The Future of Life Insurance: Digitalization and Operational Excellence

Introduction
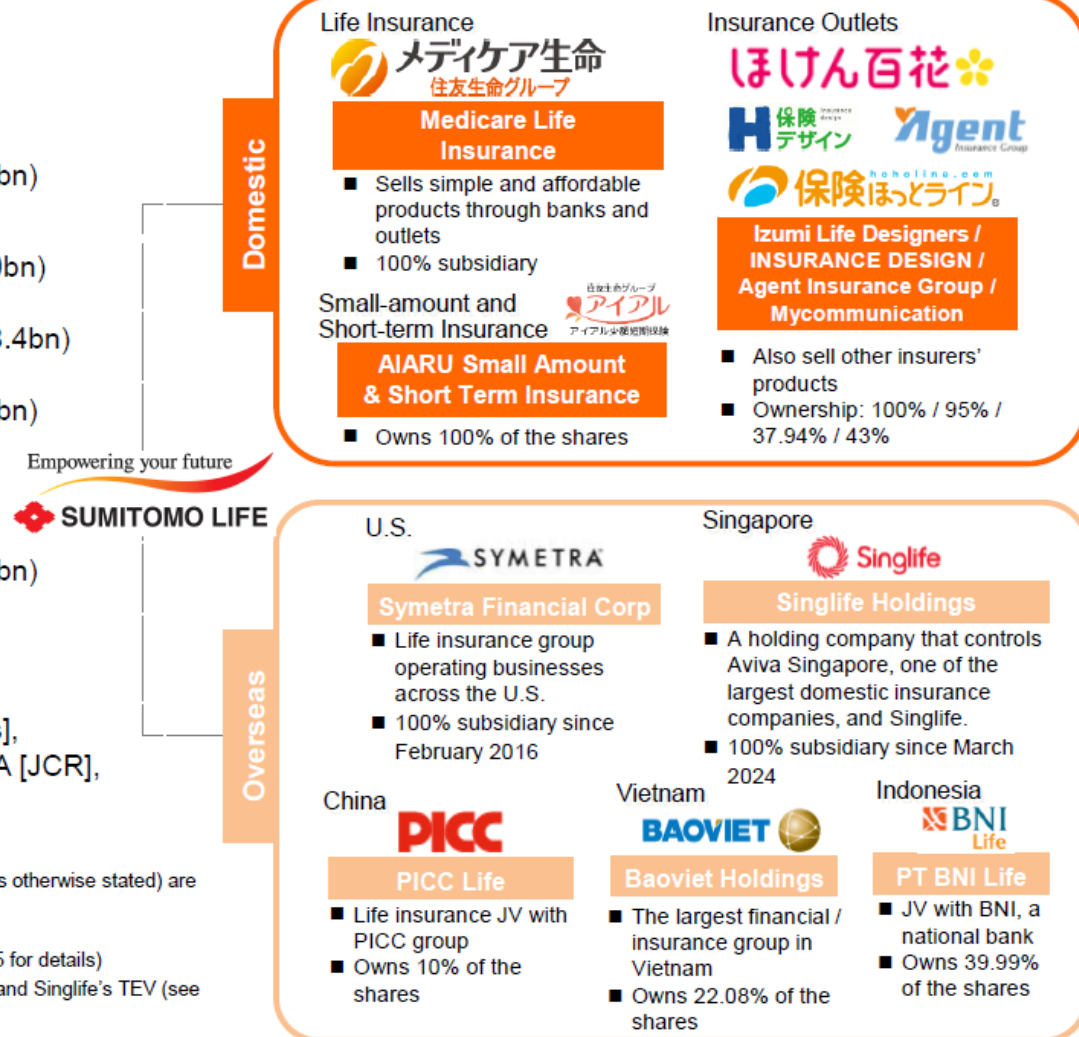
Company Overview

- Established: May 1907

Key Figures[1] – FY2023 (as of Mar 2024)

- Premium income: JPY 2.64tn (USD 17.4bn)

- Core business profit[2]: JPY 305.6bn (USD 2.0bn)

- Total assets: JPY 48.20tn (USD 318.4bn)

- Annualized premiums from policies in force[3]: JPY 3.44tn (USD 22.7bn)

- Solvency margin ratio: 639.5%

- Embedded value[4] (EEV): JPY 5.64tn (USD 37.3bn)

- Number of sales representatives: 32,082

- Insurer financial strength rating[5]: A+ [S&P], A1 [Moody's], A+ [Fitch], AA [R&I], AA [JCR],

Source: Company disclosure
1. Consolidated figures. USD amounts in parentheses in this presentation (except as otherwise stated) are translated from JPY using USD1 = JPY151.41, as of March 31, 2024.
2. Core business profit of the group (see page 6 for details)
3. Figures for individual life and individual annuity for domestic business (see page 5 for details)
4. Combined figures of Sumitomo Life's EEV, Medicare Life's EEV, Symetra's EEV and Singlife's TEV (see page 7 for details)
5. As of April 30, 2024.
6. As of March 31,2024 on ownership

Group Overview[5]

Domestic

Life Insurance

メディケア生命
住友生命グループ

Medicare Life Insurance
- Sells simple and affordable products through banks and outlets
- 100% subsidiary

Small-amount and Short-term Insurance
アイアル
アイアル少額短期保険

AIARU Small Amount & Short Term Insurance
- Owns 100% of the shares

Insurance Outlets

ほけん百花

H 保険デザイン   Agent Insurance Group

保険ほっとライン

Izumi Life Designers / INSURANCE DESIGN / Agent Insurance Group / Mycommunication
- Also sell other insurers' products
- Ownership: 100% / 95% / 37.94% / 43%

Overseas

U.S.
SYMETRA
Symetra Financial Corp
- Life insurance group operating businesses across the U.S.
- 100% subsidiary since February 2016

Singapore
Singlife
Singlife Holdings
- A holding company that controls Aviva Singapore, one of the largest domestic insurance companies, and Singlife.
- 100% subsidiary since March 2024

China
PICC
PICC Life
- Life insurance JV with PICC group
- Owns 10% of the shares

Vietnam
BAOVIET
Baoviet Holdings
- The largest financial / insurance group in Vietnam
- Owns 22.08% of the shares

Indonesia
BNI Life
PT BNI Life
- JV with BNI, a national bank
- Owns 39.99% of the shares

Empowering your future
SUMITOMO LIFE

Introduction

Approximately 42 million members in 41 countries and territories worldwide.

Introduction
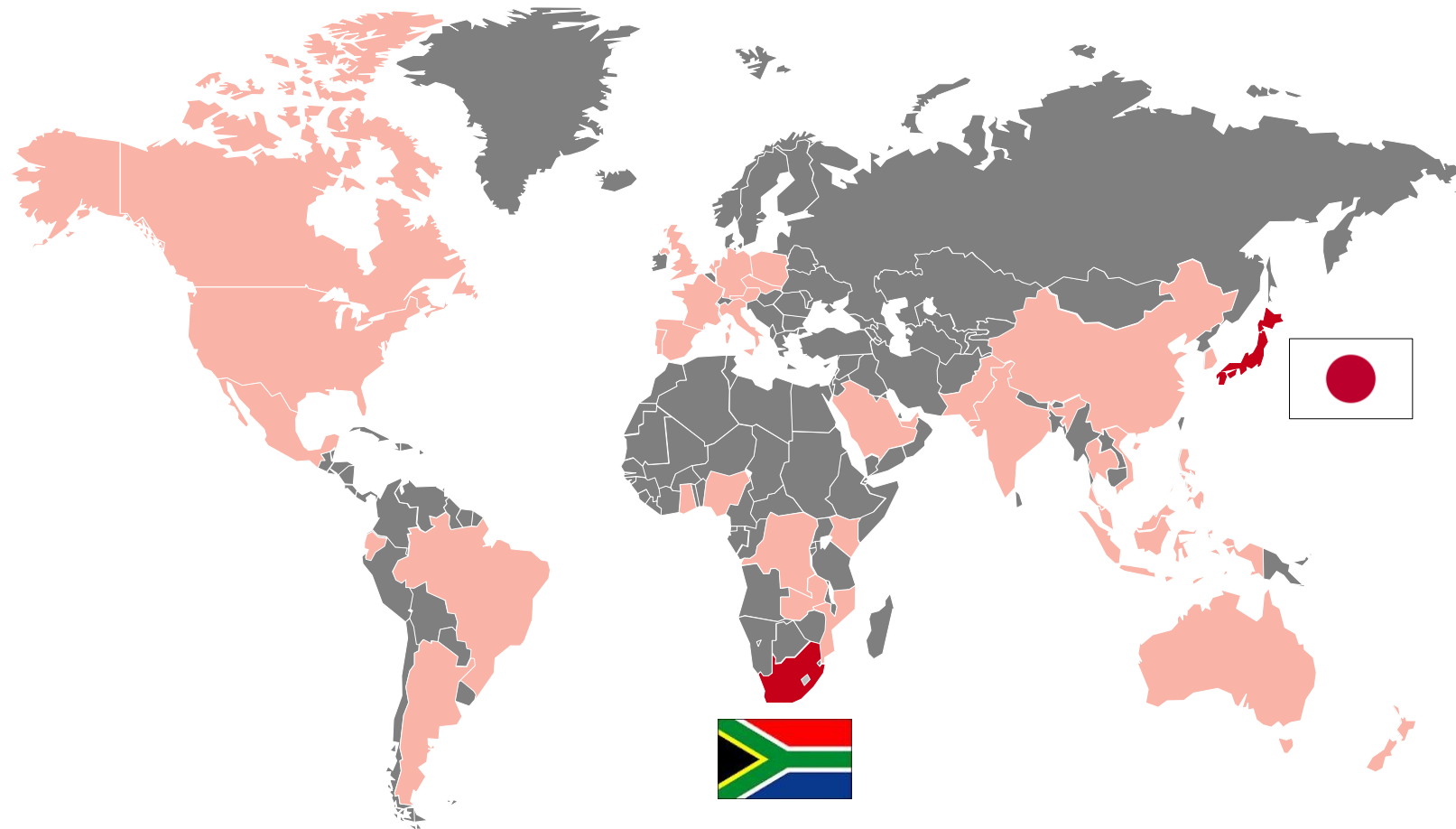
Yosuke Fujisawa
FIAJ, CERA

2000 — **Sumitomo Trust & Banking**
Fellow of Institute of Actuaries of Japan
Certified Pension Actuary

2008 — **Master of ActSc, University of Waterloo**

2011 — **Lifenet Insurance, GM of risk management**
CERA
Part-time lecturer at Osaka University

2014 — **RGA Reinsurance Company, Director**

2017 — **Swiss Reinsurance Company, Vice President**
Part-time lecturer at Waseda University

2020 — **Sumitomo Life, AI officer**
Chair of EFR forum, IAA
Member of AI taskforce, IAA

ICA2026 Tokyo

About ICA2026 Tokyo

Dates	**November 8th – 13th, 2026**
Venue	Tokyo International Forum
Style	Hybrid
Theme	*Tradition, Diversity, Innovation*

Venue (Tokyo International Forum)
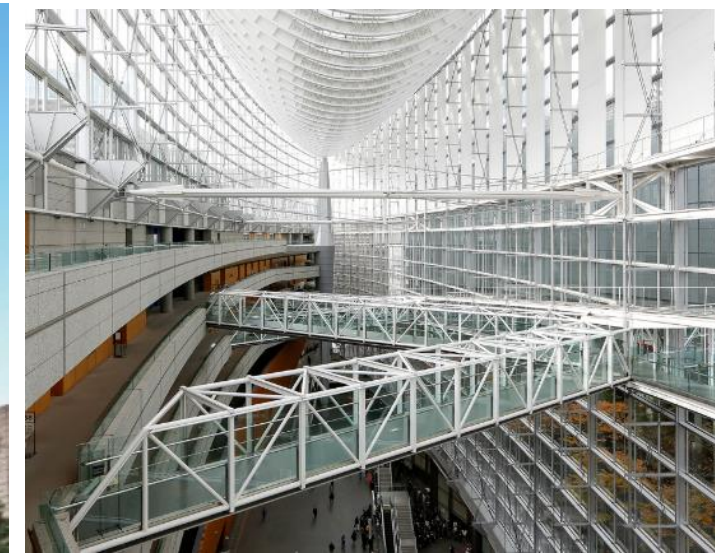
- Tokyo International Forum is located in the heart of Tokyo.
- It offers excellent access to hotels, restaurants, train stations, and airports.

ICA2026 Tokyo

The official website and SNS accounts can be accessed through the QR code or URL provided below.

