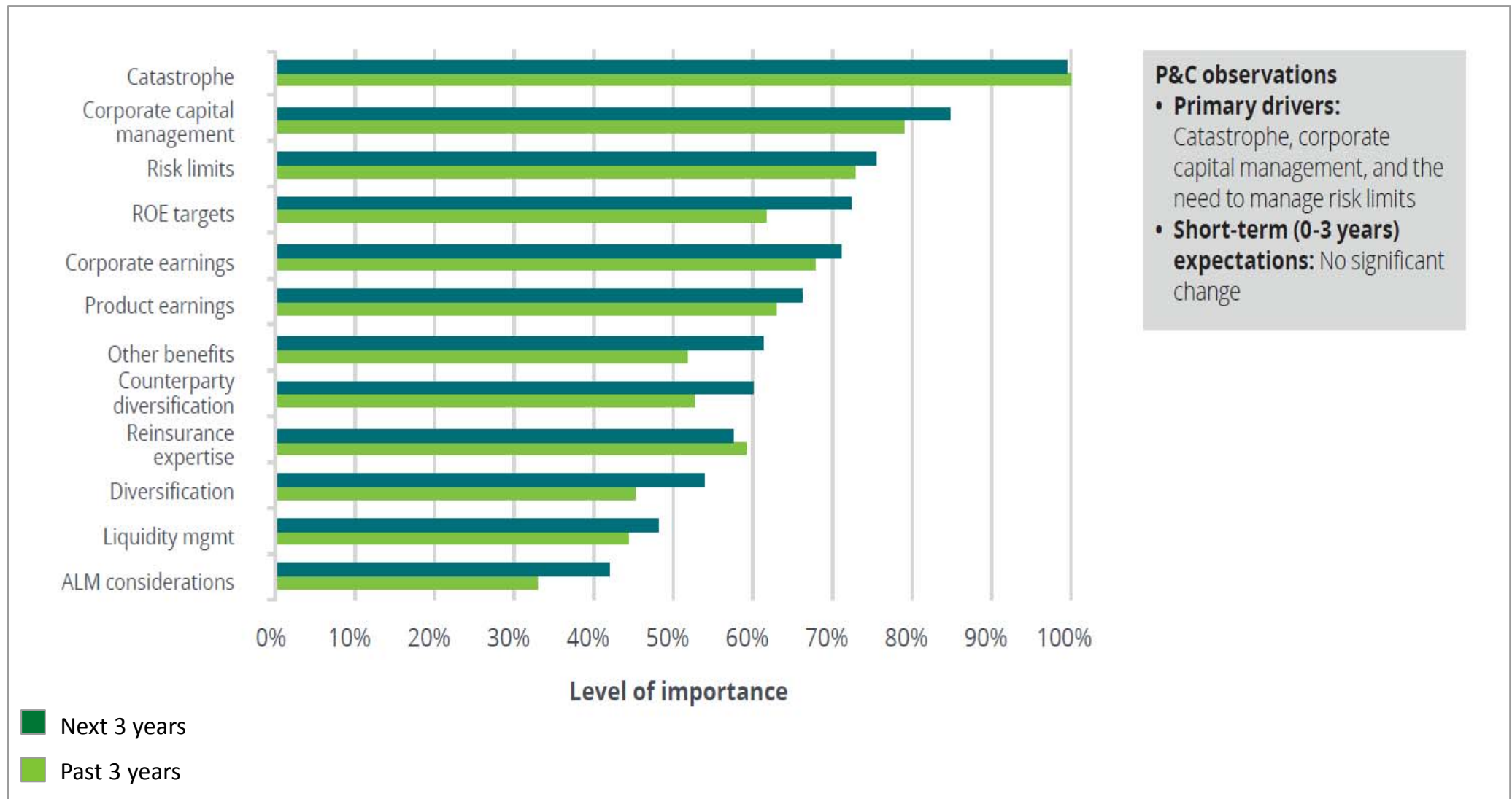
Main characteristics of Solvency I and Solvency II

	Solvency I	Solvency II
Basic idea	Rule based	Principle based
Calculation methodology	Simple formula	Complex standard formula resp. internal models
SCR-Basis of calculation	Premiums, reserves and insurance benefits (claims payments)	Best Estimate assumptions of all cash flows
Risks taken into account	Underwriting risk	Underwriting risk Market risk Counterparty risk Operational risk
Reinsurance	Limited recognition of reinsurance	Comprehensive recognition of reinsurance
Approach	Simple quantitative approach	Quantitative and qualitative approach
Addressee / Receiver	Supervisory authorities	Supervisory authorities and public

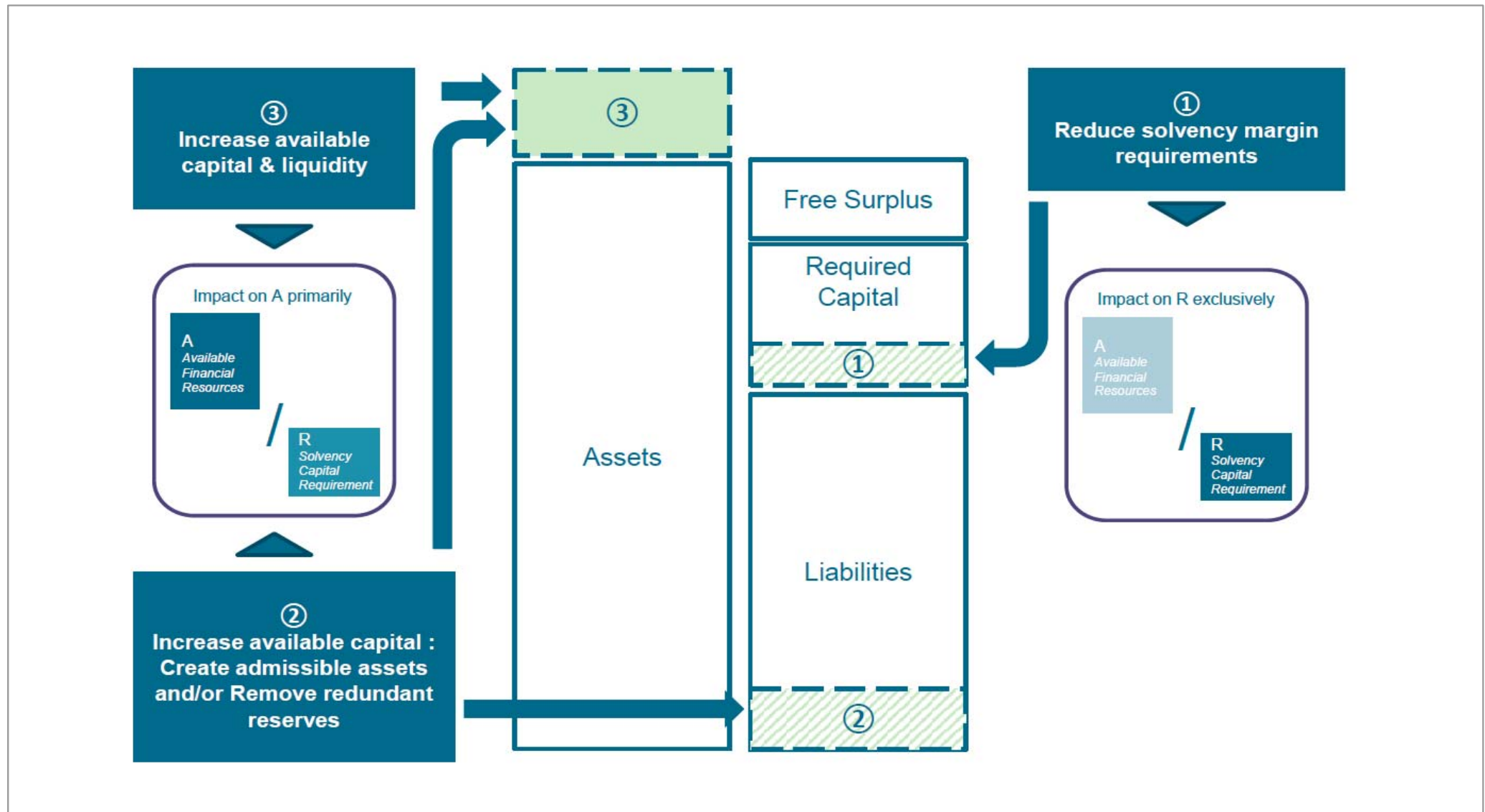
Strategic reasons for purchasing reinsurance: Life companies



Strategic reasons for purchasing reinsurance: P&C companies



Reinsurance: Efficient steering tool for the solvency ratio





Types of Reinsurance

Coinsurance



Characteristics

- Ceding company pays reinsurer (quota share of) **all policyholder premiums** or considerations
- Reinsurer pays ceding company (quota share of) **all benefits** paid to policyholders
 - Not just mortality or morbidity claims
 - Also **includes surrender benefits, interest credited**, etc.
- Assets and reserves are transferred to the reinsurer → **Reduction of reserves** by ceding company

Coinsurance

Traditional Reinsurance

Ceding Company		Reinsurer
Risk Premium	→	Risk Premium
Savings premium		
Business Expense		

Transfer of Risk Premium only

Coinsurance

Ceding Company		Reinsurer
Risk Premium	→	Risk Premium
Savings premium	→	Savings premium
Business Expense	→	Business Expense

Transfer All Risks

Financial Reinsurance/Finite Reinsurance



Definition of Finite Reinsurance (IAIS, 2006)

- Entire spectrum of reinsurance arrangements that **transfer limited risk** relative to aggregate premiums that could be charged under the contract.



Type of Finite Reinsurance

- Retrospective Finite Reinsurance: Time-and-Distance Policy, Loss Portfolio Transfers, Adverse Development Covers
- Prospective Finite Reinsurance : Finite Quota Shares, Spread Loss Treaties

Financial Reinsurance/Finite Reinsurance



..... Characteristics of Finite Reinsurance (IAIS, 2006)

- insurance **risk transfer and financing** are combined
- **assumption of limited risk** by the reinsurer
(e.g., aggregate limit of liability, blended cover, sliding scale and other adjustable commissions, loss corridors and limits or caps)
- **transfer of volatility**
(e.g., multiple lines of business, multiple years of account and multiple year contract terms)
- inclusion of **future investment income** in price of contract
(recognition of time value of money with funds withheld)
- potential **profit sharing** between parties (e.g. profit-sharing formulas, experience accounts)
- terms and pricing are typically determined in advance
- **bulk reinsurance** (i.e. administration of reinsurance is done on a bulk basis rather than on a traditional seriatim policy-by-policy basis, for a block of new or in-force business)



Korean Regulations on Reinsurance

Requirements for Recognition of Reinsurance



Article 63 of the Presidential Decree of the Insurance Business Law

- In July 2002, various form of reinsurance transactions were permitted.
- New requirements was established for recognition of reinsurance → to prevent abuse of reinsurance for other purposes

Requirements for Recognition

- Transfer of **insurance risk**;
- potential for **loss** to reinsurer; and
- reinsurer shall have satisfied the standards for financial soundness prescribed by supervisory authorities or its **credit rating** for the recent three (3) years shall have been **investment grade or higher**

Requirements for Recognition of Reinsurance



Article 7-12 of the Insurance Business Supervisory Regulations (the “IBSR”)

The insurance company shall report to the Financial Supervisory Service reinsurance with a term which is **in excess of one (1) year** and which either

- ① calculates the reinsurance premium **taking into account expected investment return** or
- ② **limits the reinsurers liability**



Article 7-13 of IBSR

Reinsurance that does not satisfy the requirements for reinsurance under Article 63 of the Insurance Business Law shall be treated as a deposit for accounting purposes.

Legislative History

Amendment of the Detailed Enforcement Regulation on Supervision of Insurance on July 26, 2002



BEFORE

- With respect to life reinsurance, only **yearly renewable term reinsurance (“YRT”)** based on transfer of risk premium was permitted.

2002. 7. 26.

AFTER

- The restriction on method of ceding to life reinsurance was deleted → Currently, it is **not prohibited to cede savings portion of insurance premium.**
- Document published by FSS in 2002
“risk management can be secured through various forms of reinsurance by permitting (i) not only risk premium but savings portion of insurance premium to be ceded and (ii) a reinsurance contract with multiple years.”
- In practice, however, **the regulators have recognized YRT based on transfer of risk premium**



Foreign Legislation

OTHER JURISDICTIONS



- Insurance Core Principles 13 (Reinsurance and Other Forms of Risk Transfer)
- The supervisor should regard an agreement that **transfers sufficient insurance risk** as insurance under jurisdictional rules.
- Reinsurance refers to insurance purchased by an insurer to provide protection against certain risks, primarily underwriting risks of the insurance policies issued by the insurer.
- The reinsurer assumes risks such as **insurance, timing, operational and credit risk**
- Finite reinsurance is a generic term that, for the purposes of this ICP, is used to describe a spectrum of reinsurance arrangements that transfer limited risk relative to aggregate premiums that could be charged under the contract.

OTHER JURISDICTIONS



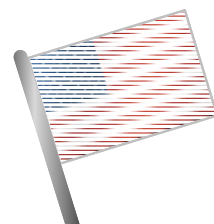
- Finite reinsurance transactions are legitimate forms of reinsurance arrangements; however, only contracts that **transfer sufficient insurance risk in order to meet the requirements of the relevant accounting standards** in force in each jurisdiction can be accounted for as reinsurance.
- A detailed review of the entire reinsurance contract and any side agreements is necessary
- Only **the amount of risk transferred under finite reinsurance contracts should be included in the regulatory capital calculations** of the ceding insurer.
- In general, a contract should be considered as a loan or deposit if the ceding insurer has the unconditional obligation to indemnify the reinsurer for any negative balances that may arise out of the contractual relationship



IFRS4/IFRS17

- An insurance contract is a "contract under which one party (the insurer) **accepts significant insurance risk** from another party (the policyholder) by agreeing to compensate the policyholder if a specified uncertain future event (the insured event) adversely affects the policyholder.
- Insurance Risk means risk, other than financial risk, transferred from the holder of a contract to the issuer.
- a contract that exposes the issuer to lapse risk, persistency risk or expense risk is not an insurance contract unless it also exposes the issuer to insurance risk. However, **if the issuer of that contract mitigates that risk by using a second contract to transfer part of that risk to another party, the second contract exposes that other party to insurance risk.**

OTHER JURISDICTIONS



U.S.A.

- Life and Health Reinsurance Agreements Model Regulation issued by NAIC categorizes the risks to be assumed by reinsurer.
- Risk Categories: **Mortality, Morbidity, Lapse, Credit quality, Reinvestment and Disintermediation**
- If the treaty does not transfer all of the significant risk inherent in the business being reinsured, no insurer shall reduce any liabilities or establish any asset
- Under SAP and GAAP, indemnification of the ceding company against liability relating to insurance risk in reinsurance requires the followings:
 - The reinsurer assumes **significant insurance risk** (**Underwriting risk and Timing risk**)
 - It is reasonably possible that the reinsurer may realize **a significant loss** from the transaction



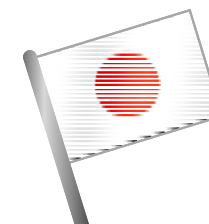
EU *(Solvency II Directive)*

- The Solvency II Directive defines “**risk-mitigation techniques**” as “all techniques which enable insurance and reinsurance undertakings to transfer part or all of their risks to another party”
- Transfer of the risk to be reflected in Solvency Capital Requirement is **not limited to Underwriting risk, but all risk**
- The Solvency II Directive requires (re)insurance undertakings to take into account the effect of risk-mitigation techniques in the calculation of the Solvency Capital Requirement under the condition that the resulting risks are properly reflected
 - **In case that reinsurance has the effect of risk transfer, it can be reflected in Solvency Capital Requirement** taking into account counterparty risk arising from entering into reinsurance transaction



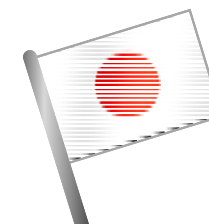
EU *(Solvency II Directive)*

- EIOPS provides principles to assess whether risk is effectively transferred
- “**Finite reinsurance**” means reinsurance under which the explicit maximum loss potential, expressed as the maximum economic risk transferred, arising both from **a significant underwriting risk and timing risk transfer**, exceeds the premium over the lifetime of the contract by a limited but significant amount, together with at least one of the following
 - (a) explicit and material consideration of **the time value of money**;
 - (b) contractual provisions to **moderate the balance of economic experience** between the parties over time to achieve the target risk transfer
- Member States shall ensure that finite reinsurance contracts are able to properly identify, measure, monitor, manage, control and report the risks arising from those contracts or activities



Japan

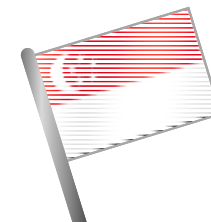
- Under Japanese regulations, there is no restriction on type of risk to be transferred to reinsurers
- When the insurance contract is reinsured, an Insurance Company may elect not to set aside the policy reserve corresponding to the portion of the reinsurance pertaining to certain eligible reinsurers
- When an Insurance Company places reinsurance to cover financial reinsurance (**limited to coinsurance**), and **if it receives fees** accrued from the insurance contract pertaining to the reinsured portion, calculated based on the profit estimated to be accrued after the conclusion of the reinsurance, **it shall set aside such received amount as the policy reserve**



Japan

- Financial Reinsurance should transfer all risks related to that reinsurance (limited to coinsurance and modified coinsurance), and is that the insurance company receives future profit generated from policies related to reinsured part after reinsurance as reinsurance commission, in advance. And it should meet all of the following requirements.

- Reinsurance company's credit rating: AA- / Aa3 or above.
- Reinsurance commission should be cash.
- Termination: only in case that all reinsured policies are terminated or insurance company cancels before maturity.
- Cancellation by reinsurance company should not be permitted other than the case of non payment of reinsurance premium by insurance company.
- In case that insurance company is liquidated, the insurance company is not required to pay deficit of existing reinsured part to reinsurer
- In case of merger, the reinsurance is turned over without any change of terms and conditions.
- Settlement should be made quarterly at least.



- There should be (i) **transfer of significant insurance risk** relating to the reinsured portion and (ii) **a reasonable possibility that the reinsurer will realize a significant loss**, in order for an insurer to enjoy the capital relief
- Category of risk to be transferred - **mortality, morbidity, reinvestment, persistency, expense**
- Any contract classified as a reinsurance contract that qualifies for capital relief should not possess any of the following characteristics:
 - the contract **does not protect the ceding insurer from negative financial impacts** arising from the underlying insurance business ceded;
 - **the amount of payments from the assuming insurer could be predetermined** and is not contingent on the cash flows or the occurrence of an uncertain event; and
 - when a reinsured event or loss occurs, the assuming insurer is permitted under the contract to **postpone the payment beyond the common quarterly or annual settlement cycle**.