ICA2026 Official Website

- **https://ica2026.org/**

ICA2026 Official SNS Accounts Information

X: ICA2026 Tokyo (@ICA2026)

https://twitter.com/ICA2026

Facebook: ICA2026 Tokyo (ica2026.tokyo)

https://www.facebook.com/ica2026.tokyo

LinkedIn: ICA2026 Tokyo

https://www.linkedin.com/company/ICA2026/

Agenda

1. Insurance market in Japan

2. Online insurance and health & wellness insurance

3. AI applications

Overview of Japanese life insurance market

1. Long-Established Domestic Insurers
Japan's life insurance market is largely composed of a few major domestic insurers (e.g., Nippon Life, Dai-ichi Life, Meiji Yasuda Life, Sumitomo Life) that have been in operation for decades. These insurer benefit from strong brand recognition and extensive distribution networks, giving them a substantial home-market advantage.

3. Bancassurance and Agency Channels
While traditional door-to-door sales remain a key part of the distribution model, bancassurance and large agency networks have become increasingly important. Many insurers collaborate with banks, post offices, and insurance shops to extend their reach to a broad customer base.

2. Aging Population
With one of the world's fastest-aging populations, Japanese consumers tend to prioritize insurance products that go beyond simple death coverage, especially hospital cash, critical illness, and LTC. As a result, insurers frequently innovate and bundle policies with health & wellness incentives to improve healthy life expectancy.

4. High Level of Household Penetration
Life insurance penetration is very high in Japan. Culturally, there is a long history of relying on life insurance to provide financial security for dependents. In many cases, multiple smaller policies (e.g., cancer insurance, hospital cash insurance, term life) are held by a single individual or household.

# Global Ranking of Life Insurance Premiums (2023)

Ranking in 2023	Country	Premium in 2023	Share in 2023	Share in 2019	Ranking in 2019	Share increase or decrease since 2019	As a % of GDP (2023)
1	US	714,859	24.7	21.55	1	3.15	2.6
2	China	390,400	13.5	11.30	3	2.20	2.0
3	Japan	277,198	9.6	11.70	2	△2.10	2.0
4	UK	236,941	8.2	9.06	4	△0.86	7.1
5	France	170,098	5.9	5.75	5	0.15	5.5
6	Italy	110,549	3.8	4.26	6	△0.46	4.9
7	India	100,185	3.5	2.73	10	0.77	0.7
8	Germany	93,325	3.2	3.48	9	△0.28	2.1
9	South Korea	84,364	2.9	3.24	8	△0.34	2.1
10	Canada	70,319	2.4	1.83	13	0.57	3.3

Source: Swiss Re "sigma No3/2024", "sigma No4/2020"

New business of individual life insurance

Japanese population
124,352k

New Business

Bubble collapse

Insures failures

Kanpo

12,602k
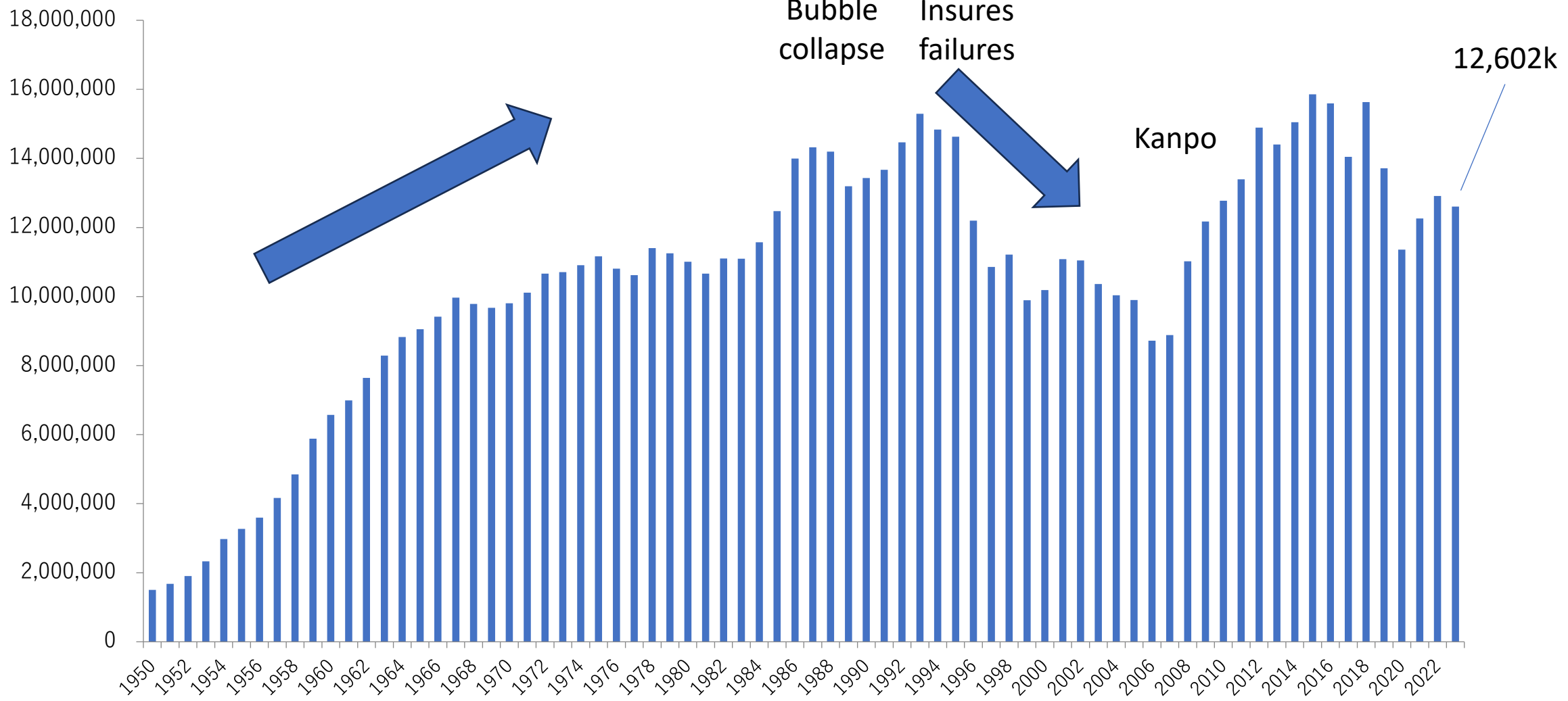
Source: life insurance association of Japan

New business of individual life insurance in 2023
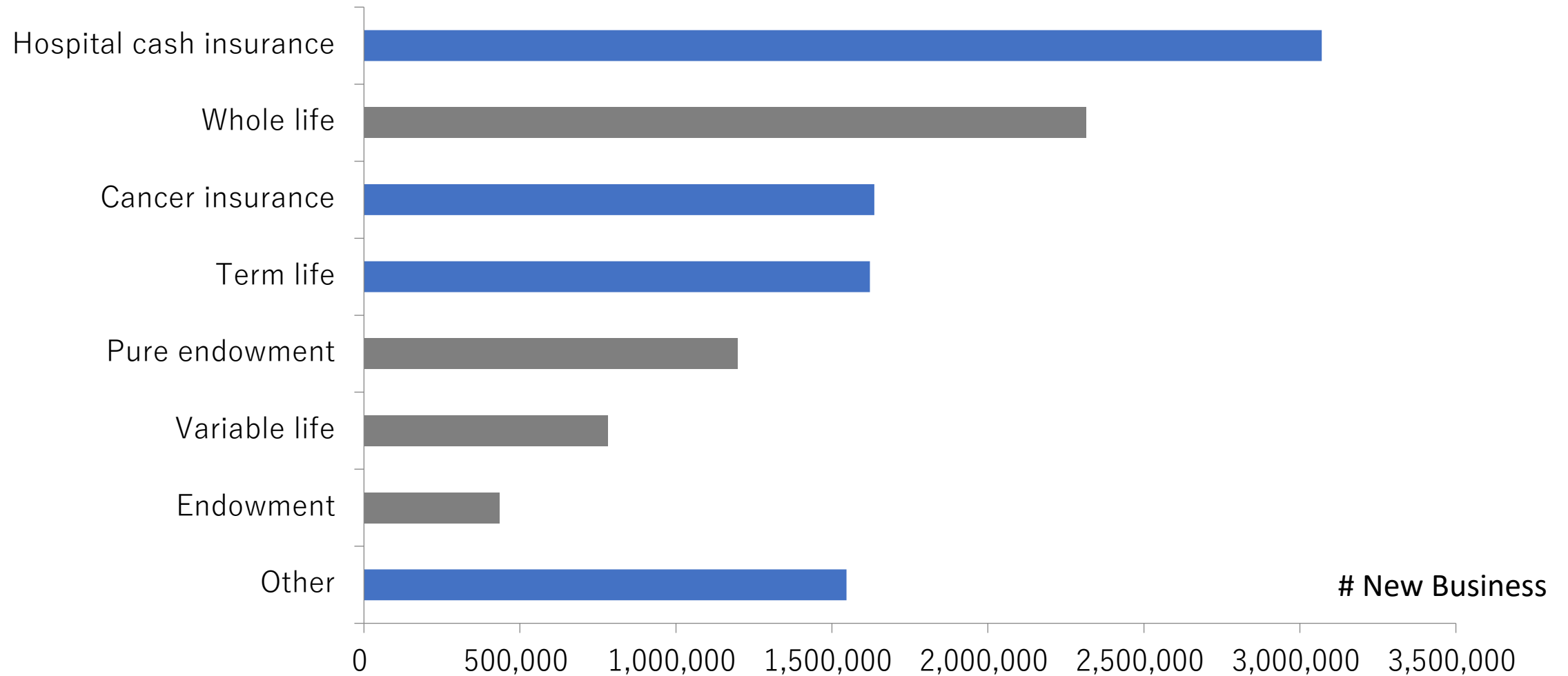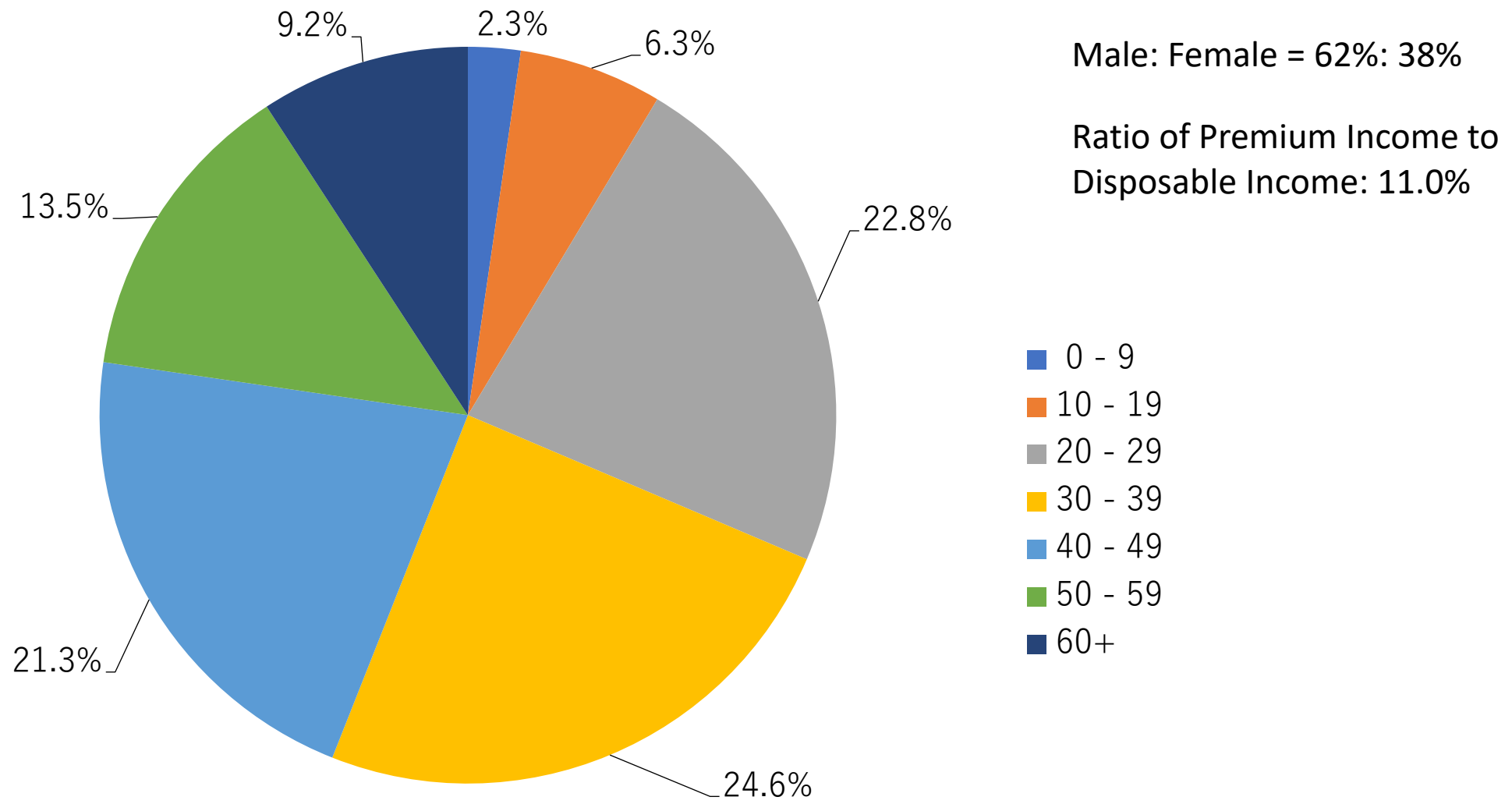
Source: life insurance association of Japan

Typical Product Spec

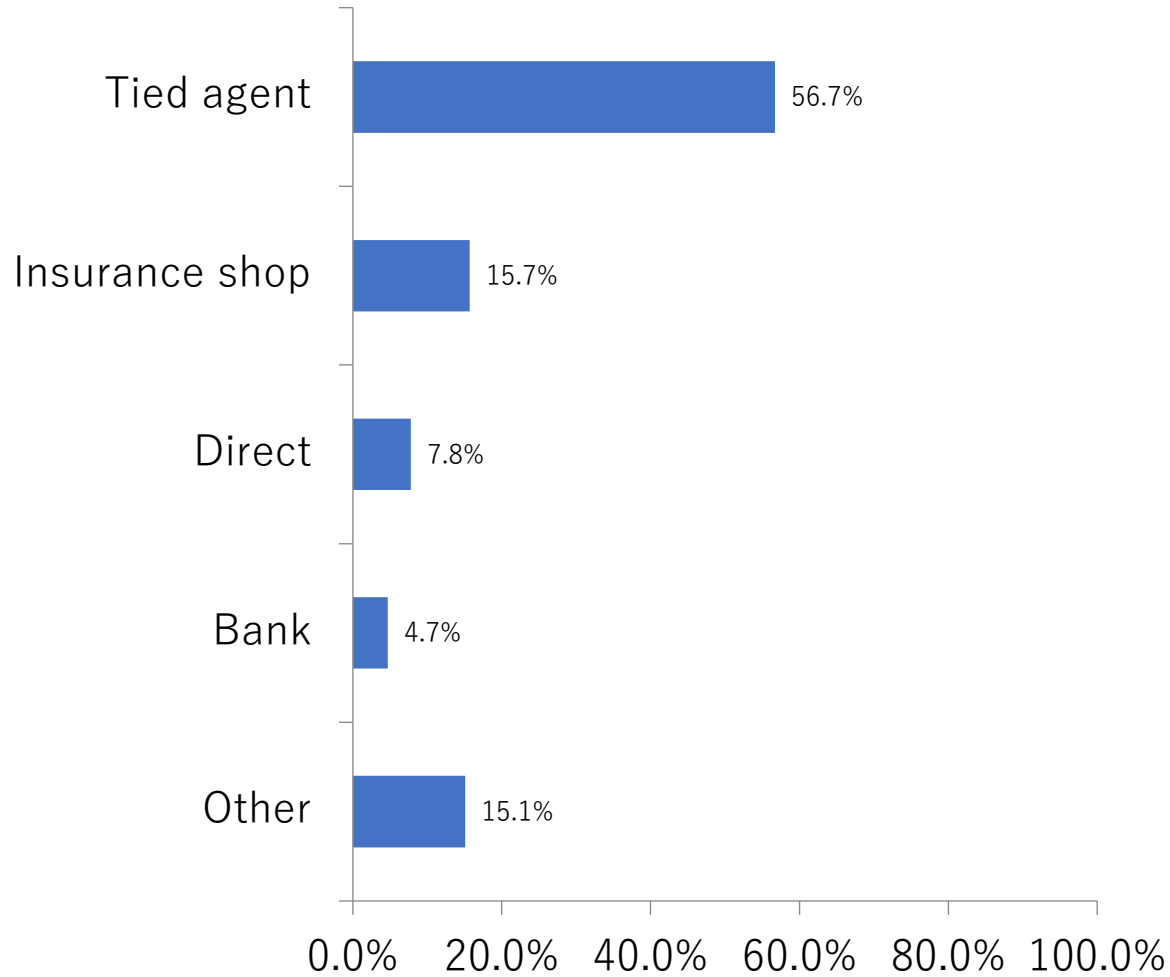|	Term life	Hospital cash	Cancer
Coverage Scope	• **Death Benefit**: Lump-sum payment if death occurs during the policy term. • Some plans offer accidental death riders.	• **Daily Hospitalization Benefit**: Fixed amount per day of hospital stay. • **Surgery Benefit** • Different from typical health insurance, or medical reimbursement	• **Diagnosis Benefit**: • **Hospitalization & Outpatient Benefits due to cancer treatments**
Policy Term	• Fixed term (e.g., 10, 20, or 30 years). • Some policies allow term renewals up to a certain age.	• Often whole-life or fixed term.	• Often whole-life or fixed term.
Premium Payment	• Generally level premiums	• Generally level premiums	• Generally level premiums
Key Features	• Pure protection, no maturity or surrender value.	• Supplements public health insurance gaps (e.g., private room fees). • Some policies include outpatient coverage and critical illness riders.	• Specialized focus on cancer (diagnosis through ongoing treatment). • Some policies offer repeated lump-sum payouts if cancer recurs.

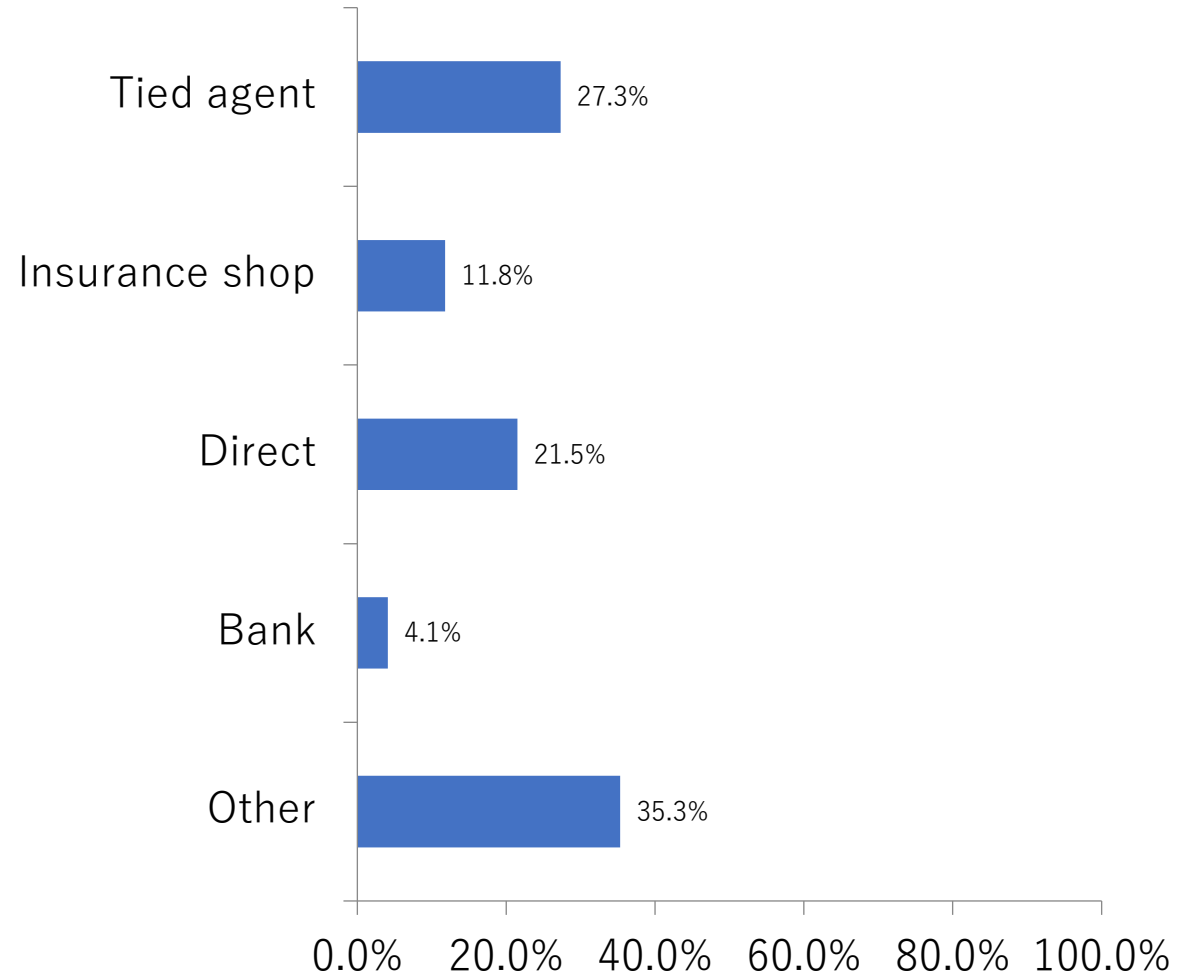# New business of term life insurance by age-band（2023）

Male: Female = 62%: 38%

Ratio of Premium Income to Disposable Income: 11.0%

2.3%
6.3%
22.8%
9.2%
13.5%
21.3%
24.6%

Legend:
- 0 - 9
- 10 - 19
- 20 - 29
- 30 - 39
- 40 - 49
- 50 - 59
- 60+

Source: life insurance association of Japan

Insurance distribution channel

	Channel purchased
Tied agent	56.7%
Insurance shop	15.7%
Direct	7.8%
Bank	4.7%
Other	15.1%

	Channel of intention to purchase
Tied agent	27.3%
Insurance shop	11.8%
Direct	21.5%
Bank	4.1%
Other	35.3%