Suggestion: Need for Expansion of Scope of Reinsurance

Need for Expansion of Scope of Reinsurance



- In many jurisdictions, (i) the transferred risks include underwriting and other risks and (ii) coinsurance and financial reinsurance are recognized as reinsurance when significant risks are transferred
- Especially, **coinsurance satisfies the requirements for recognition of reinsurance** as all risks relating to ceded insurance policy including mortality risk, morbidity risk, lapse risk, investment risk are transferred to the reinsurer
- Coinsurance is also **compliant with the intended relaxation of regulation** implemented in July 2002 to allow various forms of reinsurance transactions
- In order to ensure effective management of investment risk entailing from life insurance and long-term non-life insurance product, the transfer of risk through coinsurance should be allowed

Need for Expansion of Scope of Reinsurance



- Further, it is necessary to review in detail the introduction of financial reinsurance as reinsurance when transfer of risk by a ceding company is apparent
- The following items should be reviewed as to whether financial/finite reinsurance other than coinsurance can be recognized as reinsurance:
 - Fraudulent cases of financial reinsurance, such as U.K. Equitable Life Insurance and Australian HIH Insurance Group cases
 - Evaluation of risk transfer
 - Prevention of misuse of reinsurance transaction by different treatment in capital relief
 - Difficulty in assessment of reinsurance agreement including side agreement, verbal agreement, etc. by comprehensively reviewing the reinsurance contract

Thank you

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Insurer`s Capital Management using Reinsurance: The Experience of European Insurers responding to solvency II

Nardeep Sangha

Agenda

1. Solvency II Background and Drivers
2. Expanding View of Reinsurance
3. Reinsurance Case Studies
4. Regulatory Process and Conclusion

Solvency II Background

- Insurance regulation governing the European Union
- European Council launched the process in 2001, effective from 2016



OBJECTIVES

- Increase the understanding of the risks
- Improve the risk management framework and risk mitigation



FEATURES OF FRAMEWORK

- Creating an Economic Balance Sheet
- Required Capital is risk based and calibrated to 1-in-200 years event
- Explicit allowance for diversification benefits

New regulation is principles based

Key Drivers of the Solvency II regime

Market Value of Assets	Exposed to full market volatility
Discount Rates are risk free rates	Resultant negative spread on guaranteed investment products required long transitional measures
Negative Reserves count towards Equity	Protection and unit linked products can increase solvency
Required Capital calculations are scenario based	Diversification recognised as a key feature


Increasing volatility



**Increased use
of Risk Mitigation Tools**

Increasing Volatility requires more complex risk management tools

Traditional approach to L&H reinsurance covers single risks

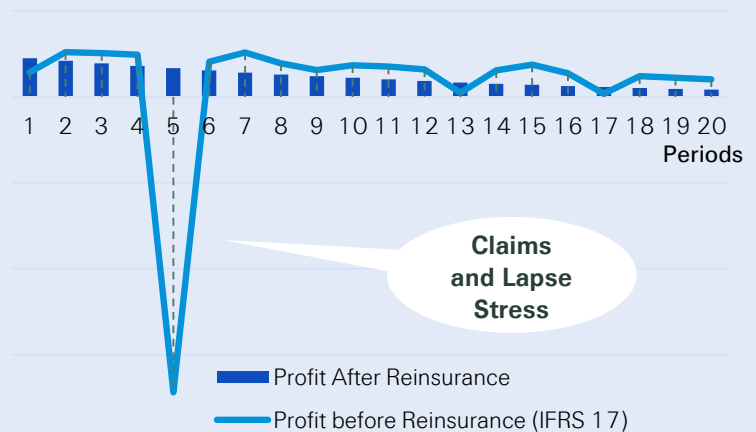


Under risk based scenarios the interaction between multiple risks drives losses and volatility

Single Risk Stress



Multiple Risk Stress

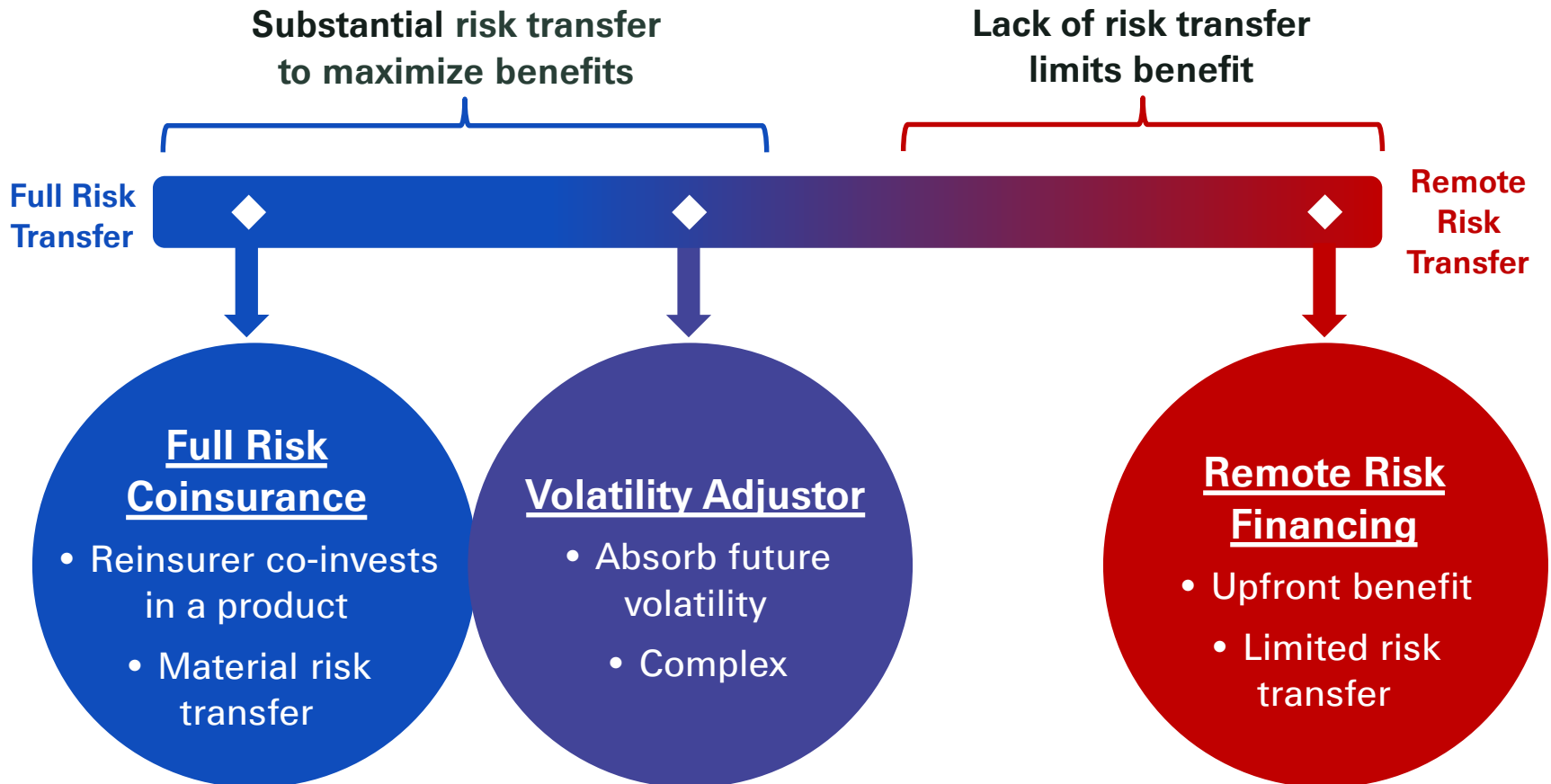


Tools are available to manage this volatility

2. Expanding view of Reinsurance

Reinsurance focused on substantial risk transfer maximises benefits

The table below shows the range of reinsurance solutions available



➔ *Focus is on ensuring sufficient risk transfer*

Reinsurance as a Capital management tool under Solvency II

Reinsurance activities can be grouped into **3 categories**

1

Portfolio Transfers

- Monetise negative reserves in order to drive strategic change
- Reduce exposure to long term risks, e.g. interest rates, trend risks

2

Reduce concentration risk

Solutions can either improve diversification or remove volatility, e.g.

- Longevity swaps or Mass lapse solutions
- Embedded Interest Rate Risks

3

Access to capital

- Strengthen access to capital under stressed conditions in order to enhance risk framework;
- Employ Contingent Solutions

Increased access to reinsurance supports increased capacity to increase primary risk taking and allows for innovative products to policyholders

3. Reinsurance Case Studies

Case Studies: Portfolio Transfers – *Monetise negative reserves*

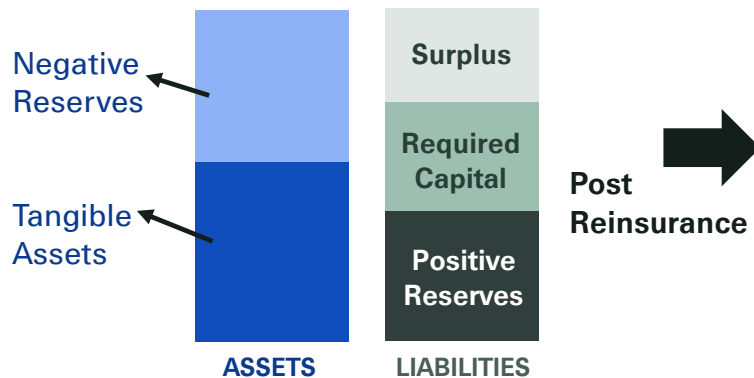


MOTIVATION

Motivation for the transaction was two-fold:

- **Strengthen its capital position** under Solvency II and
- Provide **cash** to fund future **growth**

*Analysts at JP Morgan noted that this tailored transaction provides **capital** that is immediately **fungible***

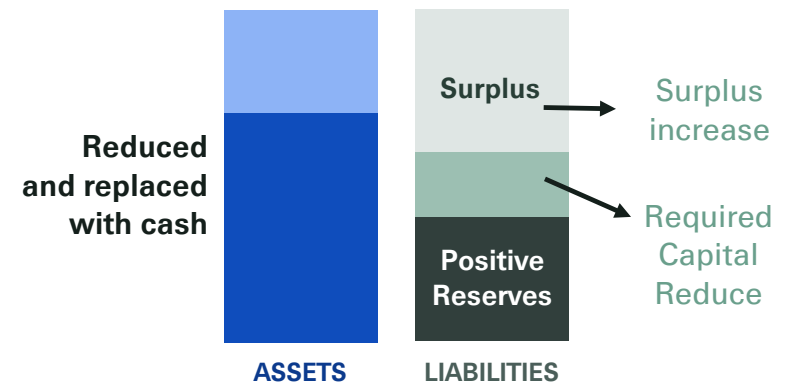


OUTCOMES

Swiss Re entered into **coinsurance arrangement** with a joint venture of a client in Spain*

In exchange for Swiss Re making a **day 1 cash payment** of €684m, Swiss Re will accept all future risks relating to the underlying portfolio

The Client will continue to service the costumers and **do not change** their **commitment** to the policyholders



Case Studies: Portfolio Transfers — *Remove long term risks*



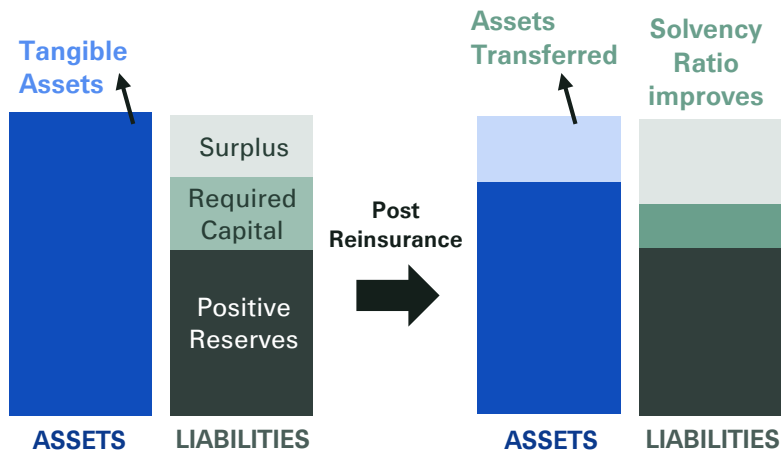
MOTIVATION

The company objective was to **reduce exposure** to core **legacy risks** and focus on newer protection business.

The legacy risks, driving the volatility was

- Older age mortality trend
- **Interest rate guarantees**

Any transaction should **increase the solvency ratio** of the firm



OUTCOMES

- Enter into a coinsurance arrangement that covers whole of life mortality business
- On day 1 the insurer **transferred reserves**
- The **reinsurer pays all** future mortality and surrender **claims**

The insurer frees up capital to redeploy, but

- Can be complex to manage; and
- Client swapping diversified assets with single counterparty risk

Required capital reduces; Risk profile becomes more balanced

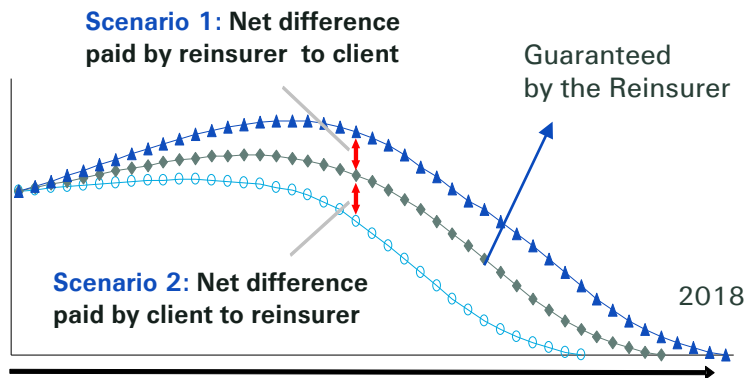


Case Studies — Reduce Concentration Risk



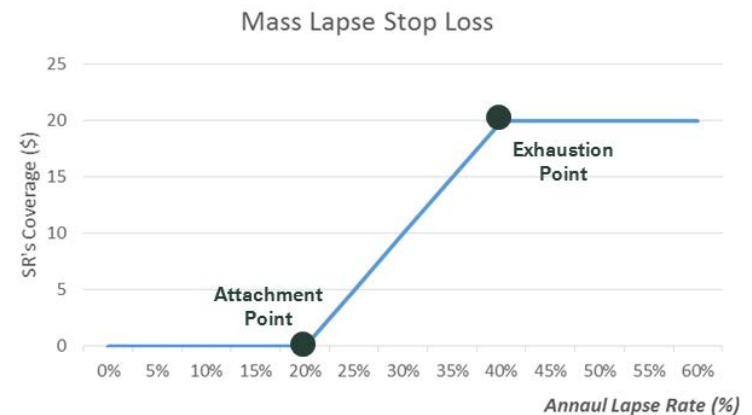
LONGEVITY REDUCTIONS

- Longevity risk is a core risk pool within the UK,
- **Changes** in longevity **trend** also materially **impacts** underlying **interest rate risk**
- Hedging longevity risk, creates cashflow certainty in order to better manage the long term interest rate risk as well as reduce longevity risk capital
- Swiss Re is a key player in this market via the use of longevity swap transactions



MASS LAPSE SOLUTIONS

- **Mass lapse** can be a **key driver** of insurance risk **capital**
- Solutions to reduce lapse capital can also improve diversification benefits
- Reinsurance guarantees a portion of the “negative reserves”



4. Regulatory Process and Conclusion

Process to Review Reinsurance Transactions

New transactions are reviewed as part of a 2 step process – **Substantial & Compliance**

1 Substantial Review



Motivation of Insurer



Risk Transfer to Reinsurer



Managing Operational Complexity



Typical Questions

- Does the reinsurance improve solvency margin?
 - Has the insurer allowed for counterparty risk, e.g. what happens if reinsurer is downgraded or defaults?
 - Are there loss scenarios where the insurer is worse off?
 - Under what scenarios does the reinsurer lose money? Is this sufficient?
 - Does reinsurance impact fungibility of capital?
-
- What is the administrative process the insurer sets up to manage the data?
 - Can the insurer's actuarial model reflect the benefits?

Conclusion

- **Solvency 2 aims to improve the risk framework**, including allowance for increased risk mitigation tools to offset volatility
- **Reinsurance is used as:**
 - A key component of risk mitigation
 - A capital management tool to strengthen the solvency position
- **Stabilising Solvency Margins creates capacity to increase primary risk taking**
- **Regulatory approval focuses on:**
 - Motivation
 - Risk transfer; and
 - Ensuring the insurer understands the impact of reinsurance



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Big Data Cases in The Insurance Industry and Suggestions

Dr. Changhui Choi,
Research Fellow, KIRI

Leap Through Regulatory Reform in the Insurance Industry: Seeking a New Business Model,
Kim & Chang and KIRI Joint Symposium,
2019.01.18(Friday)

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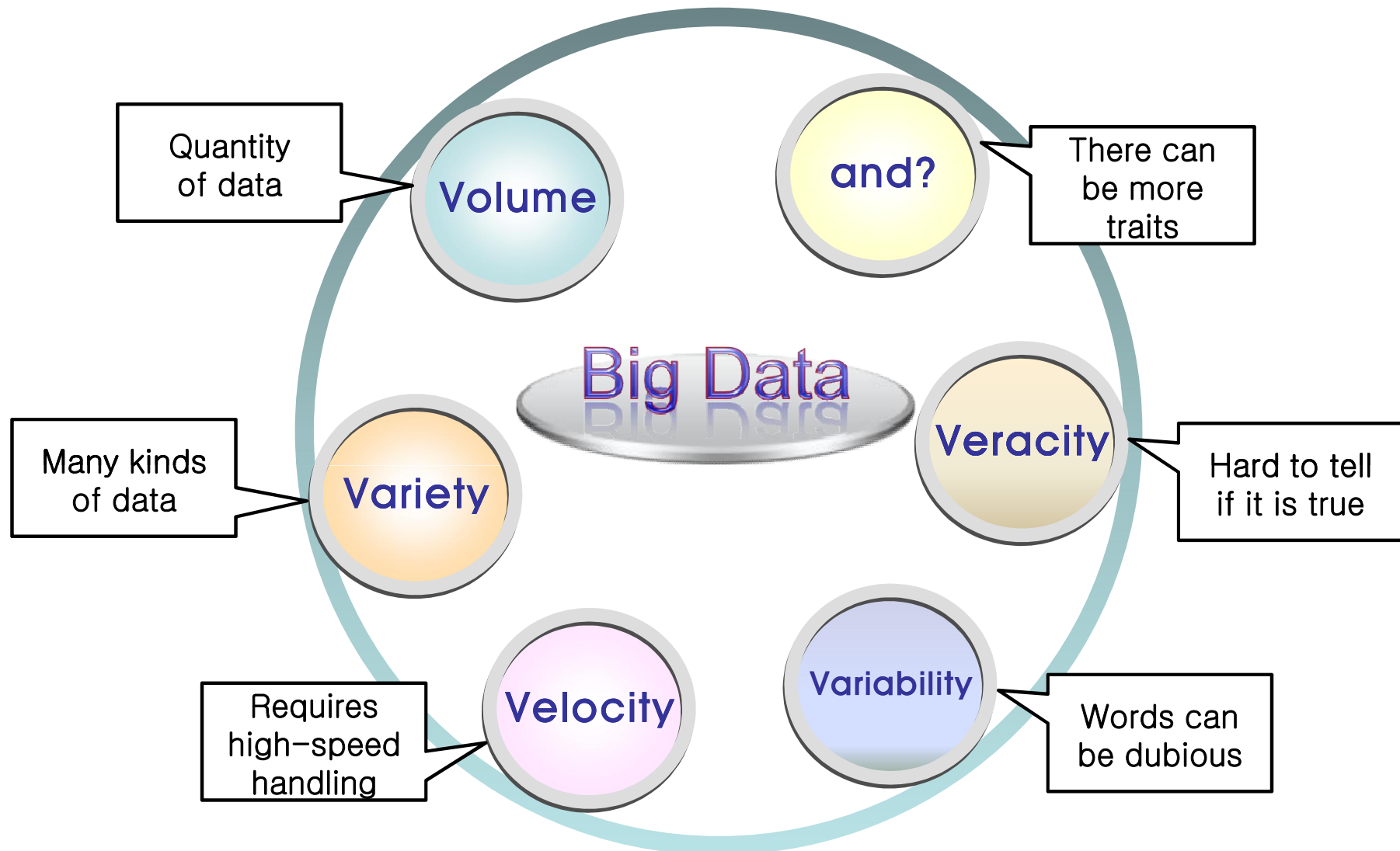
I. Introduction