Source: Japan Institute of Life insurance

New business of individual life insurance during the Covid-19

 # New Business
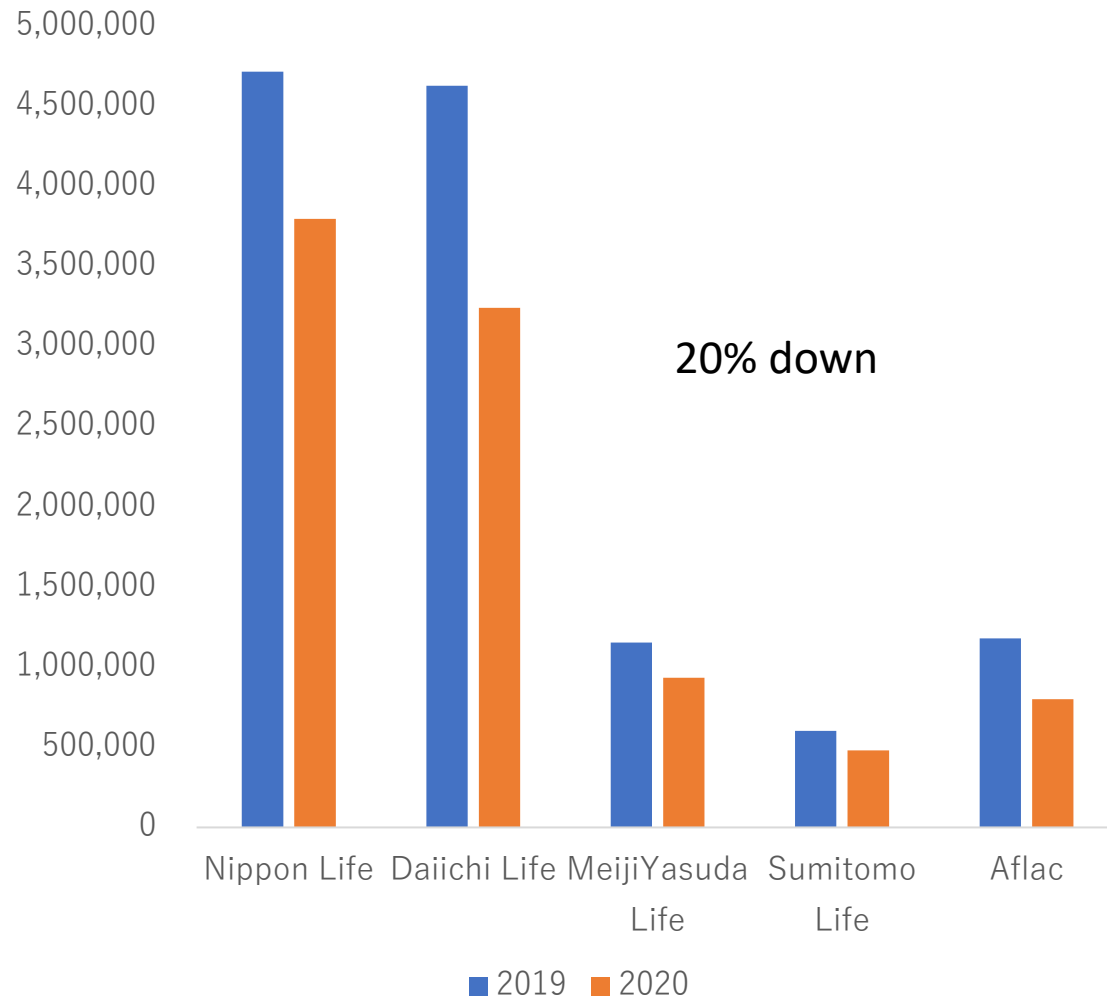
20% down

 # New Business

24% down

Nippon Life · Daiichi Life · MeijiYasuda Life · Sumitomo Life · Aflac

2019 · 2020

Lifenet

2019 · 2020

15
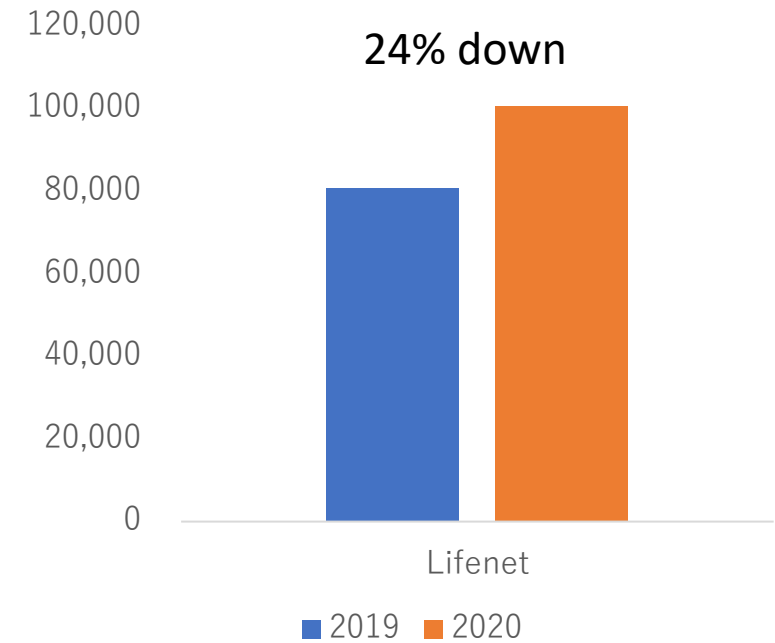
Agenda

1. Insurance market in Japan

2. Online insurance and health & wellness insurance
- Lifenet insurance
- PayPay insurance
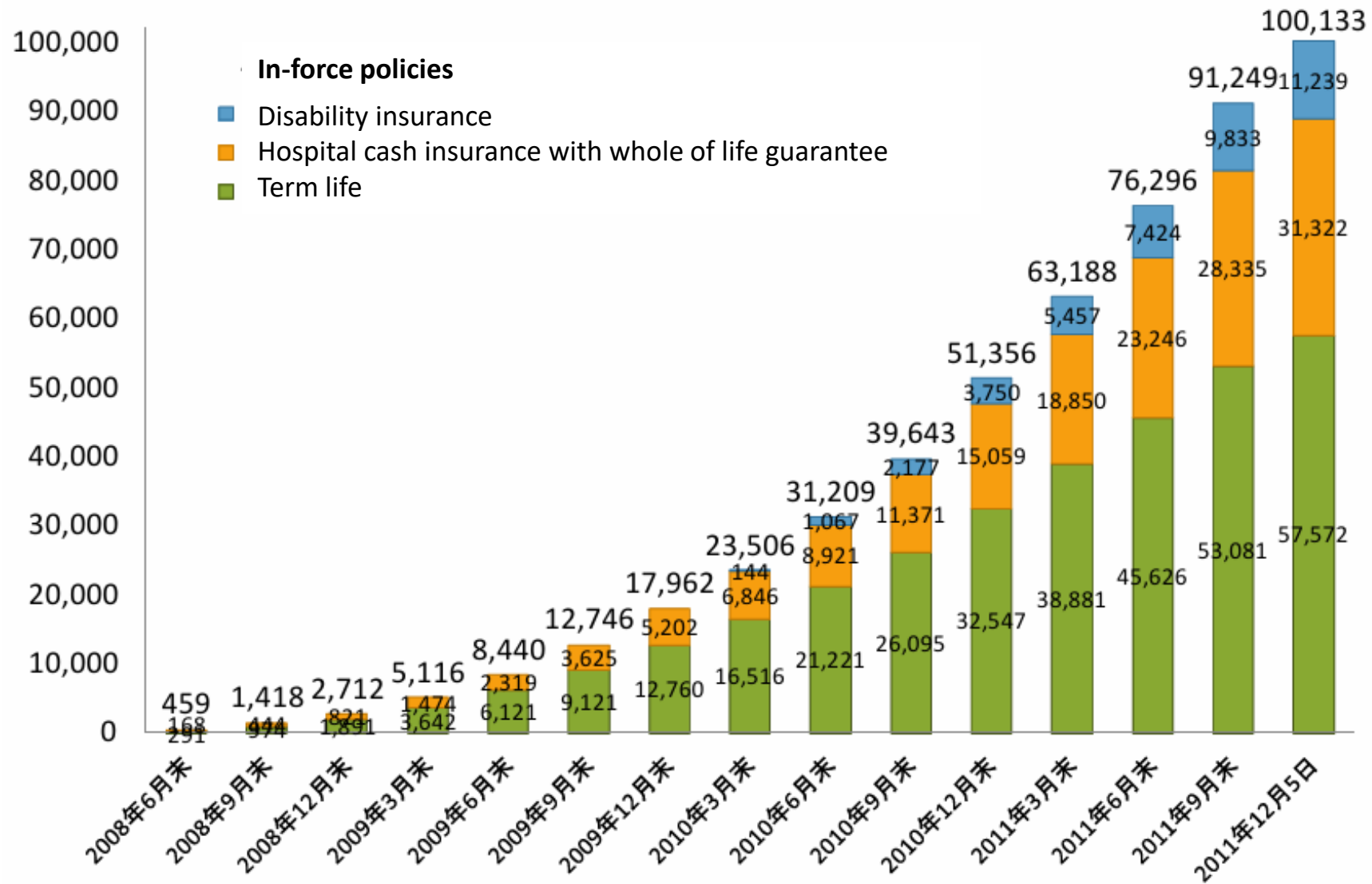- Vitality insurance & Vitality smart

3. AI applications
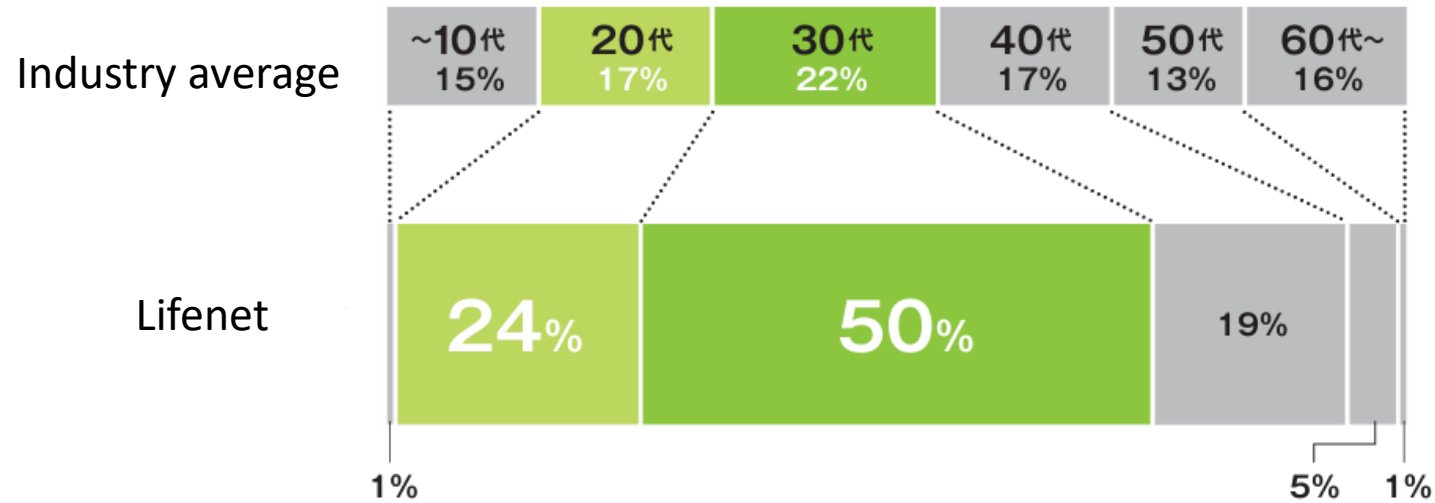
Online insurance companies

- In 2008, two life insurance companies specializing in online services, Lifenet Insurance and SBI AXA Life Insurance, were established.

- These companies have adopted a system in which the entire purchasing process, including underwriting, can be completed online, typically through the submission of required documents, such as identity verification documents, via upload.

- The insurance products sold online primarily consist of simple policies, such as term life insurance and hospital cash insurance.

- Applications are increasing not only through personal computers but also via smartphones. Additionally, services such as insurance consultations and applications using LINE are also being offered.

- With the advancement of digitalization, internet-based insurance sales are expected to continue increasing in the future.
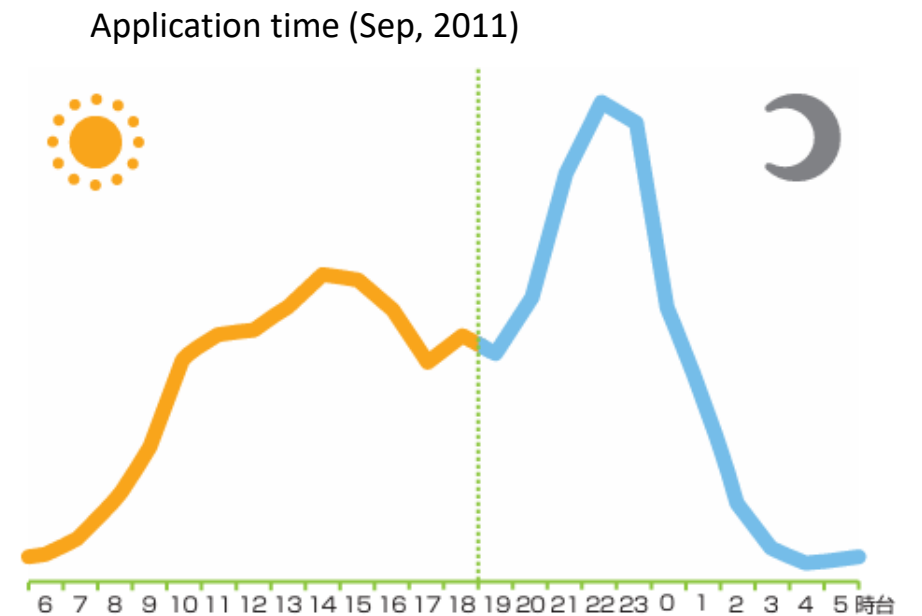
Lifenet insurance company

In-force policies
- Disability insurance
- Hospital cash insurance with whole of life guarantee
- Term life