1. What is big data?
2. Big data techniques
3. Benefits of big data
4. Recent development in BD environments
5. Summary

1. What is big data?

- ✓ Big data is described by 5Vs. But in practice 'big data' means 'data' + 'analysis' + 'application' where 'data' satisfies some traits of 5Vs and 'analysis' includes 'traditional' and 'novel' analytical tools

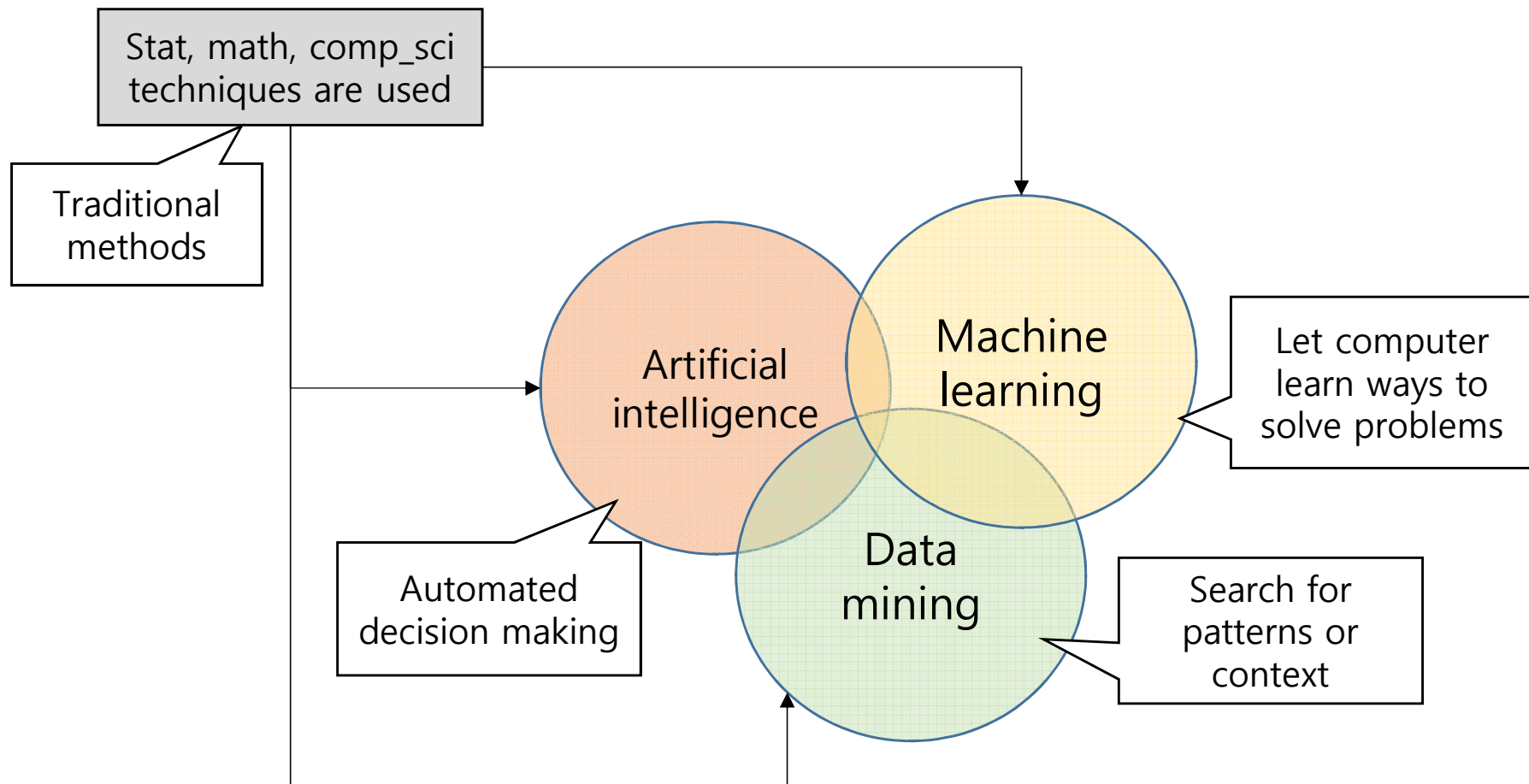
[Traits of big data]



2. Big data techniques

- ✓ Various traditional and novel techniques are used to analyze big data

[Techniques for big data analysis]

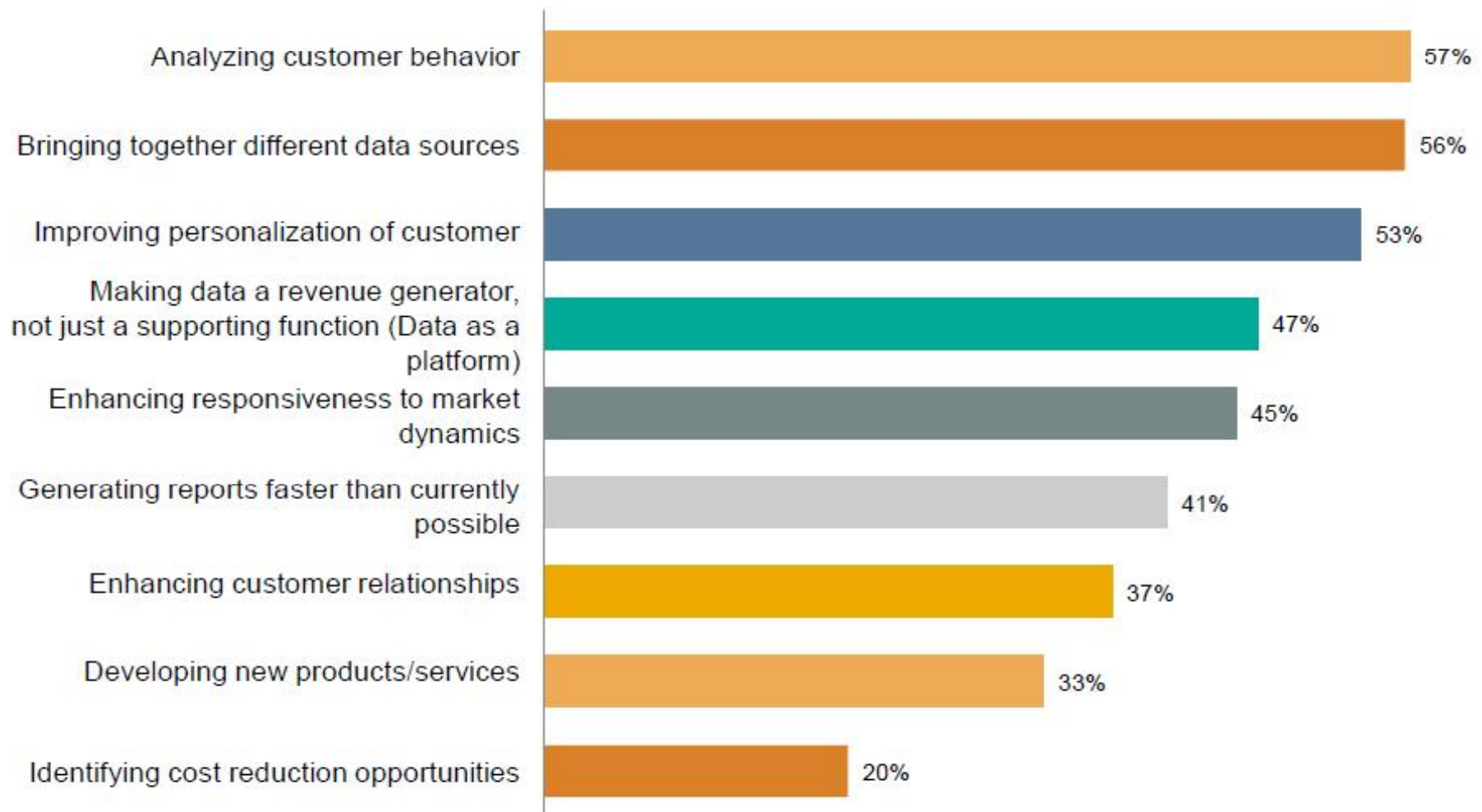


Source: modified version of Tierney(2012)

3.1 Benefits of big data: Where it is applied

- ✓ Big data analysis can help business improve efficiency and expand via enhanced understanding of customers & market and automated business processes

[For which of the following reasons, are you using big data?]

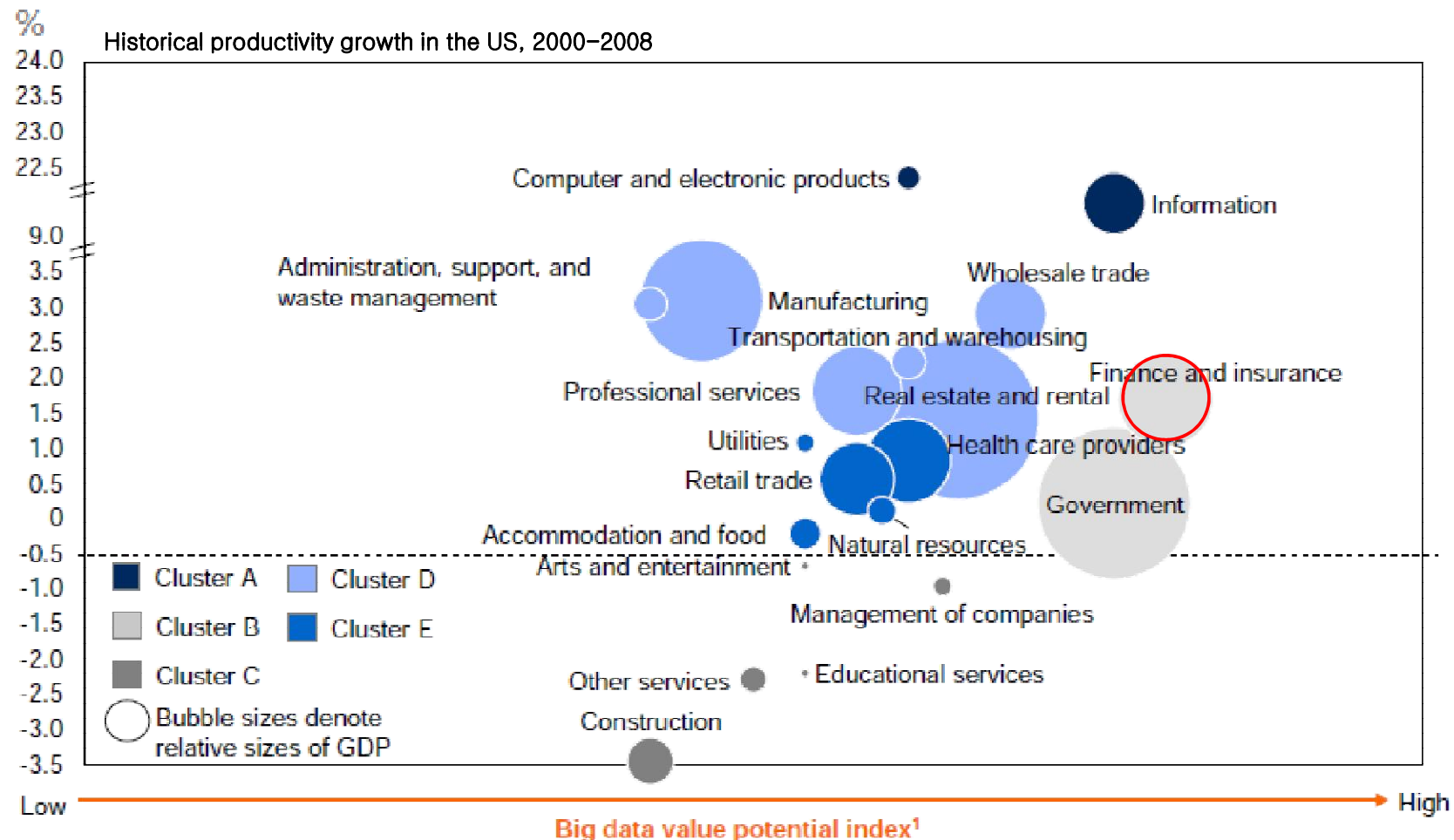


Source: Accenture(2015)

3.2 Benefits of big data: Who would benefit from it?

- ✓ US Bureau of Labor Statistics and McKinsey anticipated that 'Finance and Insurance' sector would have the highest value-potential among all industries

[Which industry would benefit most from big data?]

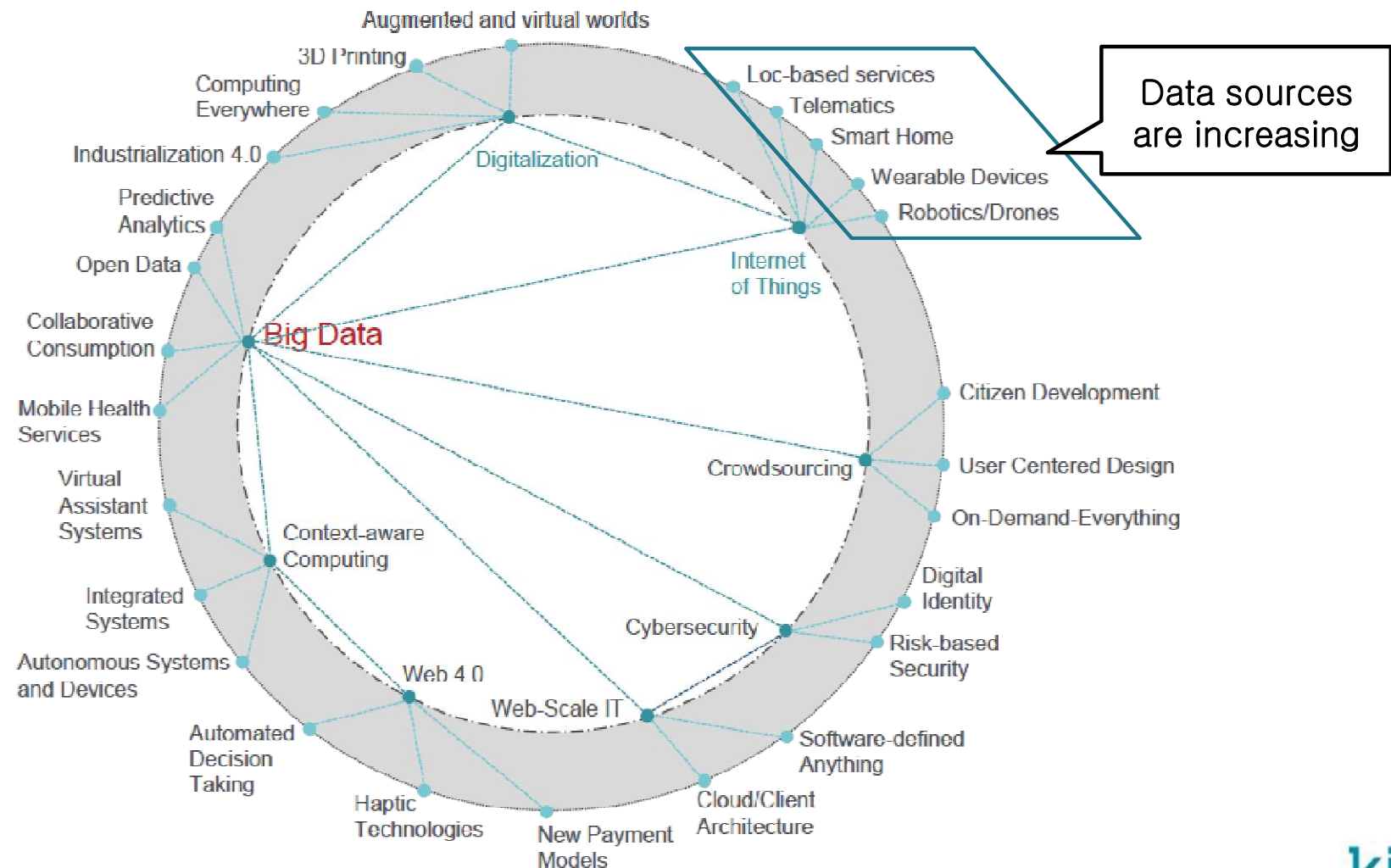


Note: 1. See McKinsey Global Institute Analysis(2011)
Source: US Bureau of Labor Statistics; McKinsey Global Institute Analysis(2011)

4.1 Recent development in BD environments: Increasing data sources

- ✓ Due to the proliferation IT instruments and techniques, the number of data sources(public, personal, industrial) that are accessible from insurers are increasing

[Scenery change in insurance industry by big data]

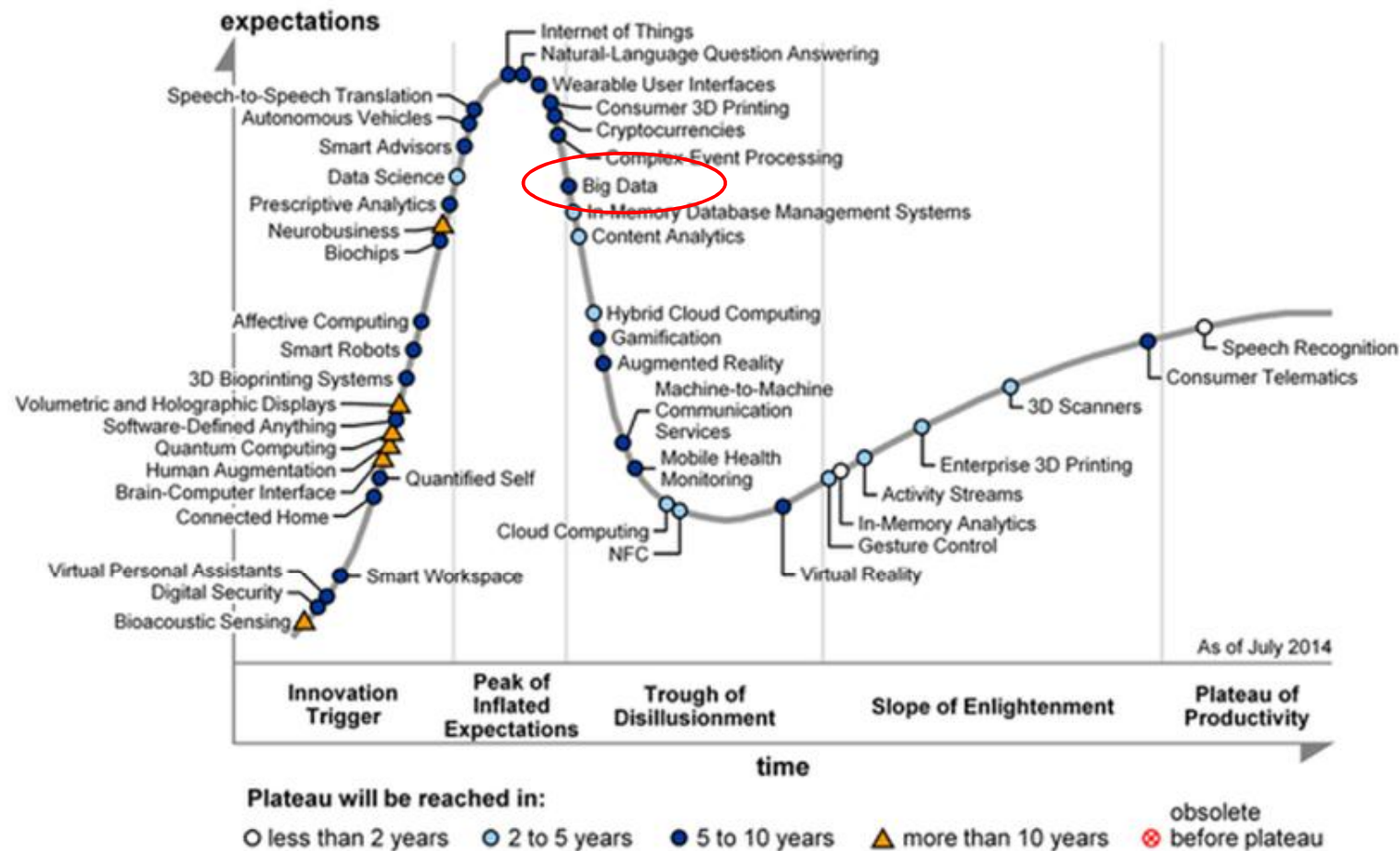


Source: Munich Re(2016), p. 3

4.2 Recent development in BD environments: Big data techniques

✓ Gartner(2017) expected that BD would reach 'the Plateau of Product' in the next decades

[Hype cycle for data management]

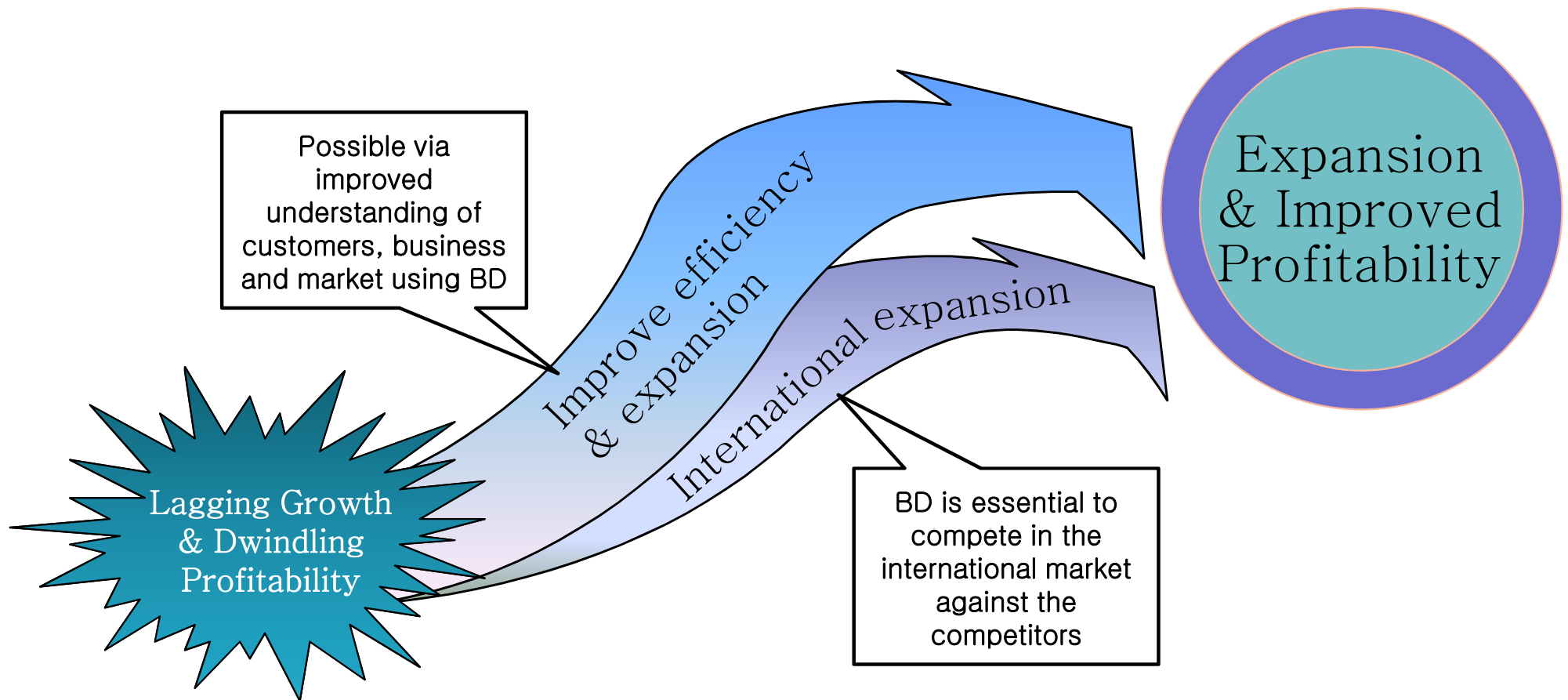


Source: Gartner(2017)

5.1 Summary: Significance of big data for the Korean insurance industry

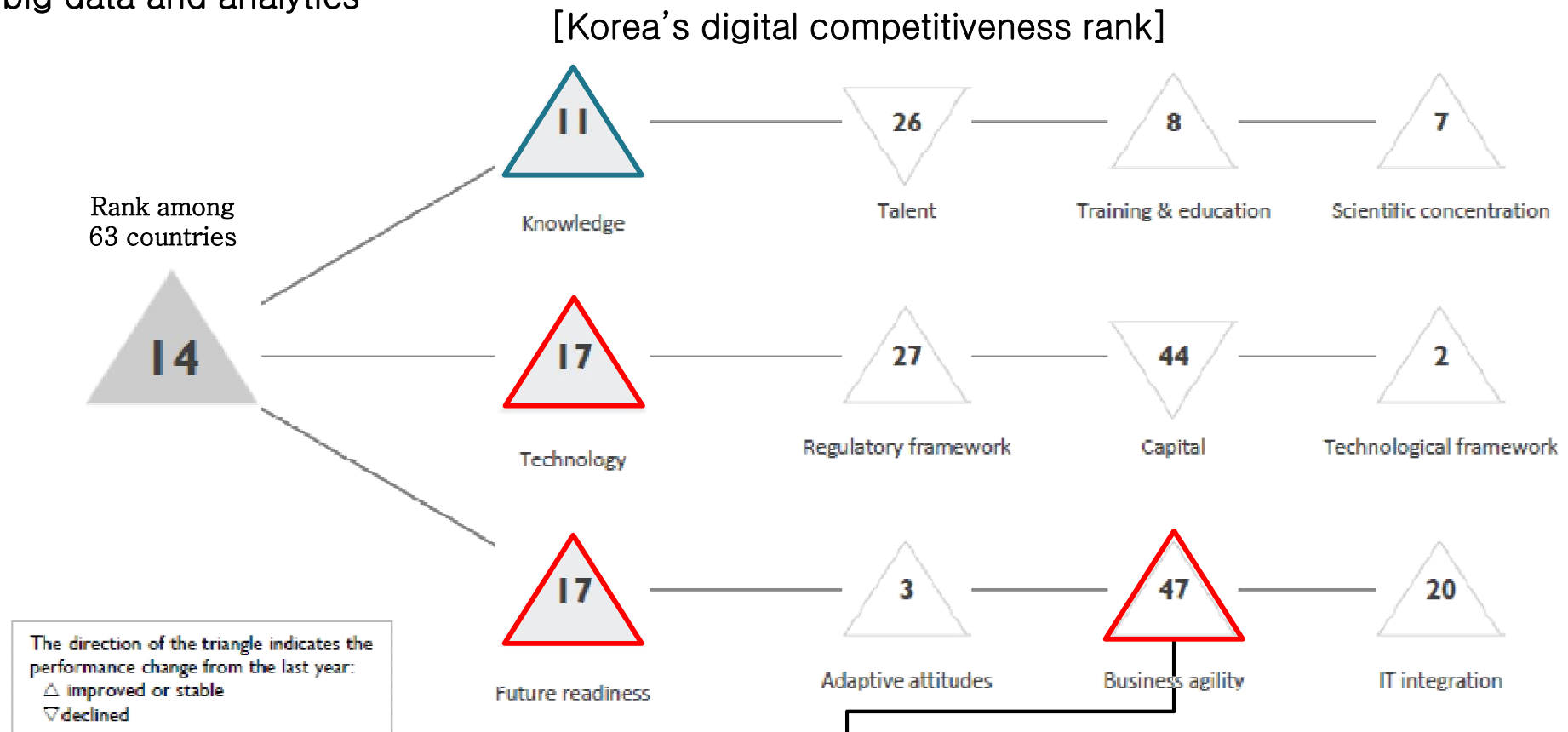
- ✓ Fully utilizing big data can make a significant contribution to Korean insurers in overcoming the current conundrum

[Big data is a “must” not a “choice” for survival]



5.2 Summary: Where we stand

- ✓ Although BD is important for the future development, Korea's digital competitiveness was ranked at the 14th (China 12th), among 63 countries, partly due to the lack of business agility pertaining to the use of big data and analytics



Note: Upward triangle means improvement and downward triangle means degradation from last year
 Source: IMD(2018)

Business agility	Rank
Opportunities and threats	52
Innovative firms	34
Agility of companies	45
Use of big data and analytics	31
Knowledge transfer	29

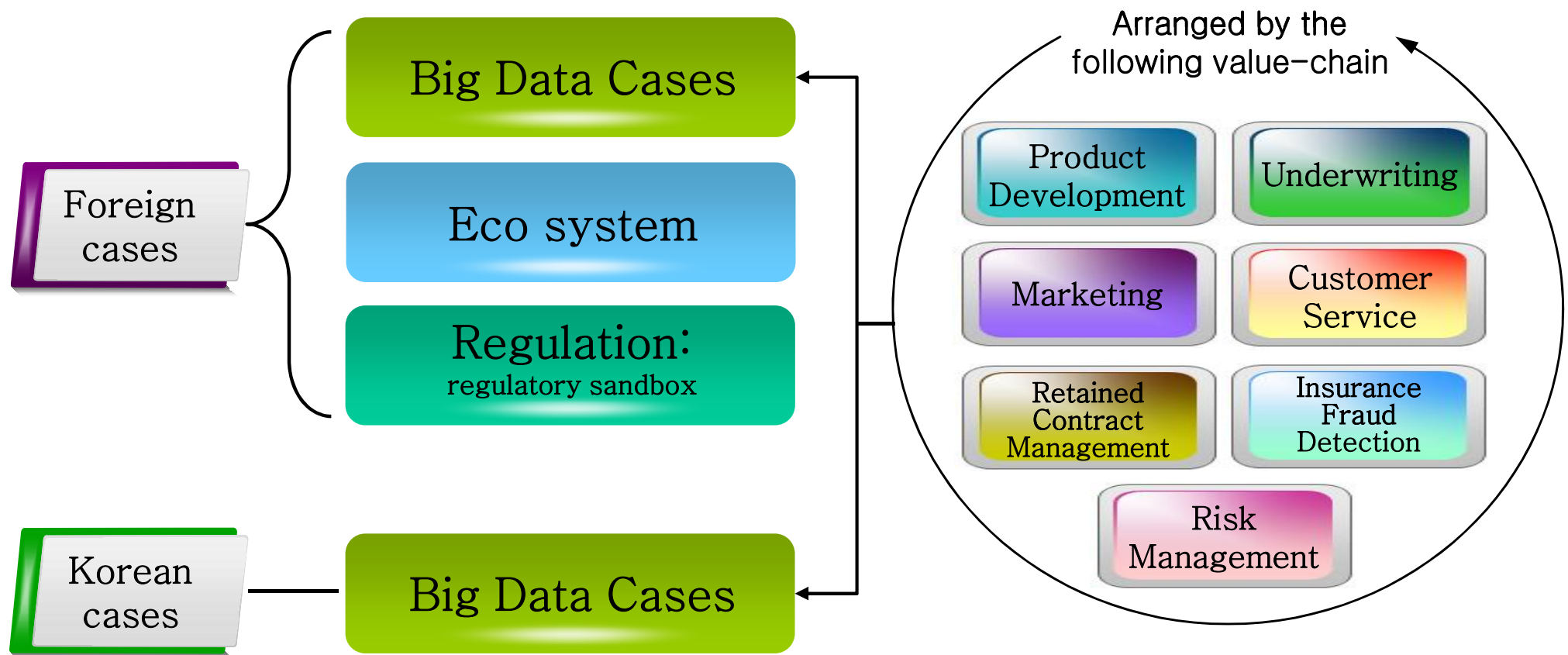
II. Big Data Cases

1. Organization of this section
2. Korean Cases
3. Foreign Cases
4. Foreign eco system
5. Foreign regulation case

1.1 Organization of this section: Summary

- ✓ This section introduce big data cases in the insurance industry, big data eco system in other countries and advanced regulatory case(regulatory sandbox of Singapore)

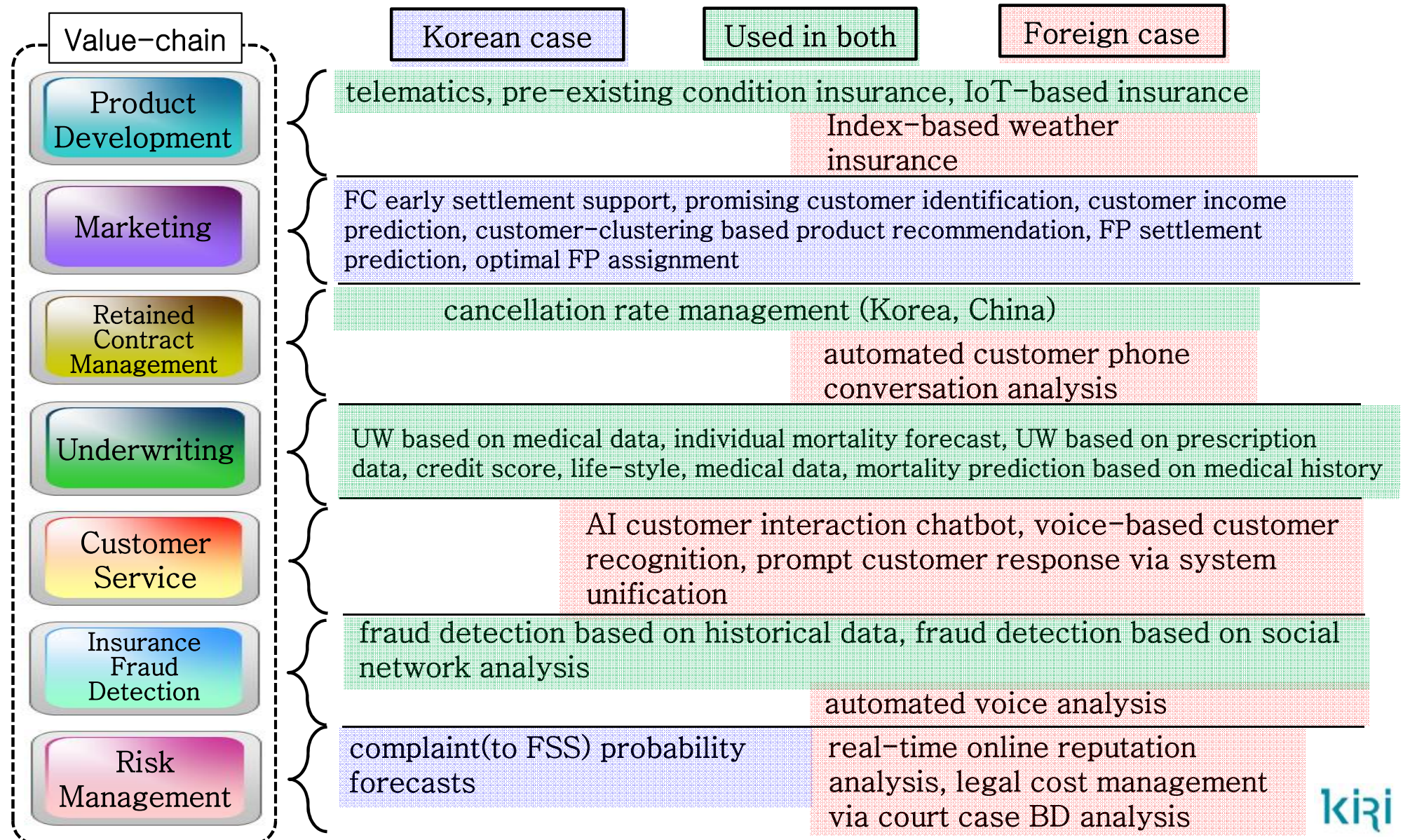
[Organization of this section]



Korean insurance industry cases: Hanwha Life Insurance, Kyobo Life Insurance, KIDI, KCREDIT
Other countries' cases: various sources

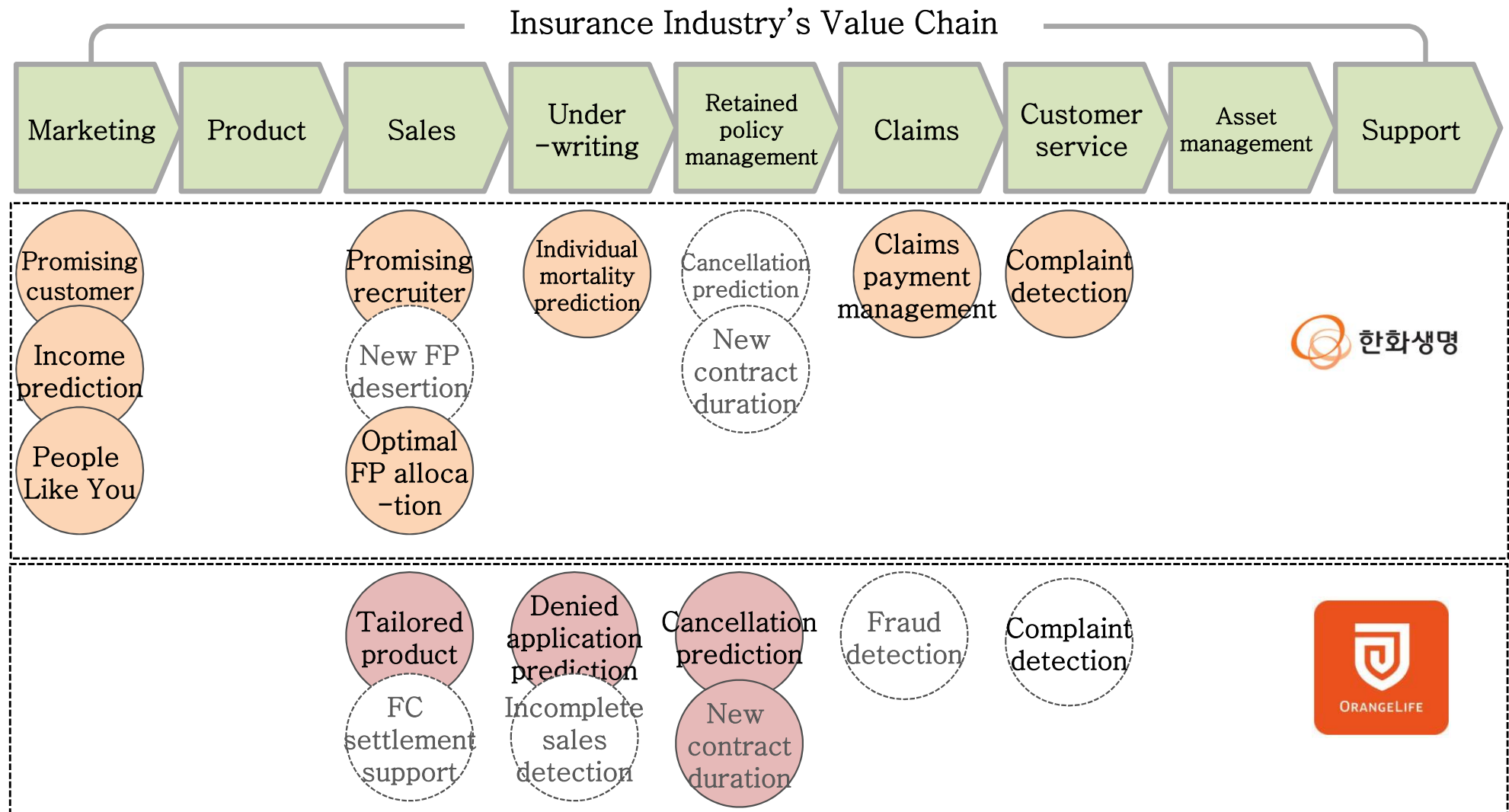
1.2 Organization of this section: Big data cases