Source: Lifenet webiste

Lifenet insurance company

Industry average

~10代 15%	20代 17%	30代 22%	40代 17%	50代 13%	60代~ 16%

Lifenet

24%	50%	19%

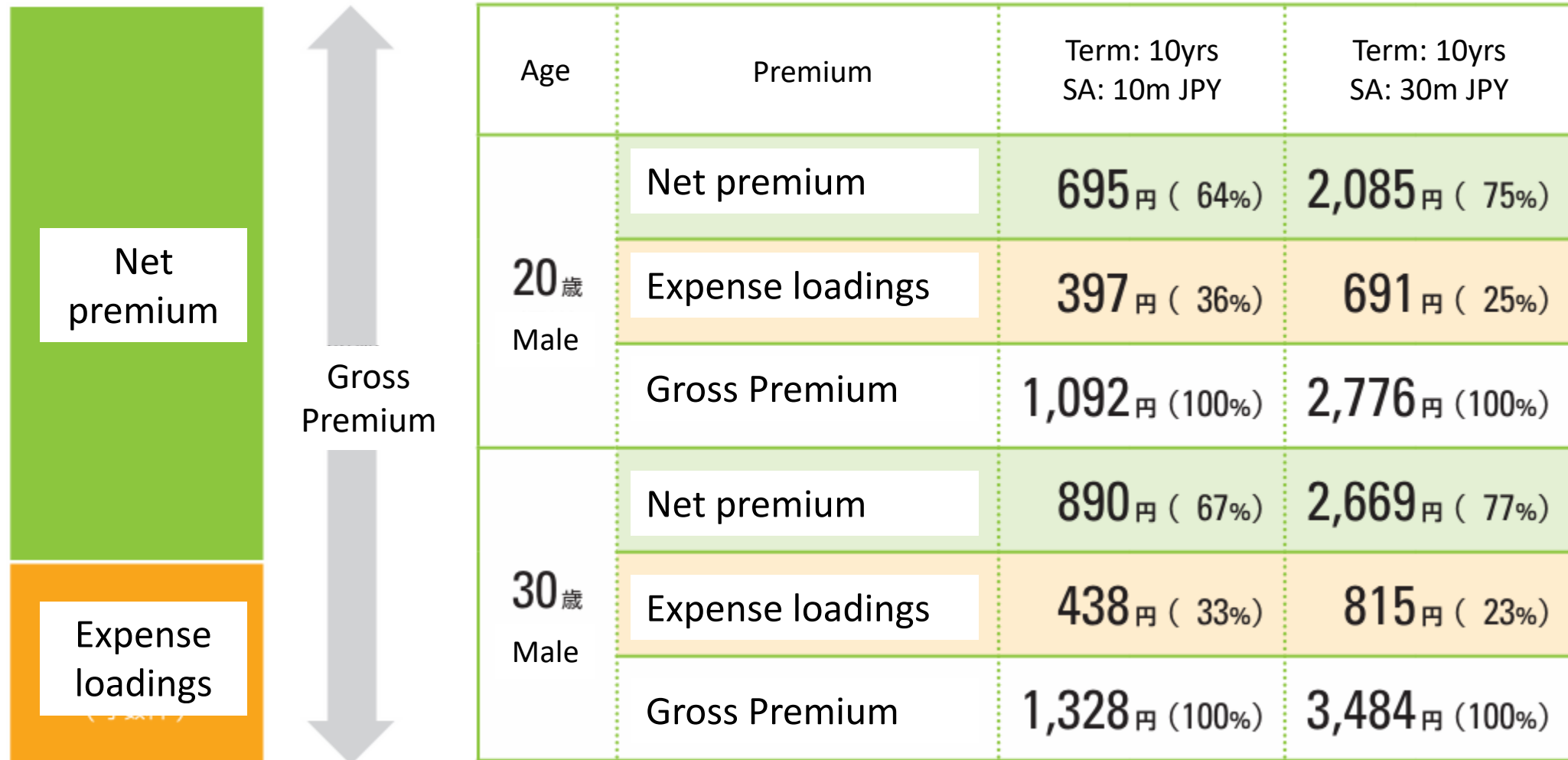1%   5%   1%

- 74% of Lifenet's policyholders are young adults in their 20s and 30s.

- Applications peak at 10pm. Nighttime and early morning hours account for the majority of applications, matching the lifestyles of the younger generation.

Source: Lifenet webiste

Application time (Sep, 2011)

6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 0 1 2 3 4 5時台

Lifenet insurance company

Age	Premium	Term: 10yrs SA: 10m JPY	Term: 10yrs SA: 30m JPY
20歳 Male	Net premium	695円 (64%)	2,085円 (75%)
	Expense loadings	397円 (36%)	691円 (25%)
	Gross Premium	1,092円 (100%)	2,776円 (100%)
30歳 Male	Net premium	890円 (67%)	2,669円 (77%)
	Expense loadings	438円 (33%)	815円 (23%)
	Gross Premium	1,328円 (100%)	3,484円 (100%)

Source: Lifenet webiste

Online insurance companies

As of March 2012

	Lifenet	Nextia (SBI Axa)	Lifenet / Nextia
Premium	3,707	1,402	264%
Death benefits	251	200	126%
Medical benefits	119	158	75%

- Compare premiums and benefits at the time of the focus on online sales.

- Lifenet's premium income is greater than Nextia.

- Death benefits are greater for Lifenet, but the ratio is smaller than the ratio of premiums.

- Lifenet's medical benefits are less than Nextia.

- Why? => 3 hypotheses 1) Marketing, 2) UW, 3) Product

PayPay insurance: Heatstroke

PayPay: 67 million registered users

PayPay insurance: Heatstroke

- The Sumitomo Life Group offers the "Heatstroke Compensation Insurance" through the PayPay app, as a simple and easy-to-understand product tailored to customers' daily lives.

- It is said that heat stroke affects approximately 300,000 people annually and 90,000 people are transported to hospital in an emergency.

- If your identity has been verified on the PayPay app, you can skip entering your name and other information, making the application process smooth. In addition, family members can also apply at the same time.

- You can apply for coverage for as little as ¥100 per day, providing coverage when you need it.

- If you apply by 9:00am, coverage is available from 10:00am on the same day. If you plan to participate in outdoor sports activities, events, or outdoor work, you can apply for coverage at a reasonable premium.

- Claims can be completed by uploading receipts and medical statements issued by medical institutions from the PayPay app. The claim will be paid to the designated account on the same day as the earliest claim date.

AI & Machine learning

PayPay insurance: Heatstroke

Digitalization with AI-OCR

Image to text with AI-OCR

アップロードされた診療明細書
の画像データをテキスト化

読取り
(AI-OCR)

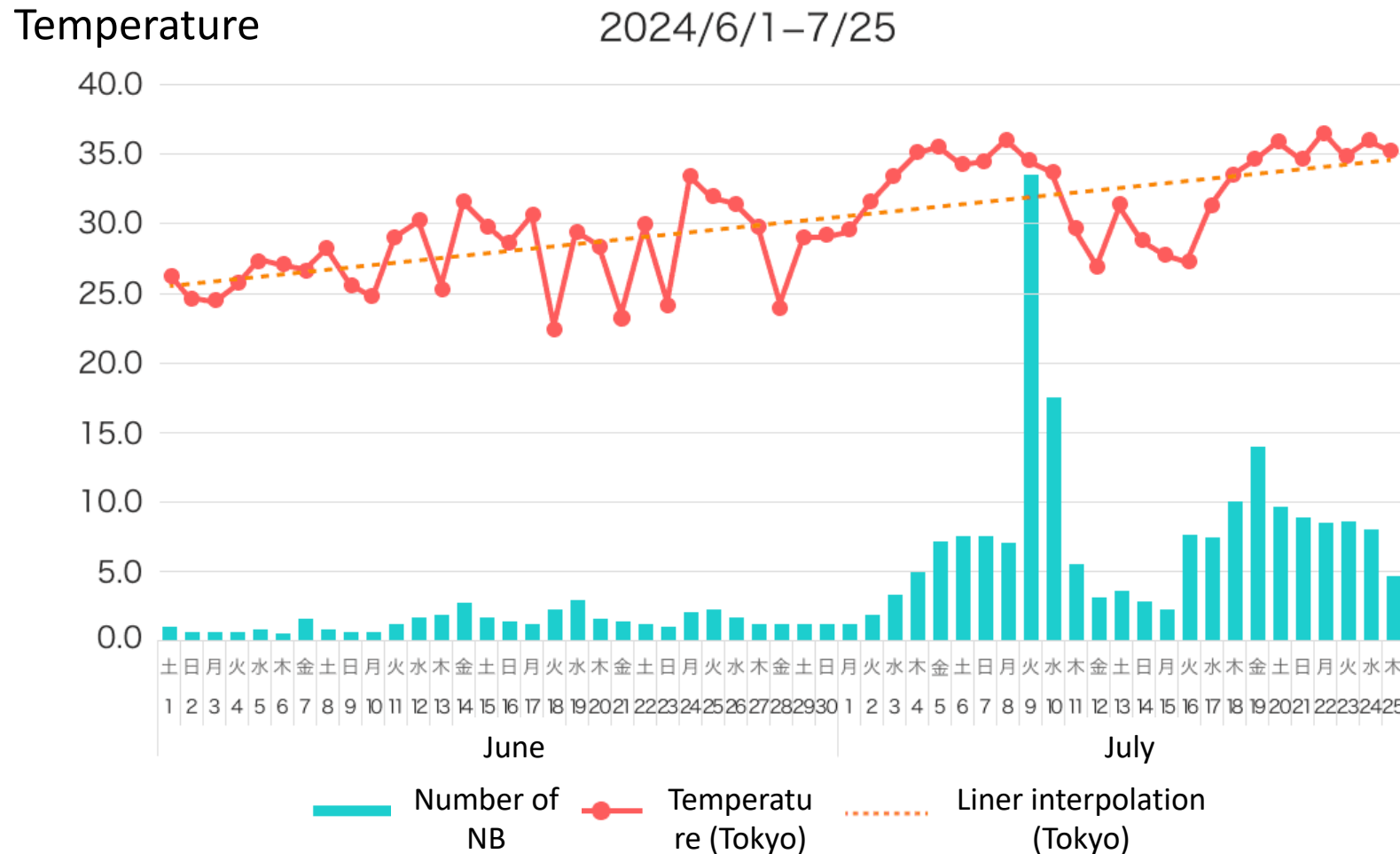### Digitalize medical treatments and remedies

Example:

Length of stay in hospital: 1 October 2021 to 5 October 2021.

Medical treatment: intravenous drip

PayPay insurance: Heatstroke

Heatstroke Compensation Insurance
Number of new business vs. temperature

Temperature

2024/6/1–7/25

Source: PayPay insurance HP

PayPay insurance: Heatstroke

2 types of benefits:

1. Medical Treatment Insurance Coverage: When an insured person suffers from heatstroke during the insurance period* and undergoes intravenous treatment at a hospital.
2. Hospitalization insurance benefit: When the insured person suffers from heatstroke during the insurance period * and is hospitalized for more than 2 days (1 night and 2 days) continuously for the purpose of treatment.

* Insurance period is monthly type (1-7 months) or daily type (1-7days).
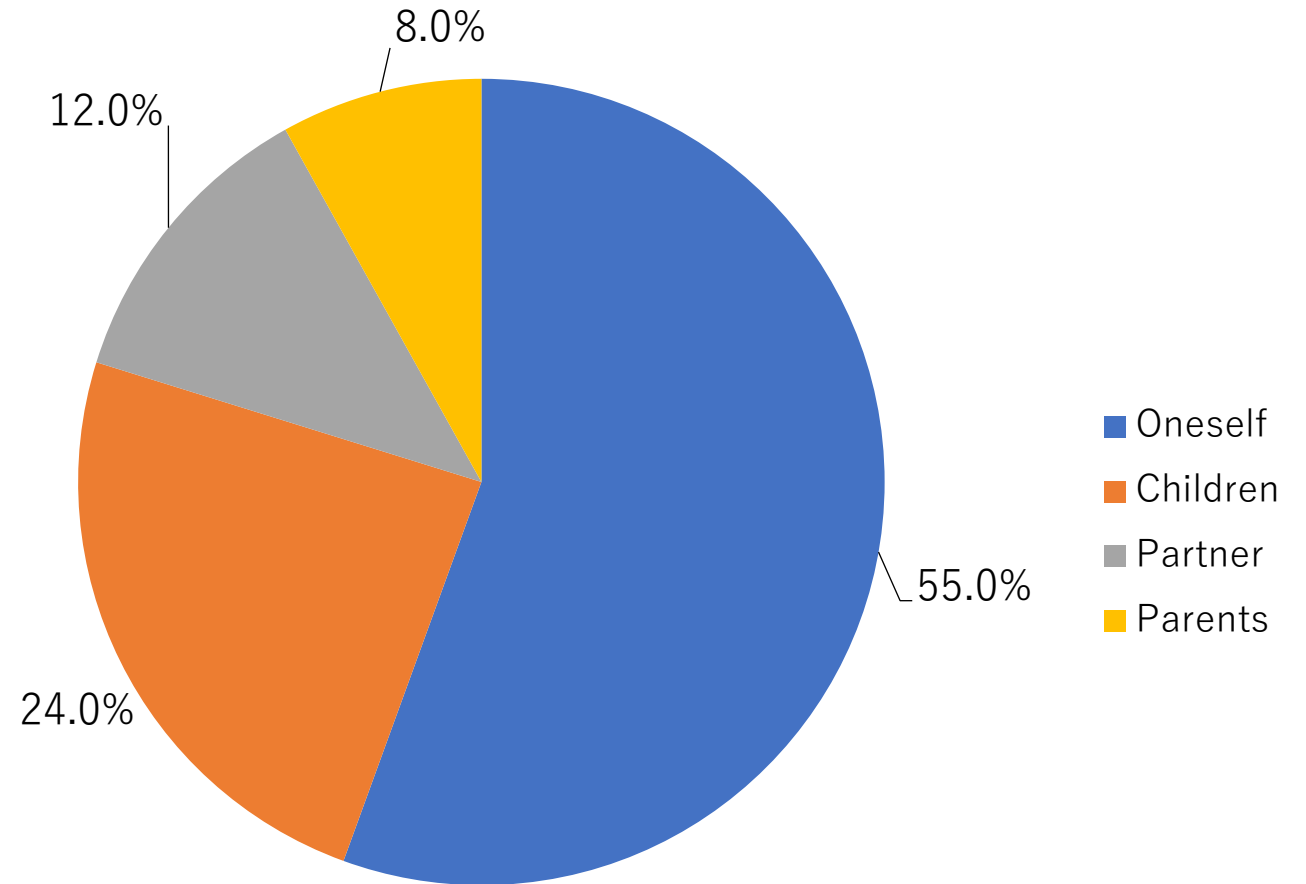
Source: PayPay insurance HP

PayPay insurance: Covid-19

December 2021
- Sompo Japan began selling COVID-19 insurance within the PayPay app.
- The insurance premium starts at an affordable rate of 500 yen for three months, and policyholders can receive a payout of 50,000 yen if diagnosed positive by a doctor.

Feb 9th, 2022
- Since mid-January, the number of policy enrollments grew rapidly, surpassing 350,000.

Feb 10th, 2022
- Sompo Japan raised the premium for COVID-19 insurance to 1,500 yen for three months starting February 10, tripling the original rate. This adjustment was made due to the spread of the sixth wave of COVID-19, driven by the Omicron variant, which exceeded initial projections.

June 14th, 2022
- Sompo Japan announced that it would reduce the insurance payout for its COVID-19 insurance by 60% from the original amount, lowering it to 20,000 yen.

August 4th, 2022
- Sompo Japan ceased the sale of its COVID-19 insurance. This decision was due to the rapid surge in infections, which made it difficult to maintain the product.

PayPay insurance: Covid-19

January 2025

- Sumitomo Life Group announced on January 28 that it will start selling insurance that covers the costs associated with the COVID-19.

	Product spec
Launch date	January 28th, 2025
Insurance period	6 months. The coverage start date can be specified from 14 to 30 days after the application date.
Age	Policyholder: Aged 18 to 99 Insured: Aged 12 to 69
Coverage	If, during the policy period, the insured is prescribed any of the 4 types of medications at a hospital.
Premium	Simple plan: JPY 100 (+ 340 funded by Shionogi & Co., Ltd.) for SA JPY 15k Basic plan: JPY 190 (+ 340 funded by Shionogi & Co., Ltd.) for SA JPY 20k Safety plan: JPY 370 (+ 340 funded by Shionogi & Co., Ltd.) for SA JPY 30k

*Shionogi & Co., Ltd. is a leading Japanese pharmaceutical company that specializes in the research, development, manufacturing, and marketing of prescription drugs and over-the-counter medications.
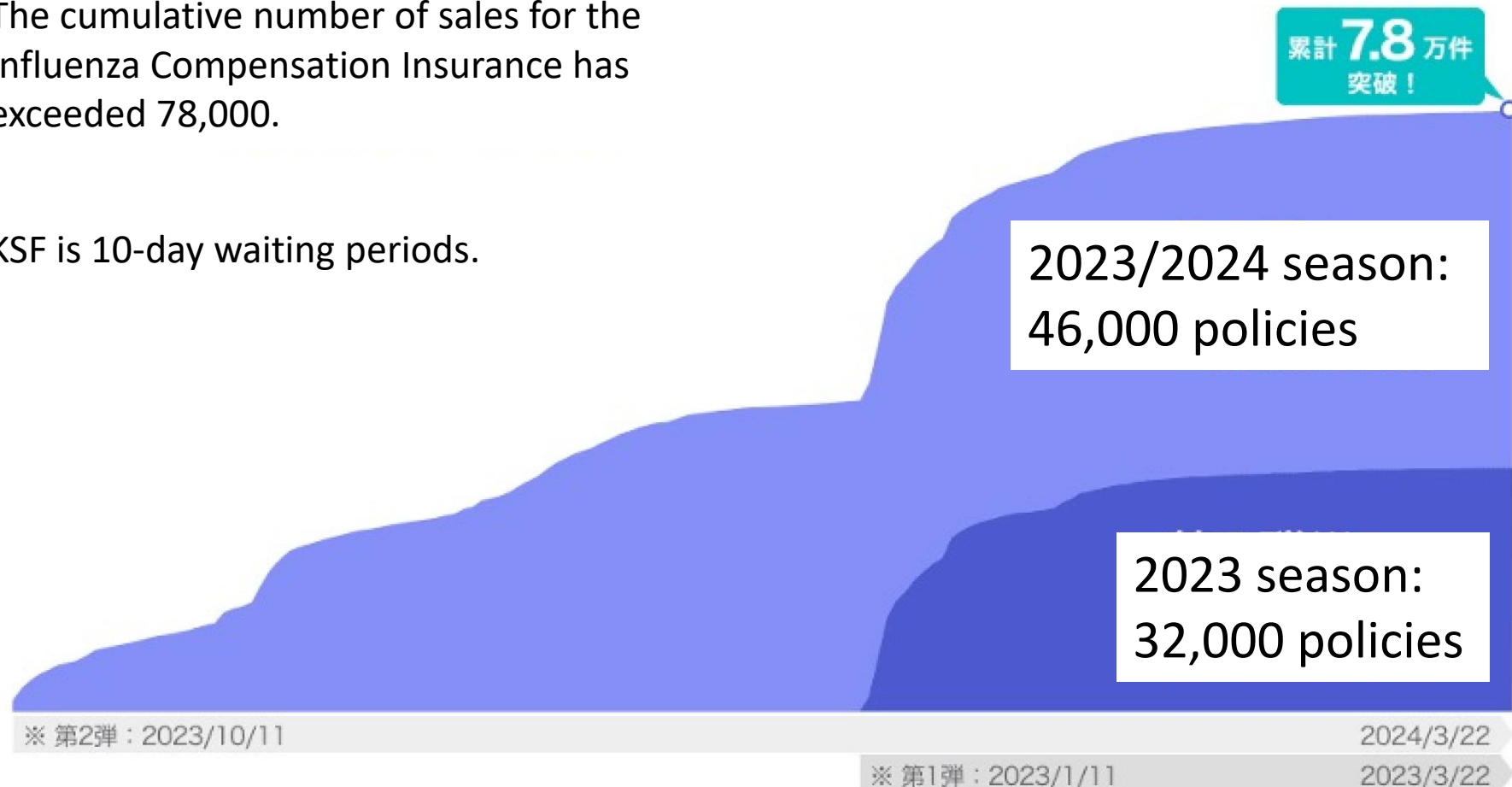
PayPay insurance: Influenza

Sumitomo Life Group

インフルエンザお見舞い金

PayPay ほけん

The cumulative number of sales for the Influenza Compensation Insurance has exceeded 78,000.

KSF is 10-day waiting periods.