- ✓ Korean Insurance companies are applying BD analytics to areas that have direct impact on profit, whereas foreign companies have more diverse applications



2. Korean Cases

- ✓ Korean insurance companies are also making efforts to apply big data analytics to various parts of value chains

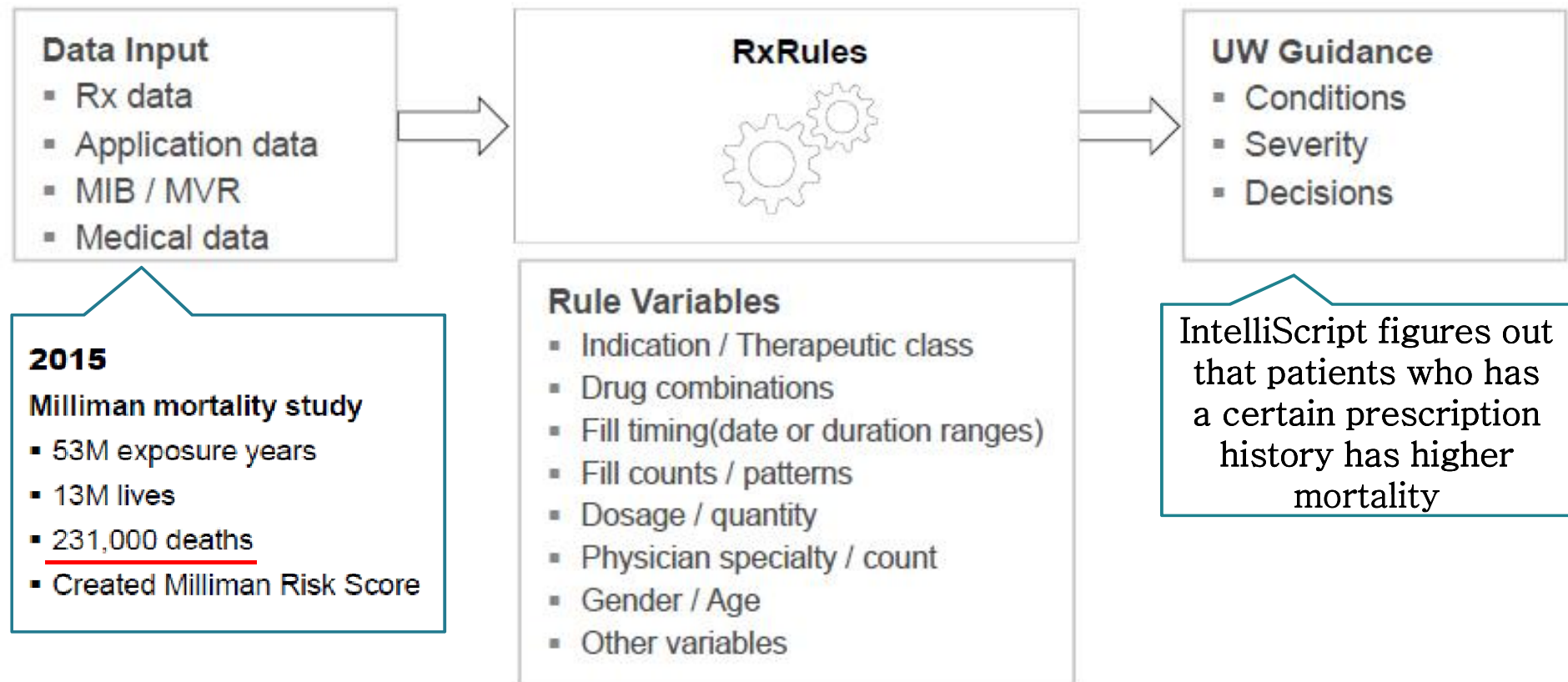


Source: Hanwha & Orangelife

3.1.1 Foreign Cases: Underwriting using prescription data(IntelliScript)

- ✓ IntelliScript¹⁾ analyzed Milliman's mortality data and figured out that the mortality has a strong correlation with the prescription history

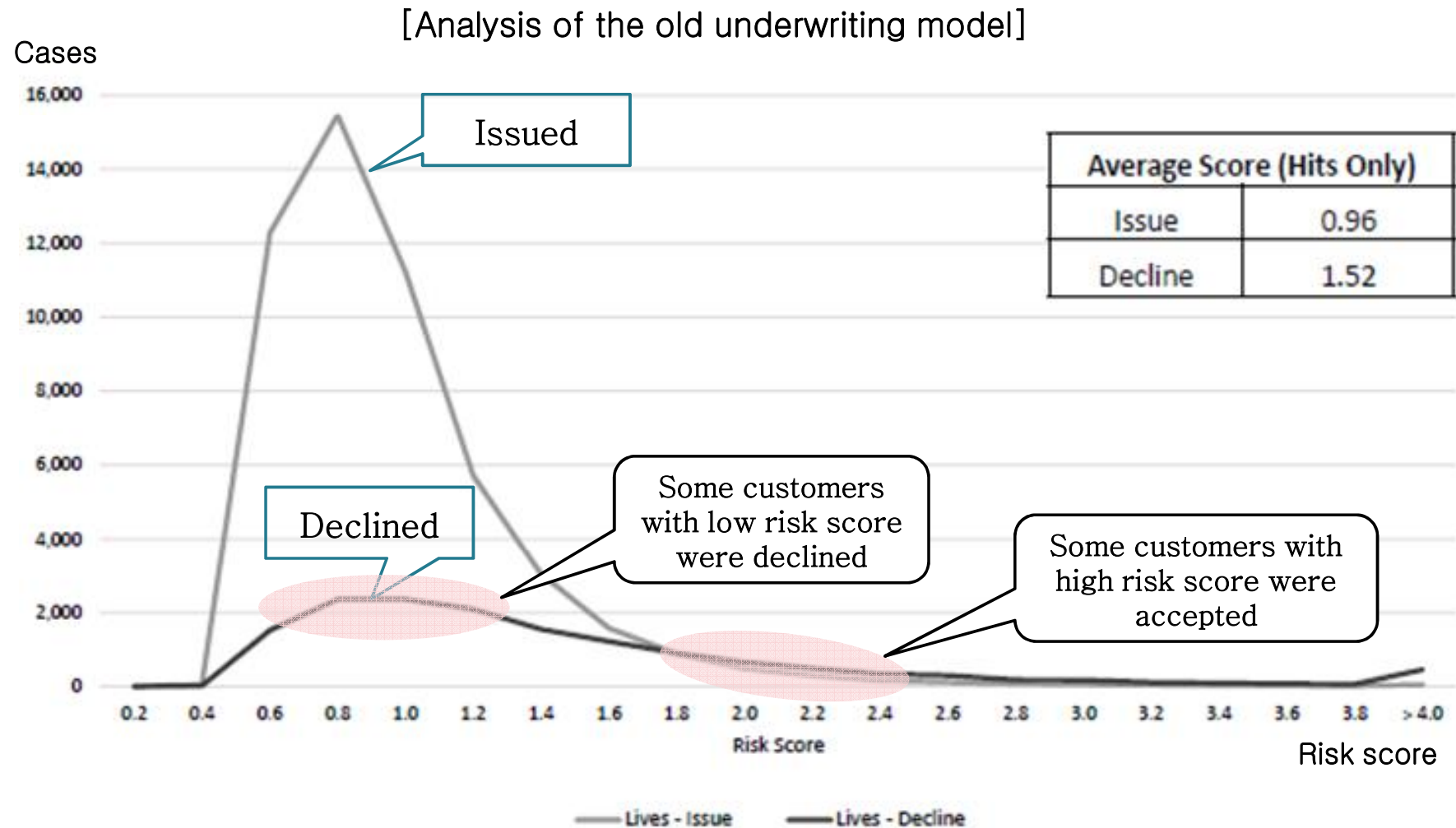
[IntelliScript's prescription-based risk assessment model]



Footnote: 1) IntelliScript is a subsidiary company of Milliman
Source: Milliman(2017)

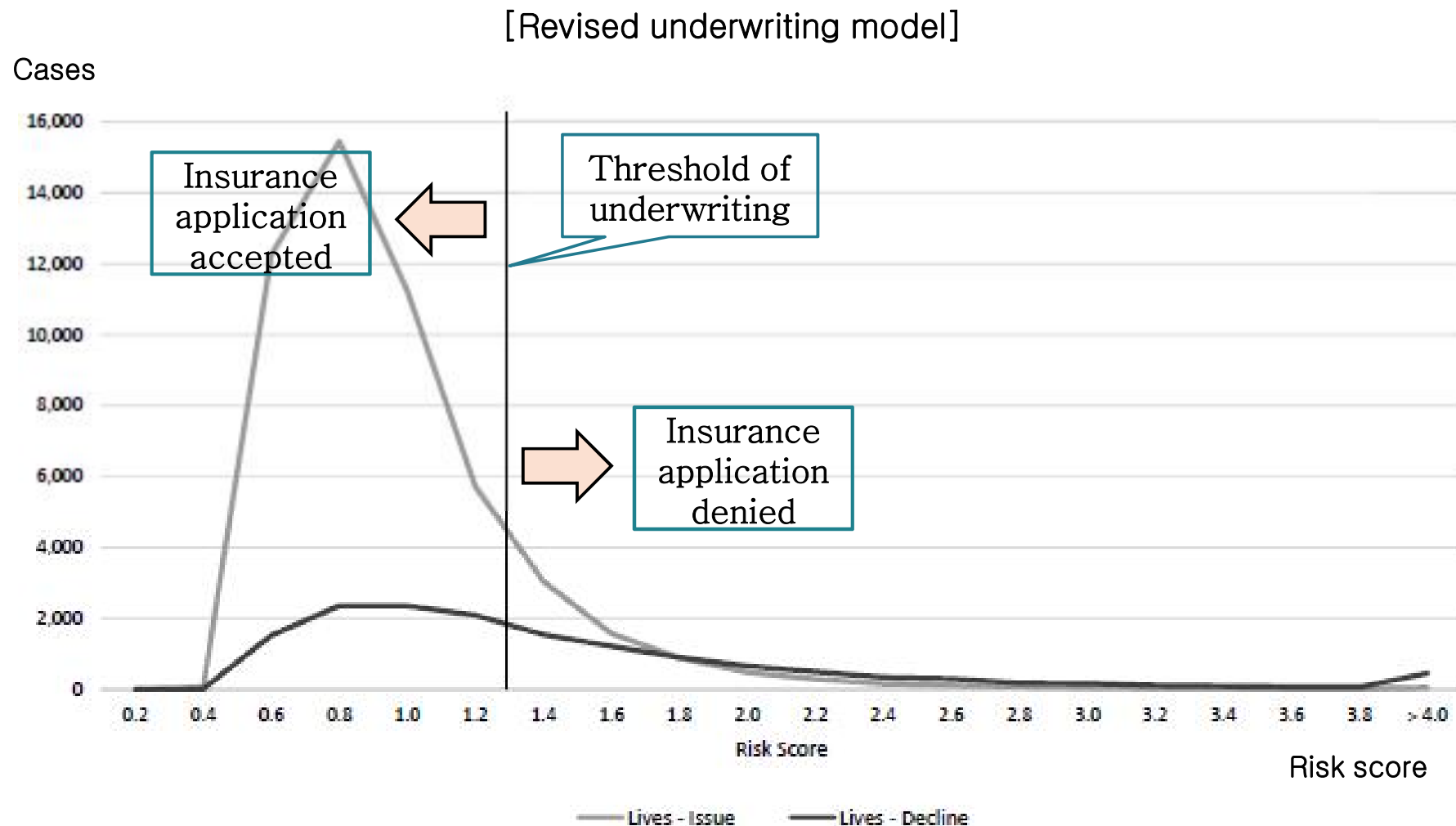
3.1.2 Foreign Cases: Underwriting using prescription data(IntelliScript)

- ✓ Analysis of the old underwriting results showed that the old method issued insurance policy for some patients with high risk and declined patients with low risk



3.1.3 Foreign Cases: Underwriting using prescription data(IntelliScript)

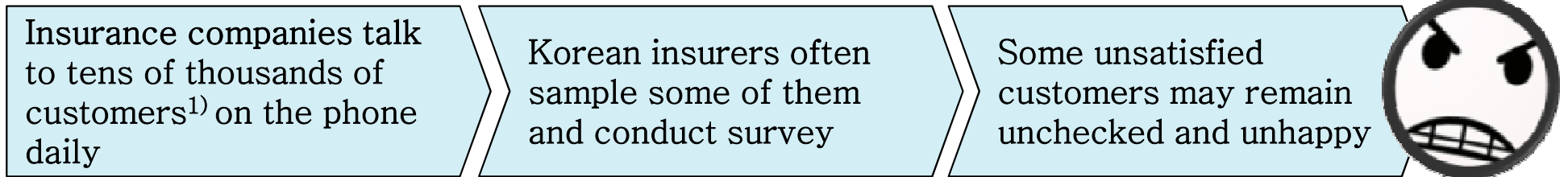
- ✓ Milliman estimated that insurance companies increased net-profit by 4 million dollars using IntelliScript's risk scoring scheme that utilizes prescription data



3.2 Foreign Cases: Phone conversation monitoring using VAS

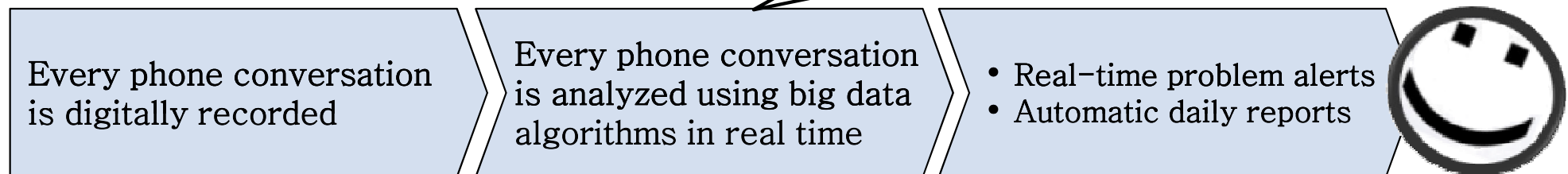
- ✓ Many foreign companies are using VAS(voice analytics system) to monitor customer–employee phone conversation real–time, which enhances customer satisfaction

[Korean insurers' phone conversation management]



big data algorithms can detect customers' emotions such as angry, frustrated, sad and so forth

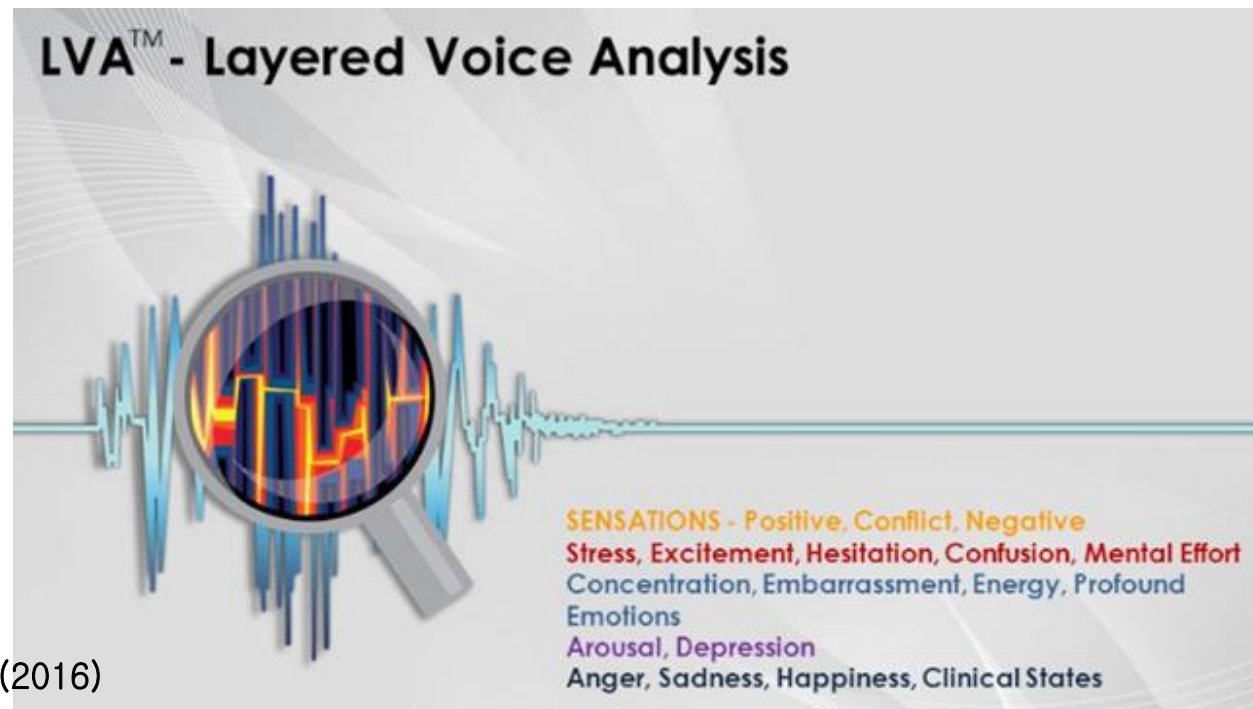
[Automated phone conversation analytics]



- Rohan(2018) reported that 80% of the fortune 1,000 companies are using automated VAS and market is going to grow rapidly
- VAS is provided by many vendors such as Epsilon, Quantifind, Narrative Science, Gridspace, SHEnetics, Toneboard, Epinium, Veridium

3.3 Foreign Cases: improved fraud detection system(LVAS)

- ✓ In addition to social network analysis, some companies proposed using layered voice analysis to detect possible insurance fraud
 - Nemesisco provides layered voice analysis system(LVAS), which detects the speaker's stress level, emotional status, credibility, criminal intent and so forth
 - Currently, many institutions such as police, military, insurance company, prison and customs office are using LAV solution
 - According to Nemesisco, LVA has 42% accuracy and improving whereas human experts showed 70% accuracy
 - However, LVA has the advantage that it can automatically process many conversations



Source: Marr(2016)

3.4 Foreign Cases: IoT based insurance

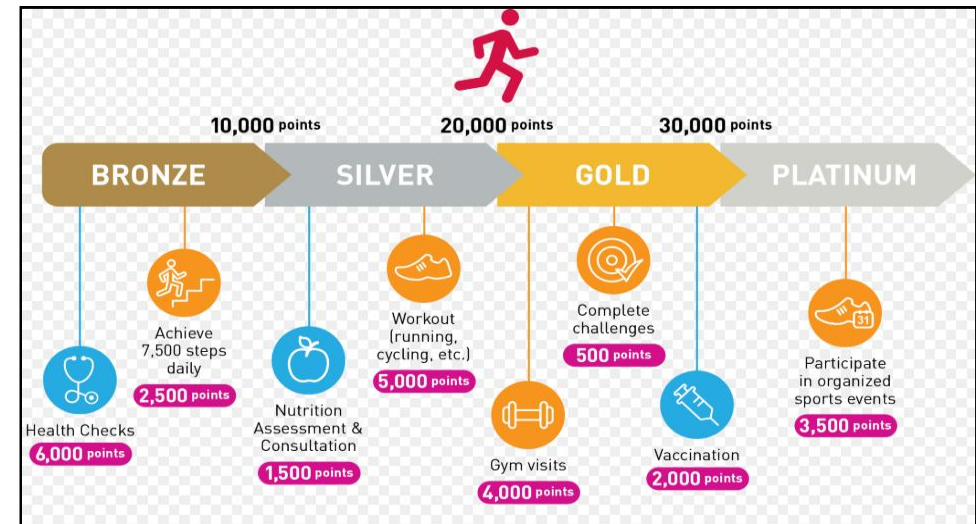
- ✓ Recently, insurance companies started providing insurance products that utilizes hand-held devices such as smart phones and smart bands

[MCL's On Track program]



- MCL provides 5% discounts to customers who successfully fulfilled the given task using a hand-held device.
- MCL figured out that this promotion is beneficial to both MCL and customer via big data analytics

[AIA's Vitality program]

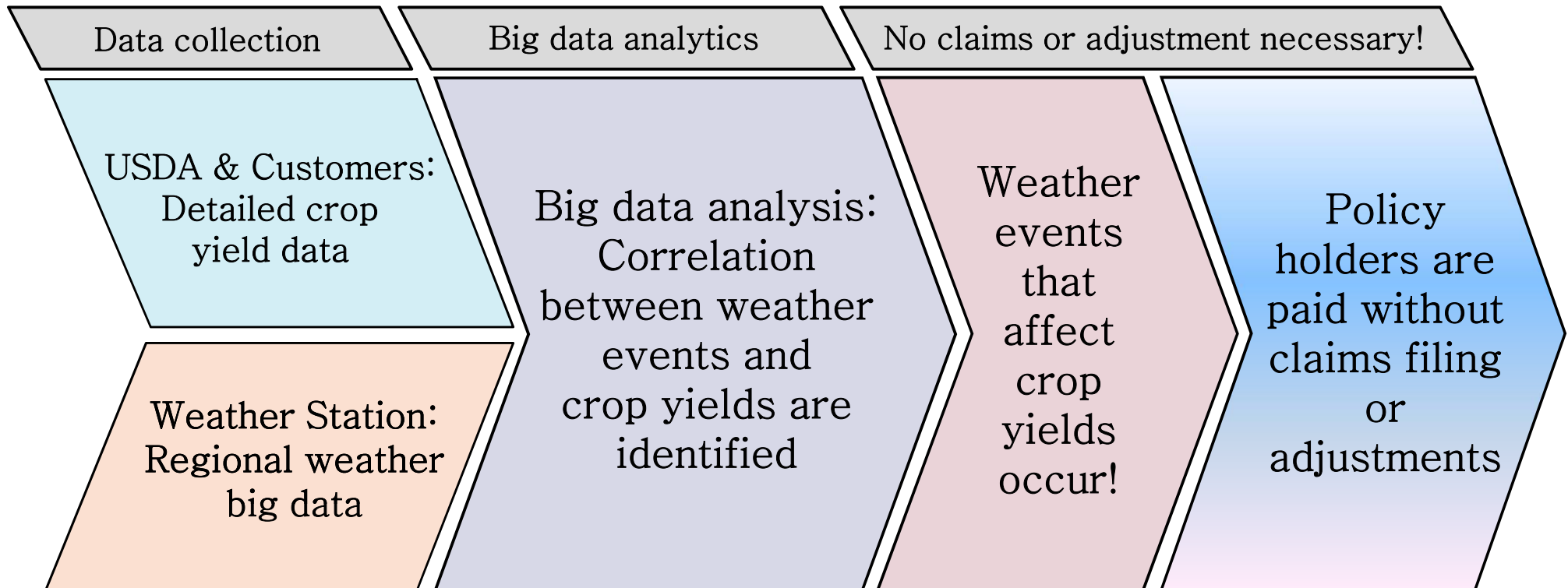


- AIA provides various rewards to the customers for fulfilling certain tasks
- Rewards include: discount on hand-held devices, cash rewards, up to 10% discount on insurance premium, reward points that can be used for gym subscription and healthy food purchase

Source: MCL, AIA websites

3.5 Foreign Cases: Index-based weather(crop) insurance(Climate Corp.)

- ✓ The Climate Corp. is selling index-based weather(crop) insurance, which was made possible by the big data analysis

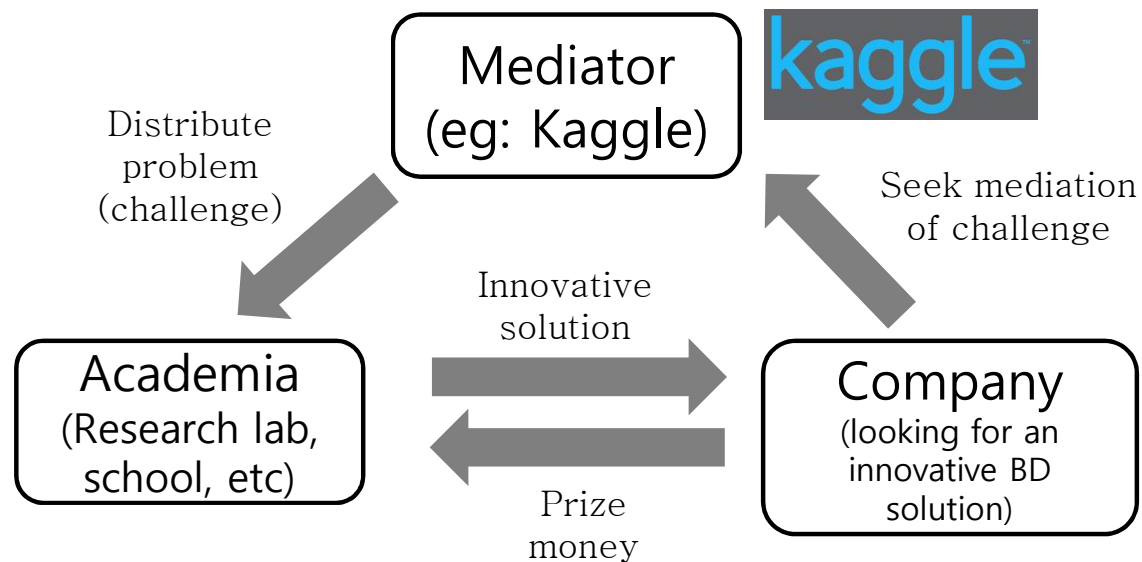


- Data: Weather data from 30,000 weather stations, detailed crop yields data from USDA and customers (manages 50 TB of data)
- Big data analysis capability: Supported by 640 labs
- Agricultural Conglomerate Monsanto purchased The Climate Corporation in 2013
- Korea: No Index-based weather insurance at the moment in Korea(Crop insurance provided by the gov.)









4.1 Foreign eco system: Kaggle

- ✓ Foreign insurers seek innovative big data solutions by sharing their problems with the research community via Kaggle

[Kaggle challenge mediation model]



[Insurance companies that sought big data solutions via Kaggle]

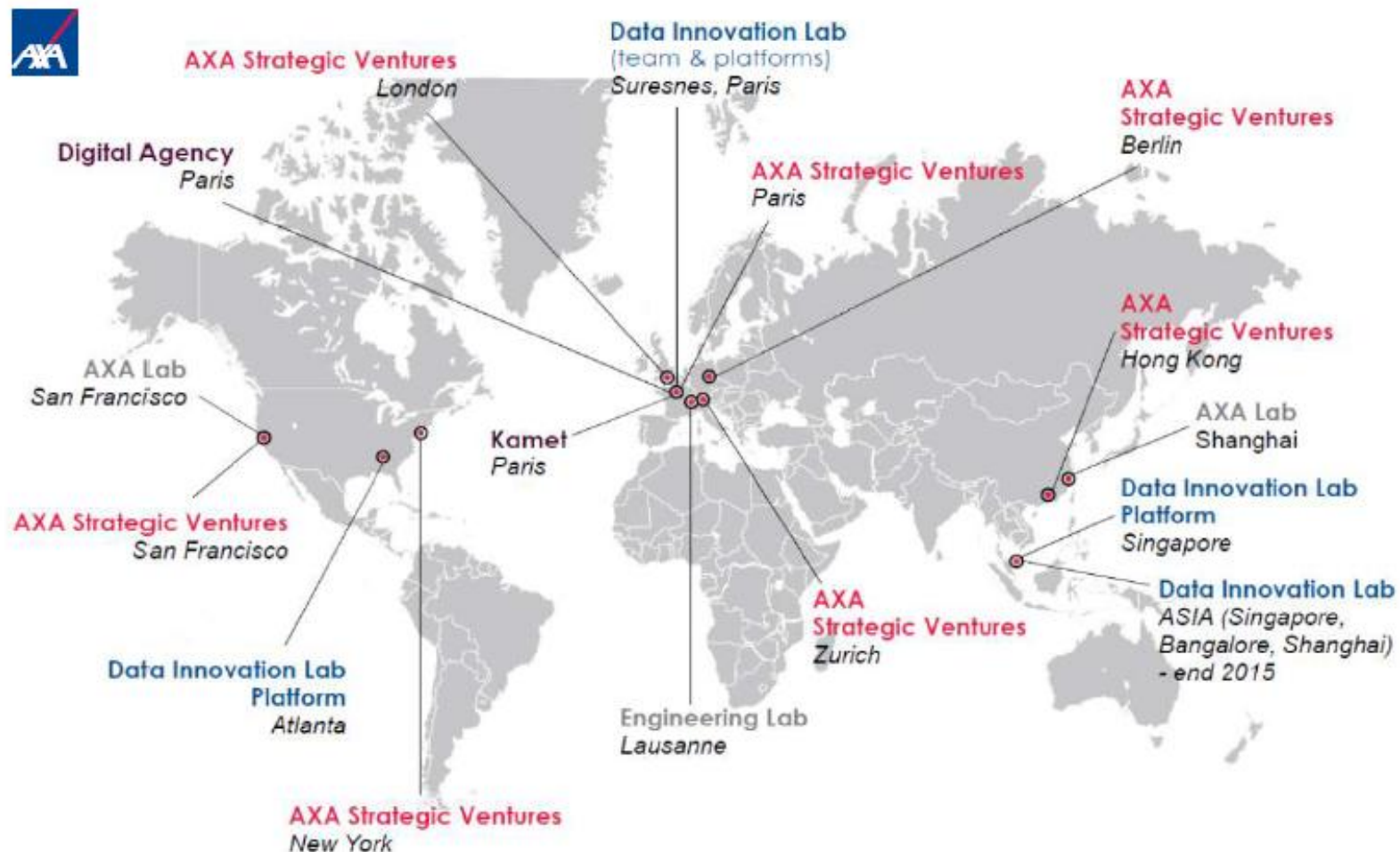
	Prudential Life Insurance Assessment Can you make buying life insurance easier? <i>Featured</i> · 3 years ago · ranking, tabular data	\$30,000 2,619 teams
	Driver Telematics Analysis Use telematic data to identify a driver signature <i>Featured</i> · 4 years ago · tabular data, multiclass classification	\$30,000 1,528 teams
	Liberty Mutual Group - Fire Peril Loss Cost Predict expected fire losses for insurance policies <i>Featured</i> · 4 years ago	\$25,000 634 teams
	Allstate Purchase Prediction Challenge Predict a purchased policy based on transaction history <i>Featured</i> · 5 years ago	\$50,000 1,568 teams
	Will I Stay or Will I Go? Predict which of our current customers will stay insured with us for an entire policy term. Masters · 6 years ago · Limited	USD 12 teams
	Allstate Claims Severity How severe is an insurance claim? <i>Recruitment</i> · 2 years ago · regression, tabular data	Jobs 3,055 teams
	BNP Paribas Cardif Claims Management Can you accelerate BNP Paribas Cardif's claims management process? <i>Featured</i> · 3 years ago · tabular data, binary classification, banking	\$30,000 2,926 teams
	Porto Seguro's Safe Driver Prediction Predict if a driver will file an insurance claim next year. <i>Featured</i> · a year ago · binary classification, tabular data	\$25,000 5,169 teams

Source: Kaggle website

4.2 Foreign eco system: AXA's expert ecosystem network

- ✓ Foreign insurers such as AXA are trying to achieve a competitive advantage in big data analytics by forming and utilizing an internal-external research network

[AXA's expert ecosystem network]

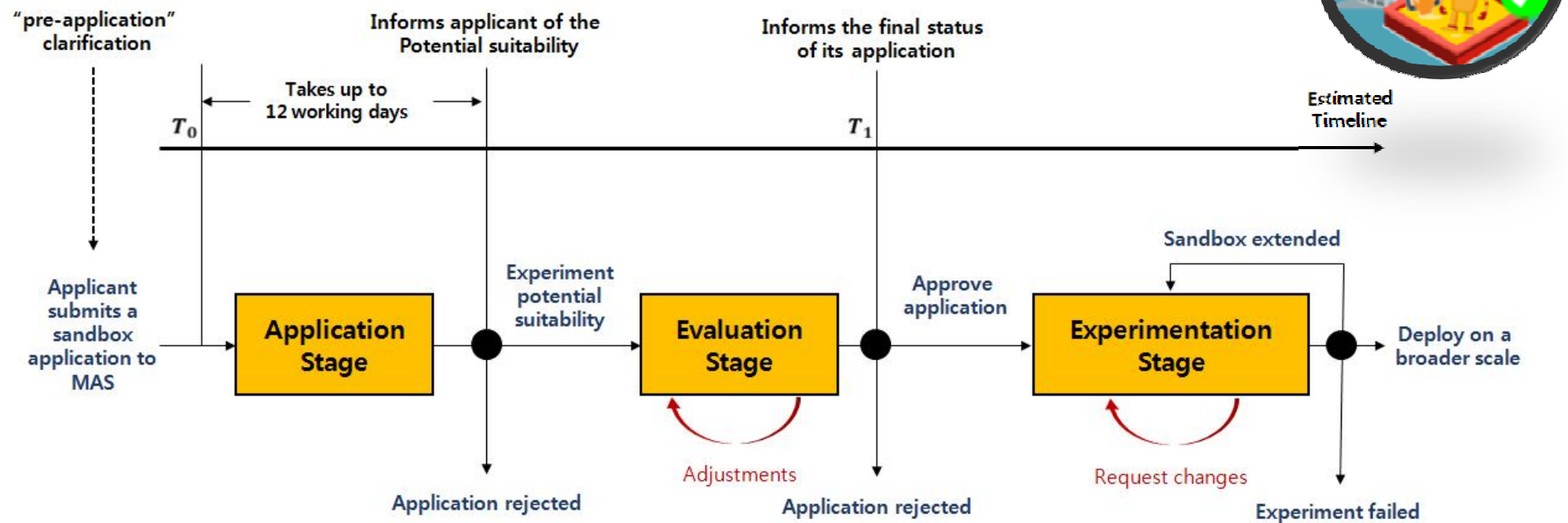


Source: AXA(2016)

5. Foreign regulation case: Singapore's regulatory sandbox

- ✓ Monetary Authority of Singapore(MAS) allows companies to test their fin-tech ideas within a regulatory sandbox: alleviated regulation is applied within a limited time and space

[Regulatory Sandbox of MAS: process]



Footnote: 'sandbox' is a confined place where children can play safely. 'sandbox' is used to refer to a confined space, where experiments can be conducted safely

Source: MAS(2016)

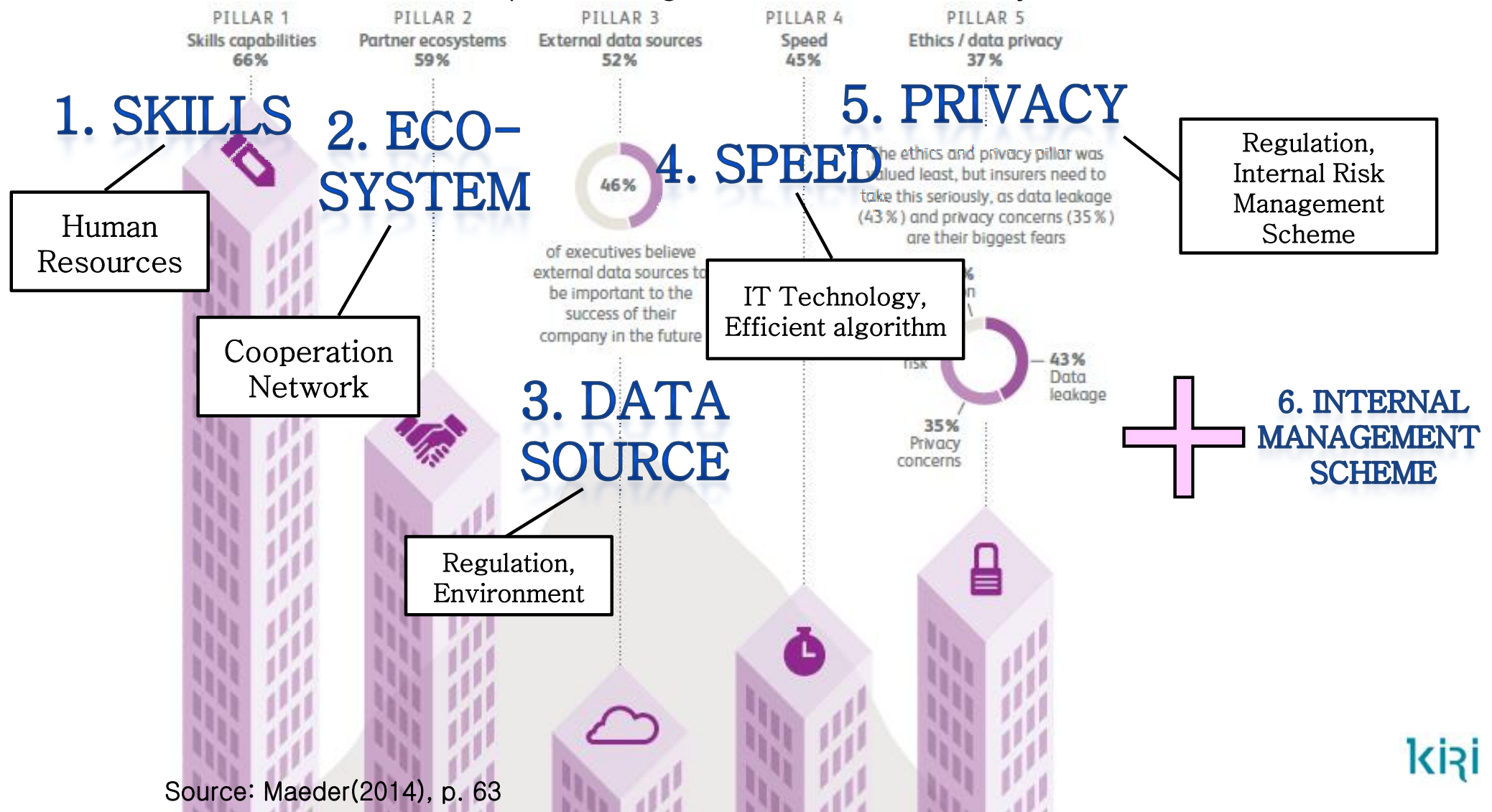
III. Issues in Using Big Data

1. Five pillars of big data
2. Identified issues
3. Issue: Data acquisition
4. Issue: Recruiting BD analytics experts
5. Issue: Insurance company's internal issues