累計 **7.8** 万件 突破！

2023/2024 season: 46,000 policies

2023 season: 32,000 policies

※ 第2弾：2023/10/11

2024/3/22

※ 第1弾：2023/1/11

2023/3/22

Source: PayPay insurance HP

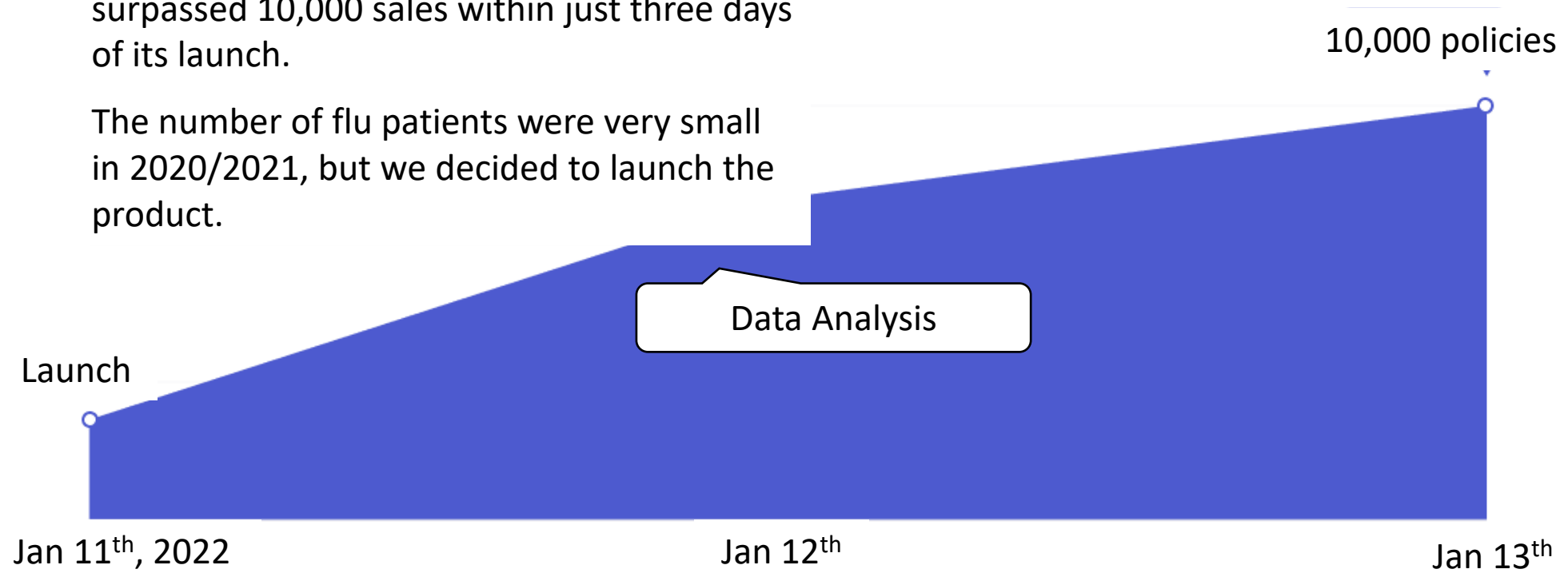# PayPay insurance: Influenza

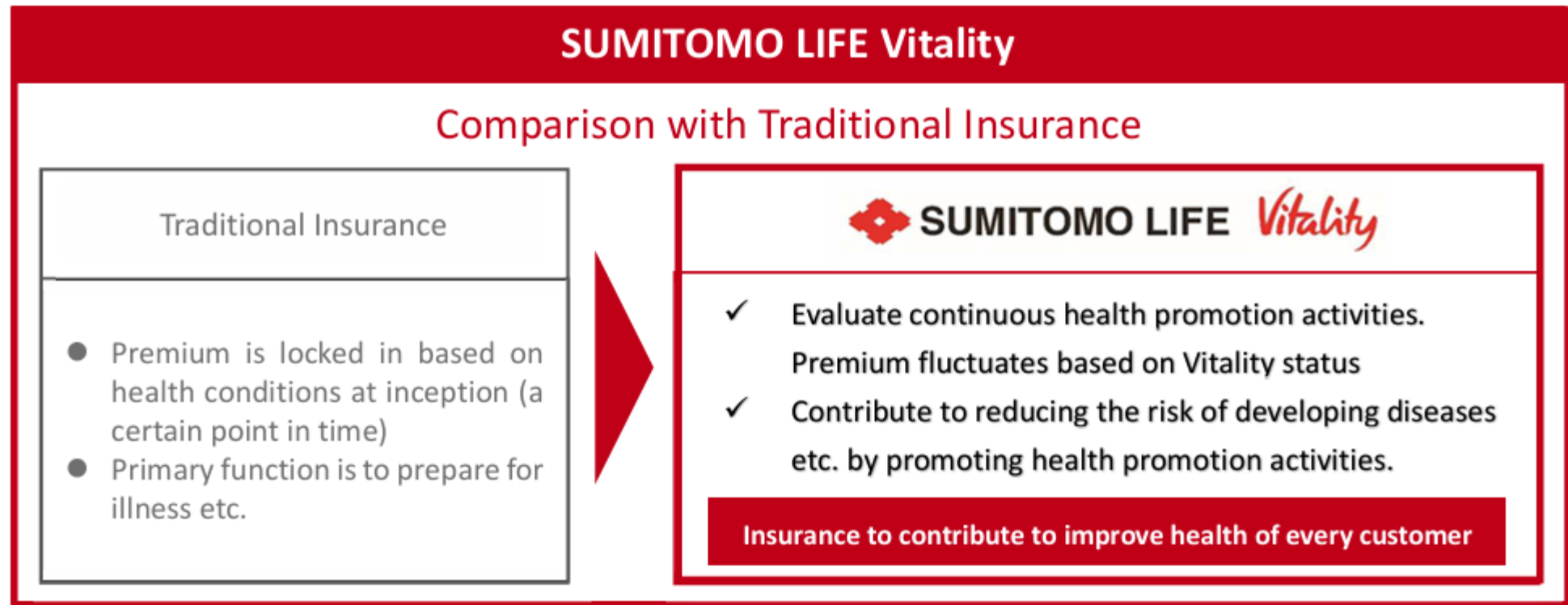**Sumitomo Life Group**

インフルエンザお見舞い金

PayPay ほけん

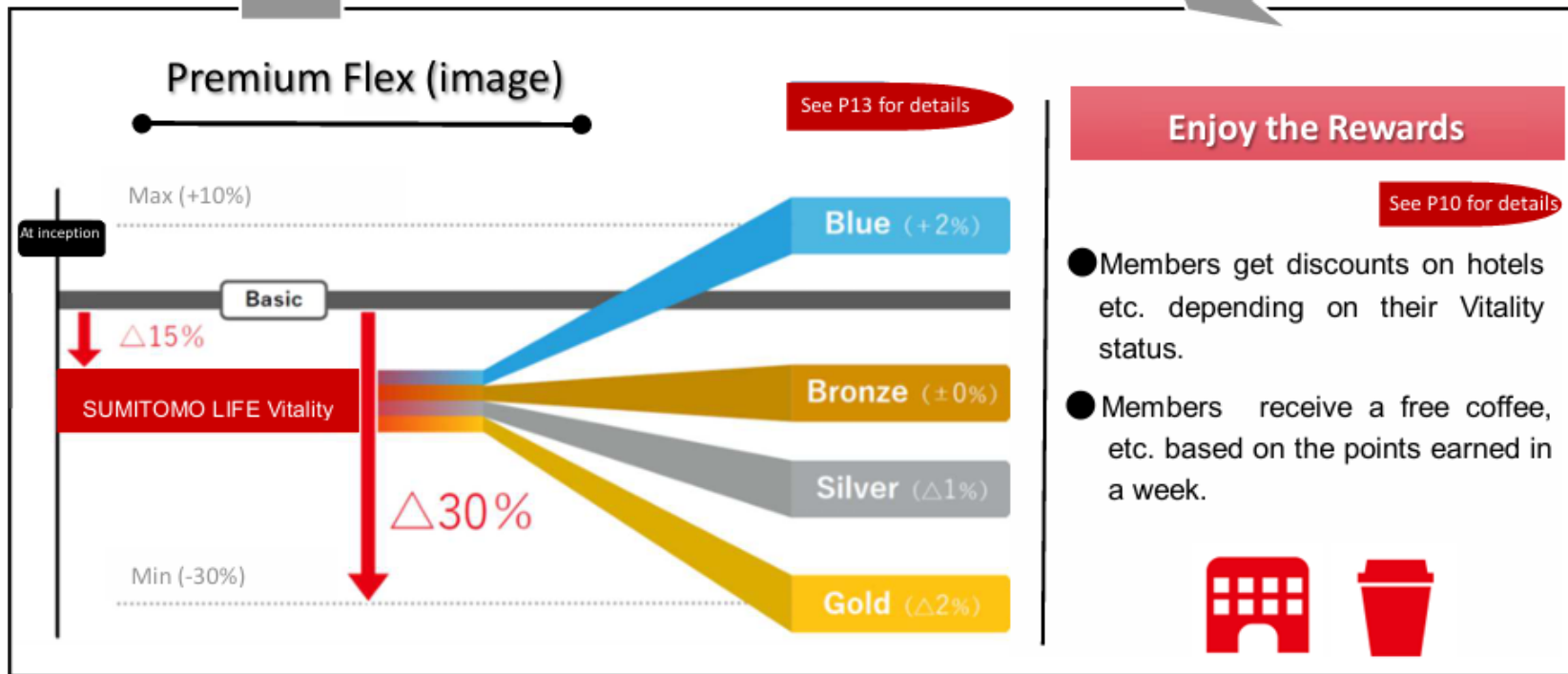The Influenza Compensation Insurance surpassed 10,000 sales within just three days of its launch.
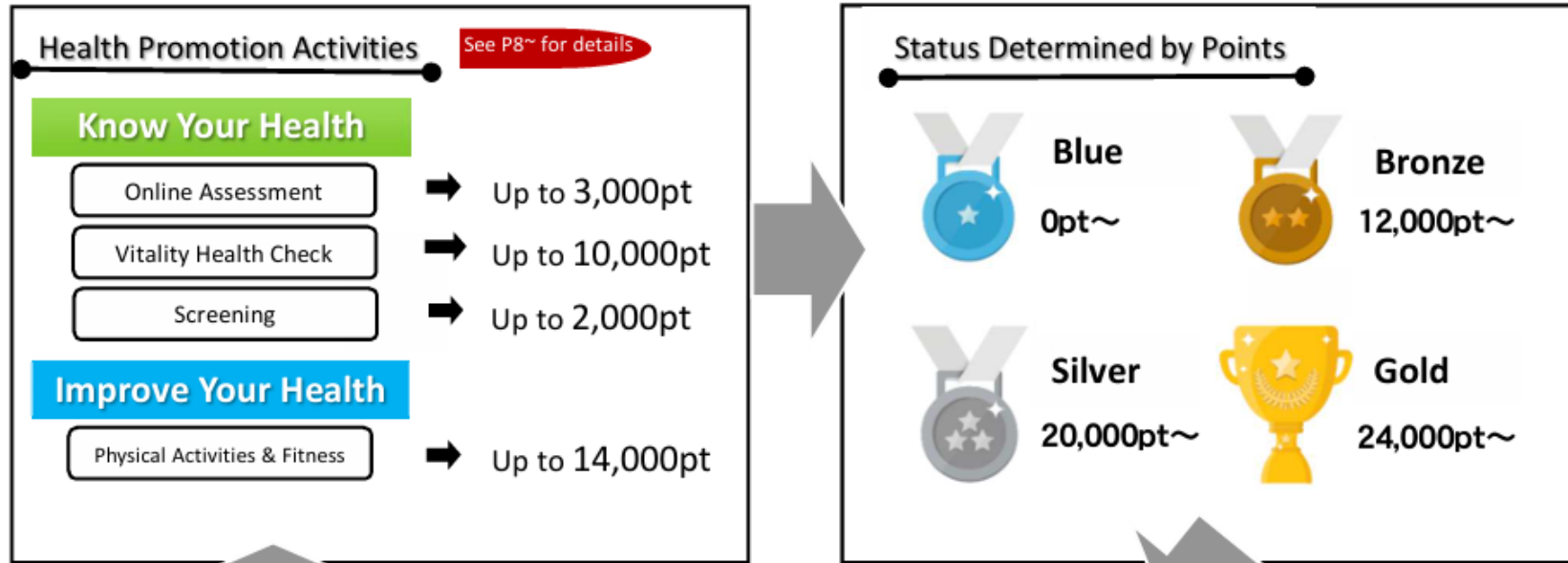
The number of flu patients were very small in 2020/2021, but we decided to launch the product.

10,000 policies

Data Analysis

Launch

Jan 11th, 2022

Jan 12th

Jan 13th

Source: PayPay insurance HP

Vitality insurance

SUMITOMO LIFE Vitality

Comparison with Traditional Insurance

Traditional Insurance

- Premium is locked in based on health conditions at inception (a certain point in time)
- Primary function is to prepare for illness etc.

SUMITOMO LIFE Vitality

- ✓ Evaluate continuous health promotion activities. Premium fluctuates based on Vitality status
- ✓ Contribute to reducing the risk of developing diseases etc. by promoting health promotion activities.

Insurance to contribute to improve health of every customer

Health Promotion Activities

Know Your Health

Online Assessment	➡	Up to 3,000pt
Vitality Health Check	➡	Up to 10,000pt
Screening	➡	Up to 2,000pt

Improve Your Health

| Physical Activities & Fitness | ➡ | Up to 14,000pt |

Status Determined by Points

Blue 0pt～

Bronze 12,000pt～

Silver 20,000pt～

Gold 24,000pt～

Premium Flex (image)

Max (+10%)

At inception

Basic

△15%

SUMITOMO LIFE Vitality

△30%

Min (-30%)

Blue (+2%)

Bronze (±0%)

Silver (△1%)

Gold (△2%)

Enjoy the Rewards

● Members get discounts on hotels etc. depending on their Vitality status.

● Members receive a free coffee, etc. based on the points earned in a week.

adidas
スポーツ用品※が特別割引価格一律30%OFF!

AEON
野菜・果物の購入額に応じて
最大25%相当のVitalityコインを獲得!

WATCH Vitality
24か月間で最大24,000円分のVitalityコイン

Vitality
最長18か月間にわたりVitalityコイン獲得!

Expedia
オンライン宿泊予約が最大40%OFF!

FamilyMart
お茶等のチケット獲得!

FIT365 フィットネスジム
会員だけの特別プランで利用可能!

GARMIN
会員特別価格最大40%OFF!

JOY FIT / JOY FIT 24 / JOY FIT YOGA
会員だけの特別プランで利用可能!

KONAMI SPORTS CLUB
会員だけの特別価格で利用可能!

LAVA HOT YOGA STUDIO
レッスン受講でVitalityコイン獲得!

LAWSON
スムージーやお茶等のチケット獲得!

MRSO
人間ドック・健康診断等の予約・受診で
Vitalityコインを獲得!

Oisix
対象商品が最大25%OFF!

Pokémon GO
毎週の週間目標達成で、
ゲーム内で使える道具を獲得!

POLAR
会員特別価格最大40%OFF!

RENAISSANCE
スポーツクラブやオンラインレッスンを
会員だけの特別価格で利用可能!

STARBUCKS
ドリンクチケット贈呈!

SoftBank
ウェアラブルデバイス等が
獲得できるスマートフォン特典!

TIPNESS
会員だけの特別価格・エクササイズ動画の特典!

アクティブチャレンジでの寄付!

33

Vitality insurance
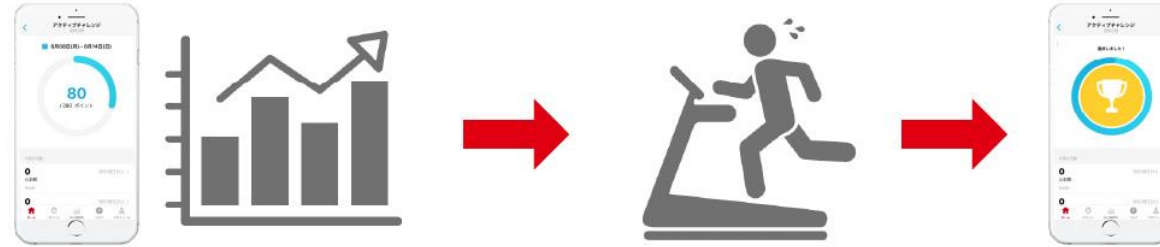
1. Automatic Setting of Exercise Point Goals
By launching the "Active Challenge" feature in the Vitality app, weekly point goals are automatically set.
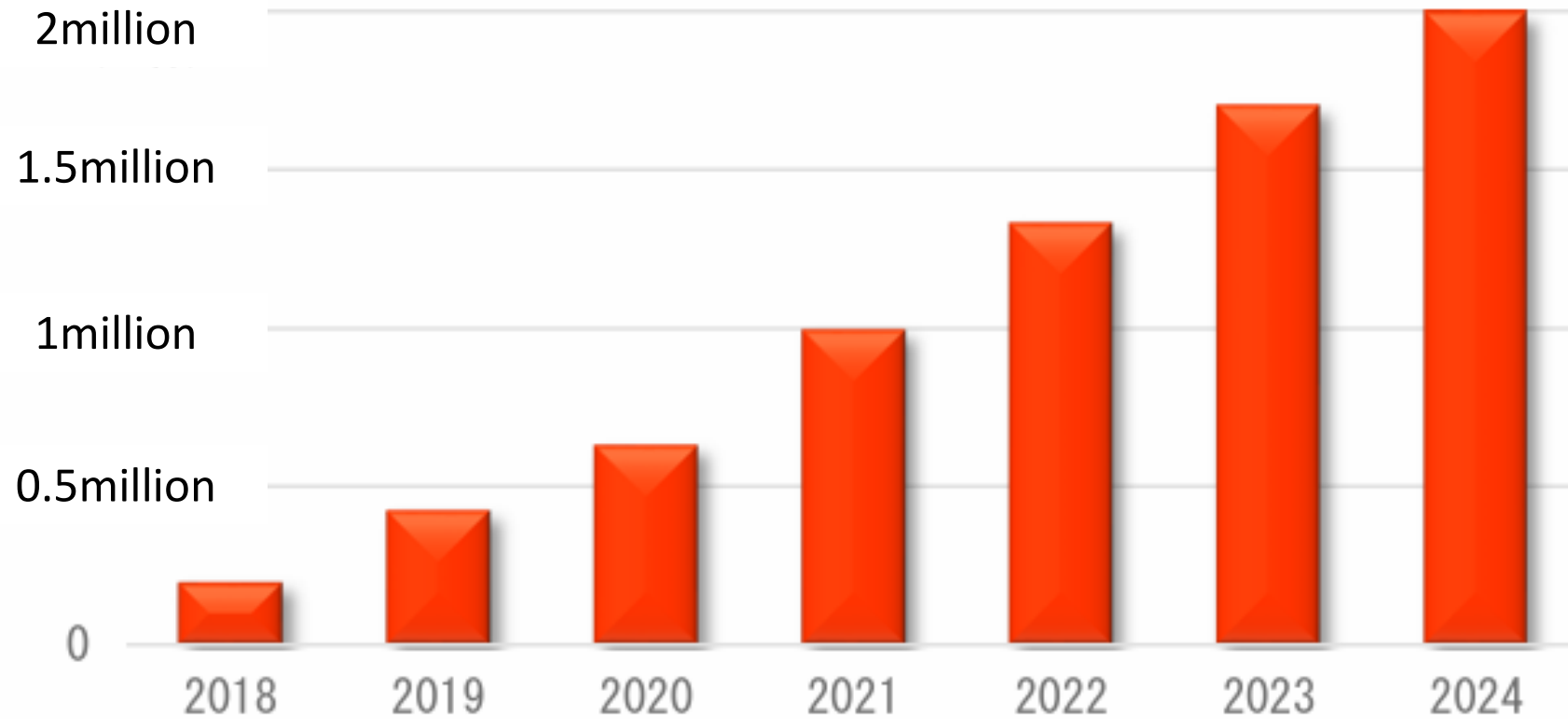
2. Work Toward Achieving Goals
Engage in physical activities to aim for achieving the set goals.