1. Five pillars of big data

- ✓ According to Maeder(2014), insurance company CEOs pointed out that the following five factors are critical for the successful application of big data analytics. In addition, we also need to take an internal big data management scheme into account

[Five pillars of big data and advanced analytics]



2. Identified issues

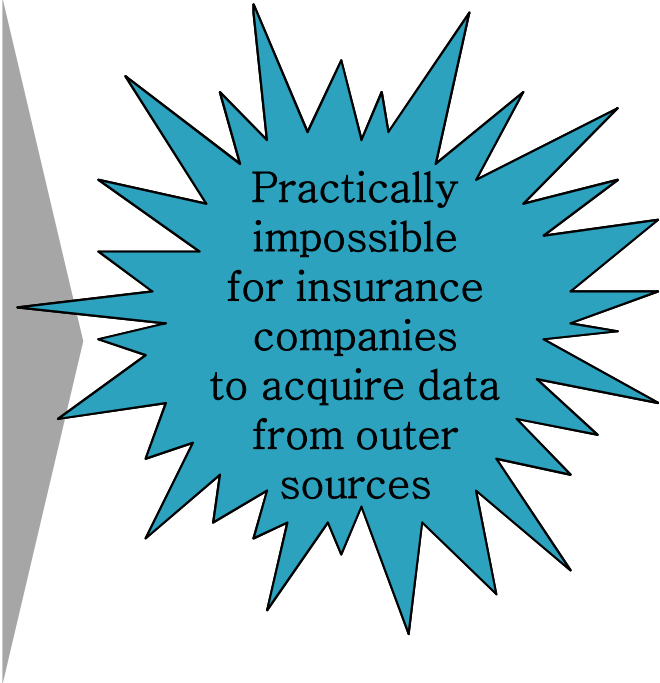
- ✓ Big data experts in insurance industry pointed out that the following issues hamper the developments of big data analytics of the Korean insurance industry

Issues	Explanation	Cause/Classification
Data acquisition	▶ Difficulty in data acquisition due to strict PIPL(personal information protection law)	▶ Regulation
Recruiting BD Experts	▶ Some insurance companies are having hard time recruiting big data experts	▶ Ecosystem
Strict internal security process	▶ Some insurance companies' internal processes for information security are too strict: have to go through a complicated process to have an access to internal big data ⇒ inefficiency occurs	▶ Internal management scheme
Resistance in practice	▶ Some insurance companies complained that some employees resist applying them in practice	▶ Internal management scheme
Unbalanced application areas	▶ Big data analytics are applications are concentrated on areas that have direct impact on profit	▶ Internal management scheme

3.1 Issue: Data acquisition(personal information protection law)

- ✓ PIPL prohibits insurance from acquiring data regarding people from outer source
⇒ Insurers' can apply big data analytics on quite restricted scope

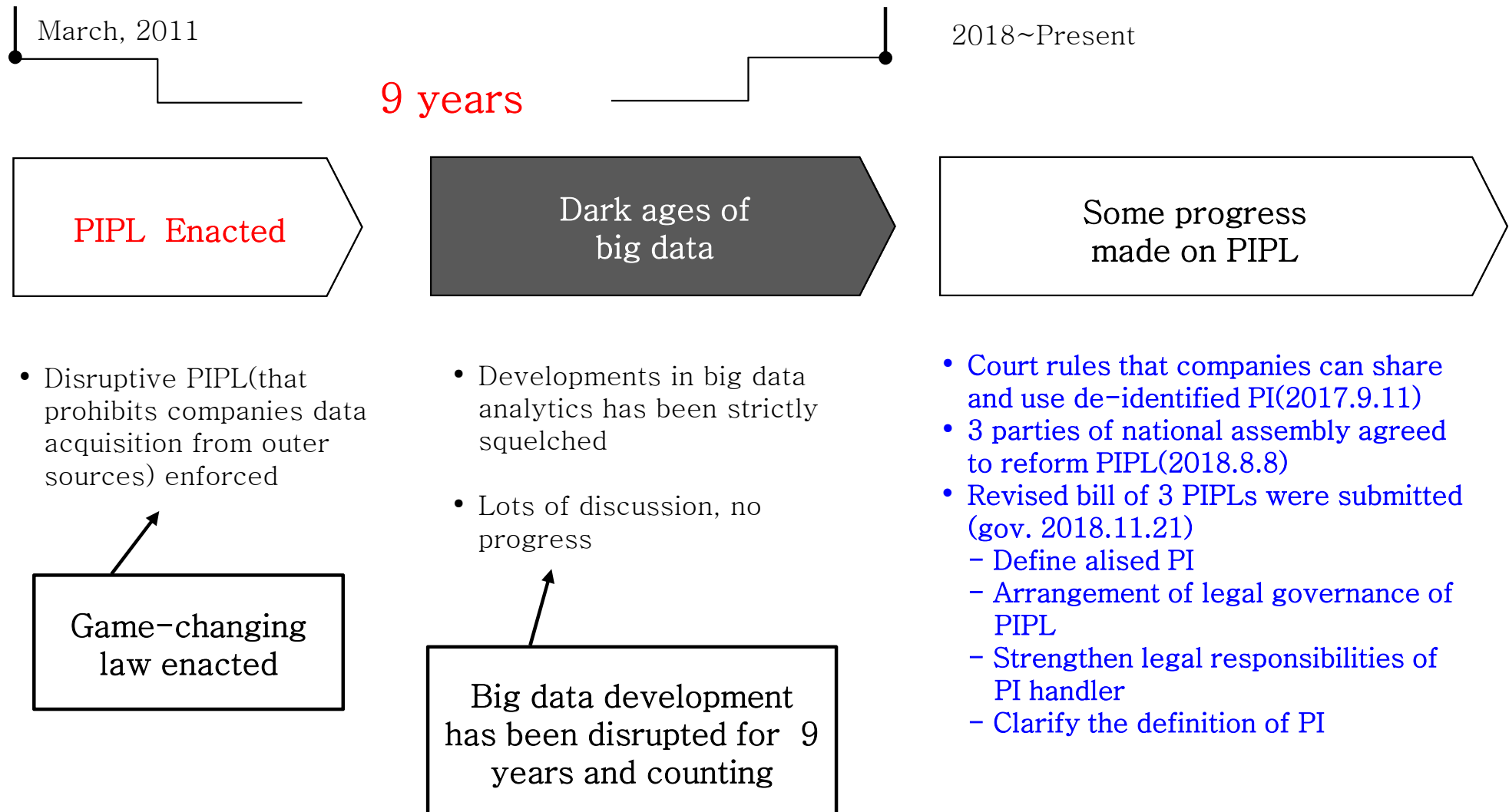
PIPL	Contents
Personal information? (Law §2-2)	<ul style="list-style-type: none">• PI is information of a living person, such as name, citizen registration number, video, that can be used in identifying a person. Information, after combined with other information, that can be used in identifying a person is also considered as PI ⇒ Almost any information of a person can quality as PI
Restriction on use(Law §18)	<ul style="list-style-type: none">• PI handler can use and provide PI for the following cases:<ol style="list-style-type: none">1. Acquired an agreement from the PI owner2. Where it is allowed in other laws3. Under life-and-death situations4. For academic purpose(without personal identification information)5. Other special cases



Practically impossible for insurance companies to acquire data from outer sources

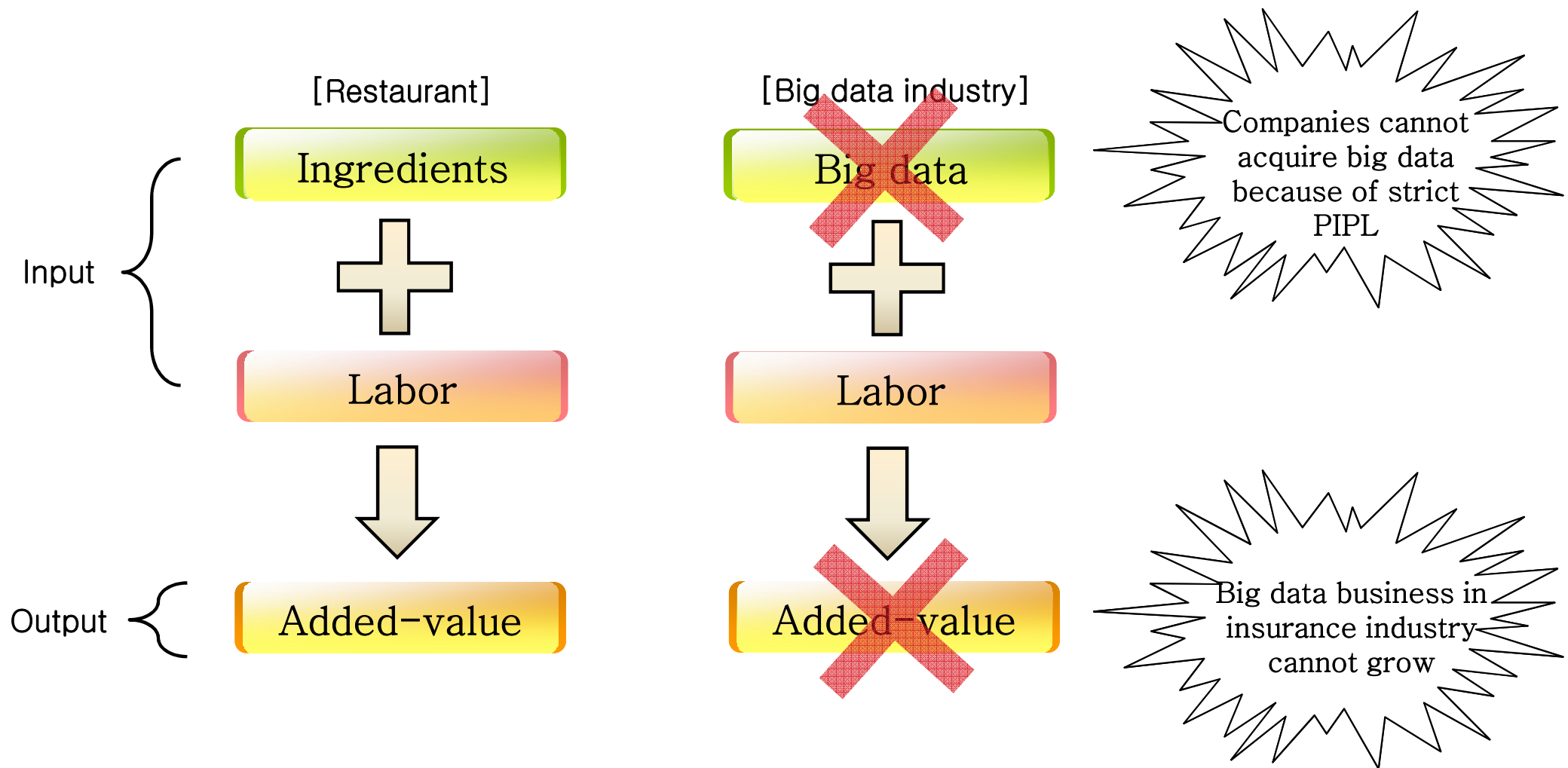
3.2 Issue: Data acquisition(recent changes of PIPL)

- ✓ PIPL that was adopted only 2 month after the massive PI leakage has disrupted the development of the industrial big data applications for more than 3 years



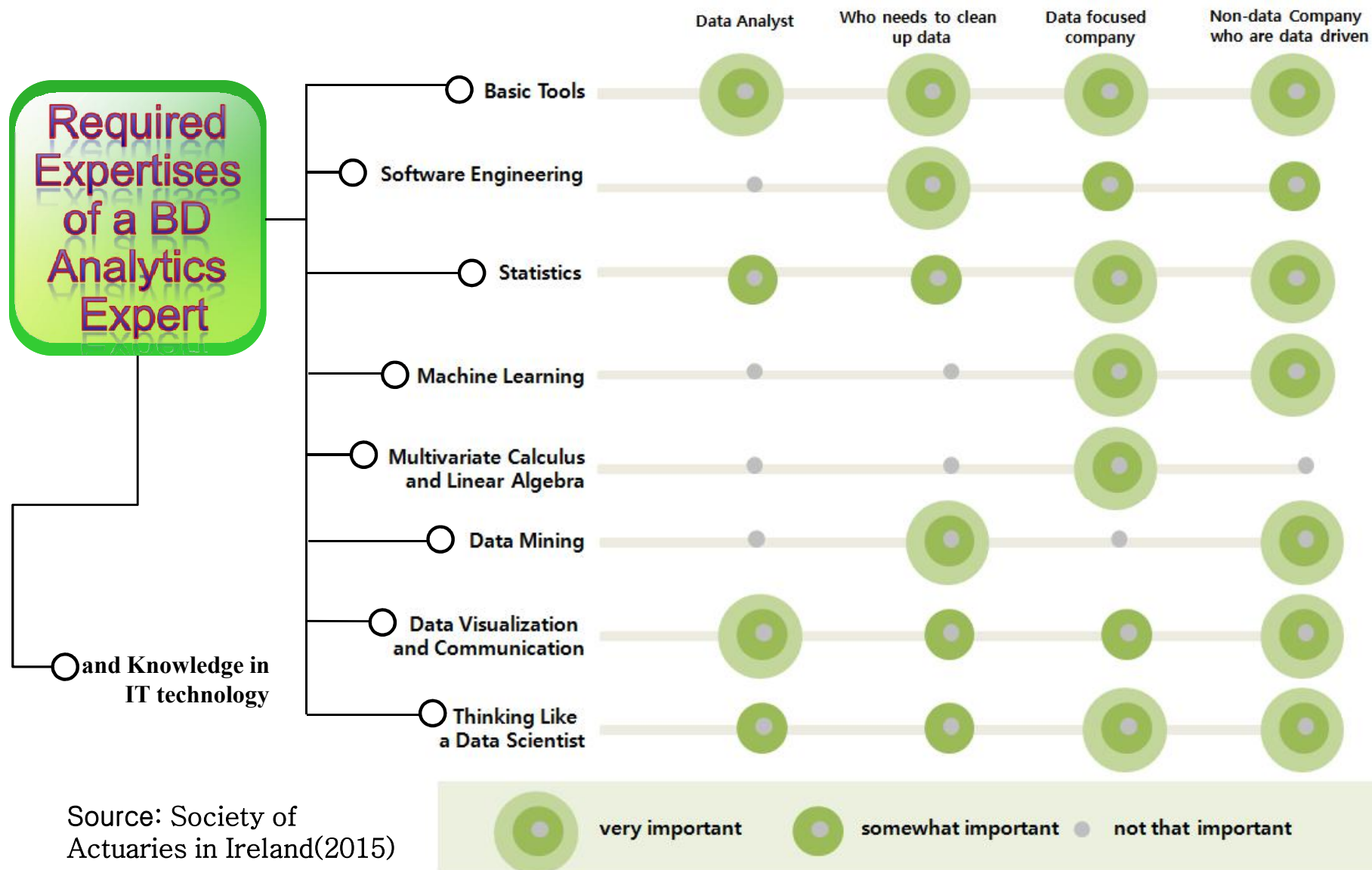
3.3 Issue: Data acquisition(strict PIPL → no big data → no big data industry)

- ✓ Current strict PIPL is disrupting the flow of big data. The big data industry cannot grow without big data.



4.1 Issue: Recruiting BD analytics experts(required expertises)

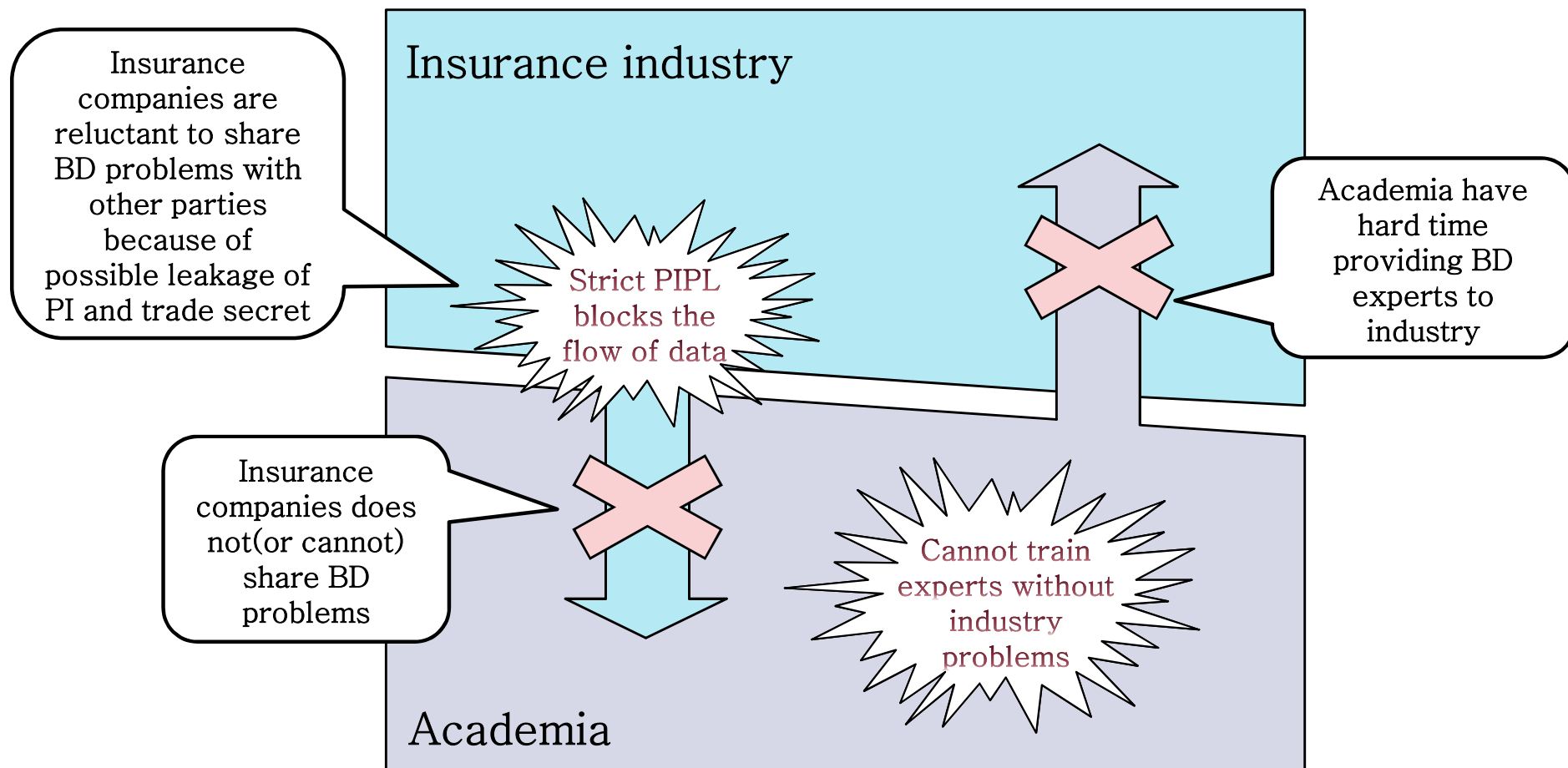
- ✓ Expertises required to be a DB analytics expert include: basic analytics tools, software engineering, statistics, machine learning, multivariate calculus, linear algebra, visualization, communication and thinking like a data scientist(intuition)



4.2 Issue: Recruiting BD analytics experts(no ecosystem, not enough experts)

- ✓ Korean insurance companies are having hard time recruiting BD analytics experts partly because we do not have a prosperous big data ecosystem(no ecosystem, no experience, no experts!)
 - Big data problems are solved internally or by consulting companies

[Problem with the Korean big data ecosystem]



5. Issue: Insurance company's internal issues

- ✓ Certain internal issues such as strict internal security process, resistance in practice and unbalanced applications can hinder the development of big data analytics in insurance industry

Strict internal security process


- Electronic finance supervisory regulation(13.5) states that “company needs to set up and apply internal electronic security control process”(grants a certain degree of freedom)
⇒ Some companies set up complicated internal processes (conservative interpretation of the law). i.e. require approval of many senior employees ⇒ Inefficiency occurs

Resistance in practice

- Some employees resist applying big data analytics in practice:
 1. Their experience may contradict big data analytics
 2. It is too cumbersome
 3. Simply do not trust the result of big data analysis

Unbalanced application areas

- Big data applications of Korean insurance industry is concentrated on value-chains that have direct impact on profit whereas other countries have more broad range of applications
⇒ unbalanced growth can limit the growth of big data capability of Korean insurance industry



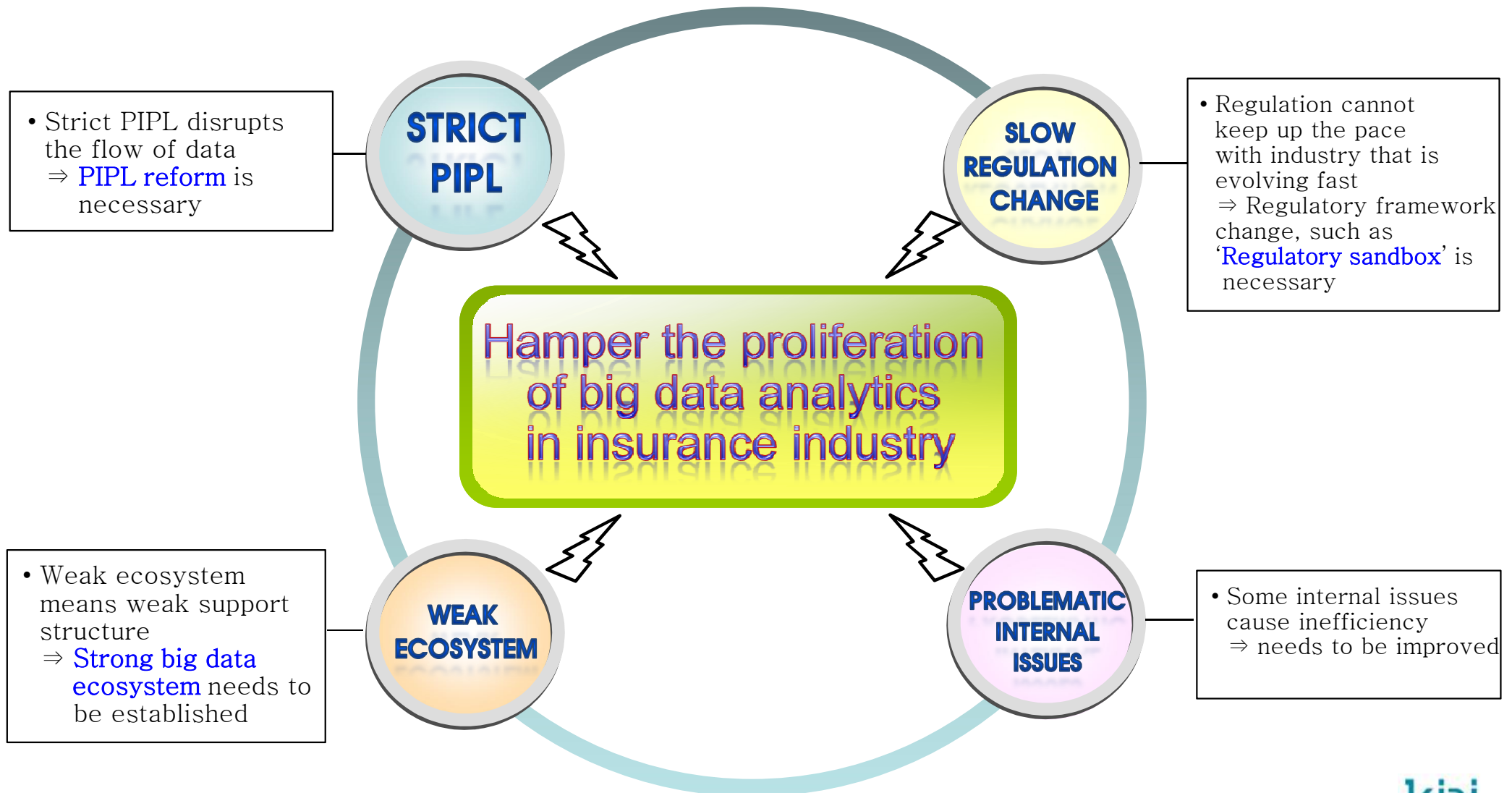
May hinder the
development
of BD analytics
in insurance
industry

IV. **Suggestions**

1. Summary
2. Suggestion: Personal data protection law
3. Suggestion: Regulatory sandbox
4. Suggestion: Creation of echo-system
5. Suggestion: Improve internal security process

1. Summary: 4 factors that need improvement

- ✓ We propose 4 ideas for the proliferation of big data analytics in Korean insurance industry: PIPL reform, adoption of 'regulatory sandbox', strengthening BD ecosystem and internal process management



2. Suggestion: PIPL reform

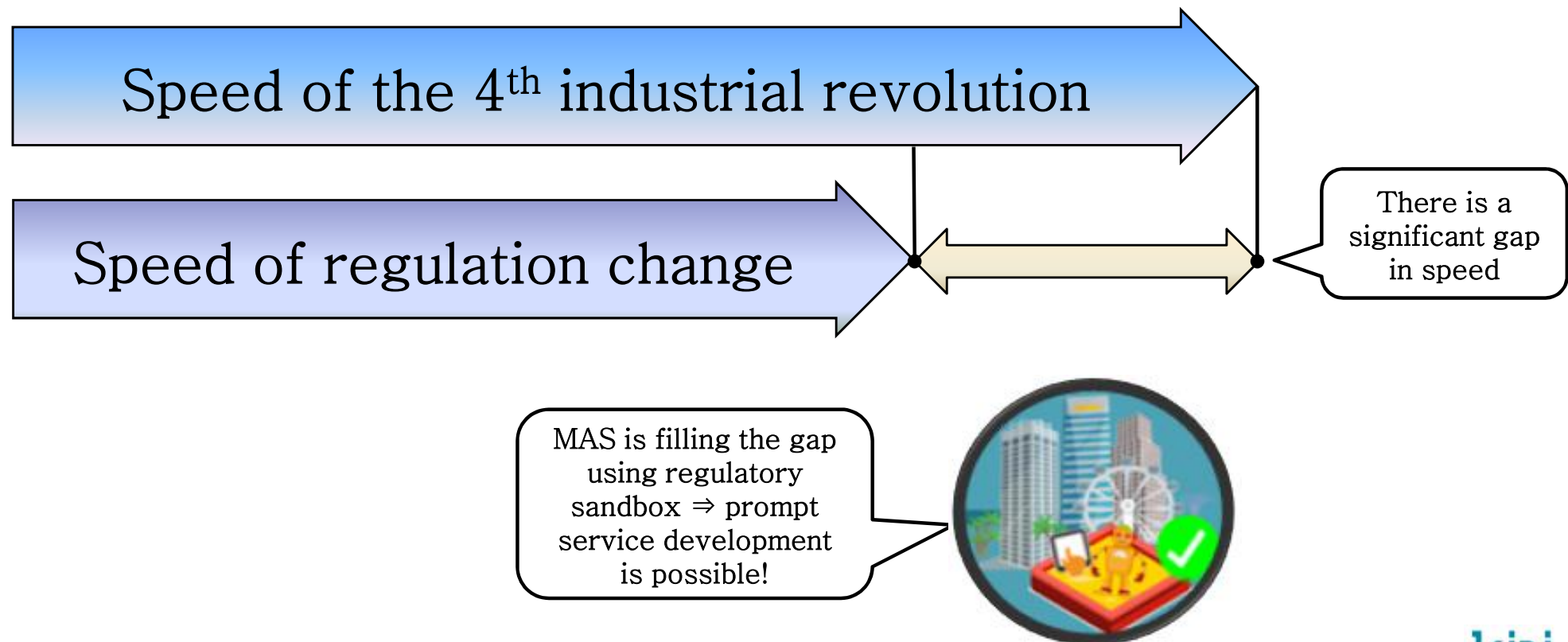
- ✓ Two options exist to alleviate the strictness of PIPL, which include: reform of PIPL itself and legislate a special law
 - 3 national assembly parties agreed to reform PIPL(2018.8.8) and FSC¹⁾ announced a plan to legislate a special law(2018.3) ⇒ No progress has been made yet

PIPL	Current law	Proposed revision
1. Reform PIPL (Law §17-①)	① PI handler can provide PI to the 3 rd party for the following cases: <ol style="list-style-type: none"> 1. The owner of PI agreed 2. PI was collected under §15 ① -2, 3, 5 and provided within the prescribed legal limits 	Change ①-2 as follows <ol style="list-style-type: none"> 1. --- 2. PI was collected under §15 ① -2, 3, 5 and 6, and provided within the prescribed legal limits (§15-① 6 states: PI handler provides PI for a justifiable benefit where the handler's right precedes that of the PI owner. This case is limited to the case where PI handler has a significant interest and conducted within reasonable boundaries. (Lee, 2018))
2. Legislate a special law	<ul style="list-style-type: none"> • PIPL §6 states: Unless stipulated in other laws, court rules according to this law ⇒ In other words, PI handlers can provide PI to the 3rd party if a special law allows it 	<ul style="list-style-type: none"> • Special law that includes: <ul style="list-style-type: none"> - Definition of de-identified PI - Allow PI handlers to share PI with 3rd parties within a certain guideline

Footnote: 1) Financial Supervisory Commission

3. Suggestion: Adopting 'regulatory sandbox'

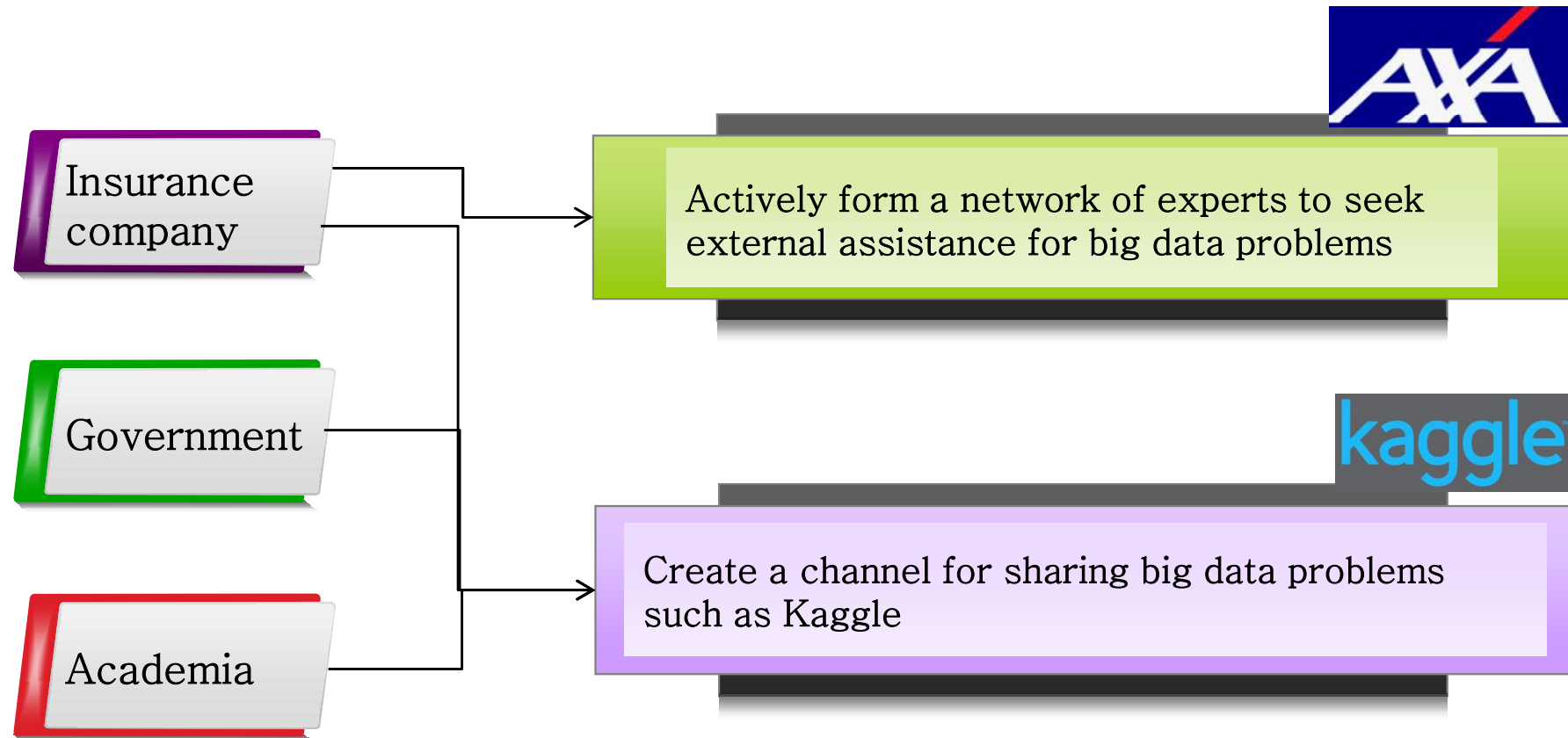
- ✓ We need to adopt 'the regulatory sandbox of MAS'!
 - In the age of 4th industrial revolution, industry evolves faster than regulation
 - MAS is filling the gap using regulatory sandbox
 - ⇒ let companies develop services with less regulatory restrictions
- ✓ The national assembly recently passed 'the law for supporting the revolution of financial sector' (2018.11.23), which include the adoption of 'regulatory sandbox'



Source: picture is from MAS website

4. Suggestion: Improve big data ecosystem

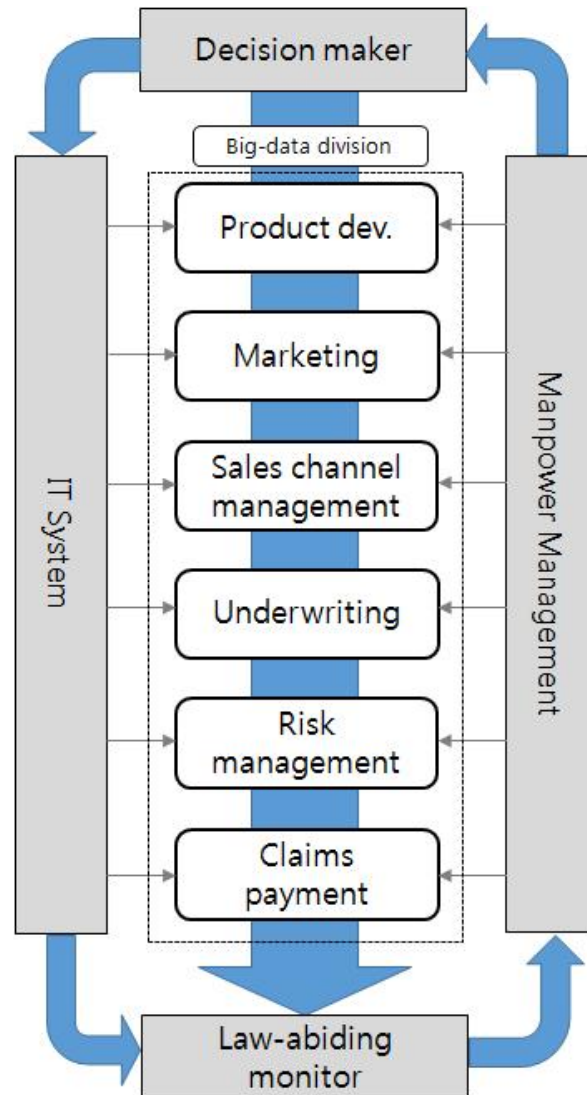
- ✓ Insurance companies, financial supervisory authority and academia need to work together to create a sustainable big data ecosystem



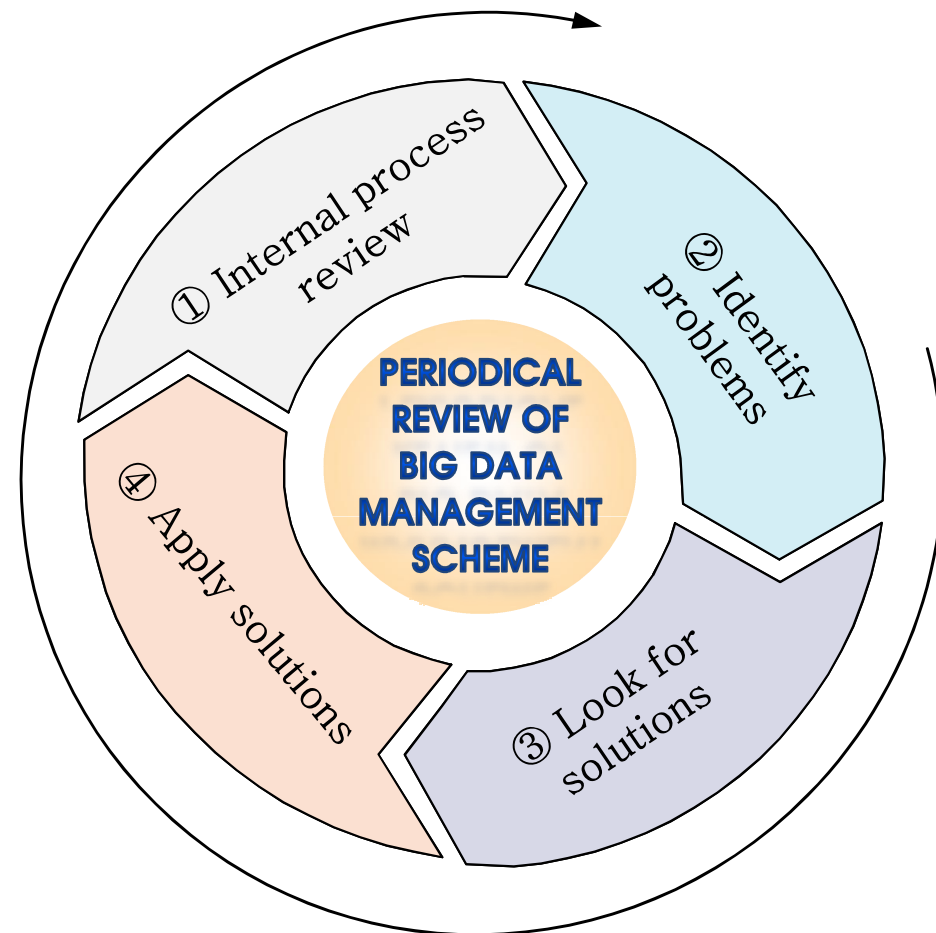
5. Suggestion: Improve internal security process

- ✓ Insurance companies need to set up a internal big data management scheme and need to review it periodically for its continual improvements.

[Big data management scheme]



[Review process of big data management scheme]



Thank you

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