Win Rewards with Roulette
※5

3. Earn Rewards by Reaching Exercise Point Goals
Enjoy various rewards such as drinks. You can also choose to make a donation instead of receiving drinks or other rewards.

Vitality insurance

Cumulative number of sales

Vitality insurance

1. change one's mindset

I'm more health conscious than before I joined.

94%
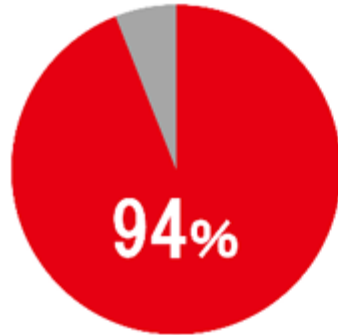
2. change one's behaviour

% increase in steps per day

+22% ※4

Continue moderate exercise

加入後

Join	1yr	2yrs	3yrs	4yrs
7,447歩	8,332歩	8,687歩	8,916歩	9,113歩

3. outcome

Blood pressure dropped

50%
※10mmHg以上

Blood glucose dropped

42%
※10mg/dl 以上

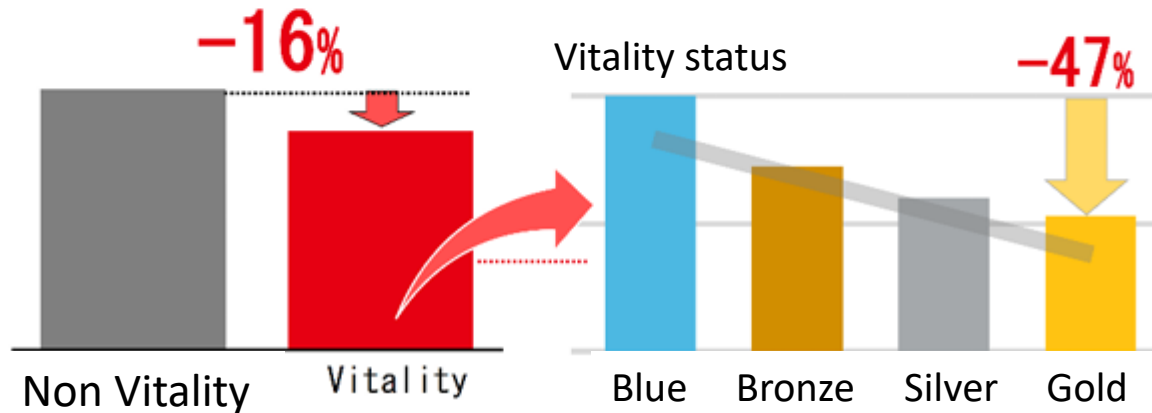LDL cholesterol dropped

49%
※10mg/dl 以上

Vitality insurance

Mortality

Vitality has 47% lower mortality rate than Non Vitality

−47%

Vitality status

−70%

Non Vitality   Vitality   Blue   Bronze   Silver   Gold
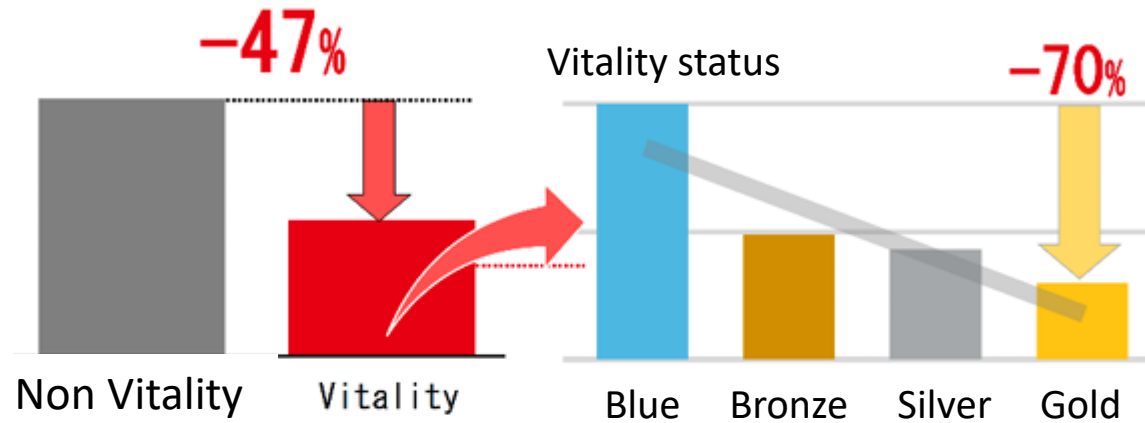
Hospitalization rate

Vitality has 16% lower hospitalization rate than Non Vitality

−16%

Vitality status

−47%

Non Vitality   Vitality   Blue   Bronze   Silver   Gold

Vitality smart

- Vitality Smart is a health promotion app that does not come with life insurance.

- Customers' daily health promotion activities are converted into points, and their status is determined based on the accumulated points.

- Start with online check:
  1. Open the Vitality application
  2. Answer a few questions about your health, diet, and other lifestyle habits
  3. Earn points

- Annual health check:
  - Upload your health certificate and earn points

- Points are awarded not only for daily activities such as walking and heart rate monitoring but also for exercise at fitness gyms, online fitness programs, and participation in events like walking or marathon races.

- The monthly fee is 330 yen (including tax).

Our digital and data strategy

1. Expansion of Products and Services
By harnessing the power of digital technology and data, we aim to further evolve our Vitality services and create new well-being services in non-insurance areas, in addition to our traditional insurance products. This will enable us to offer products and services tailored to the diversifying needs and lifestyles of our customers.

3. Providing Personalized Value
By accumulating and utilizing customer touchpoint data, as well as unique health data specific to Sumitomo Life, we aim to create optimized customer experiences for each individual. This will be achieved by combining multiple products and services to deliver tailored value to every customer.

2. Expansion of Customer Touchpoints
To create well-being services, collaboration and co-creation with new business partners such as local governments, corporations, and platform providers are essential. By leveraging the customer base of these business partners, we aim to expand our touchpoints with customers and deliver the value of "well-being" to a broader audience.

4. Stabilizing Business Foundations
By leveraging the latest digital technologies, including generative AI, we aim to enhance efficiency and automate operations. This not only improves customer experience value but also ensures business continuity in an environment where the working population continues to decline, thereby stabilizing our business foundations.

Agenda

1. Insurance market in Japan

2. Online insurance and health & wellness insurance

3. AI applications

Swiss Re Institute — June 2024
Swiss Re SONAR
New emerging risk insights

SONAR 2023
The rapid development of generative artificial intelligence (AI) systems opens opportunities for underwriting and claims processing. It also raises questions of ownership and associated risks.
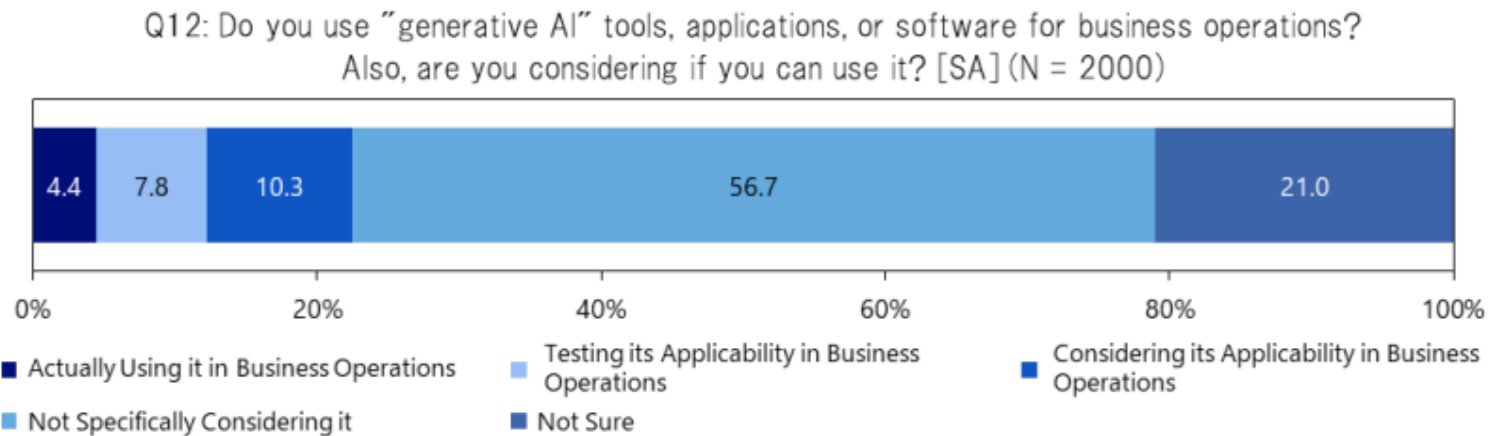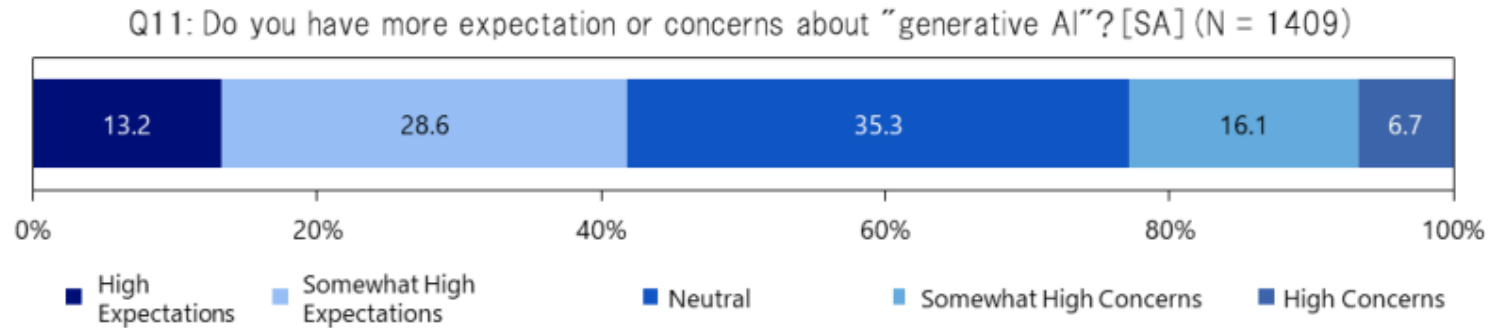
SONAR 2024
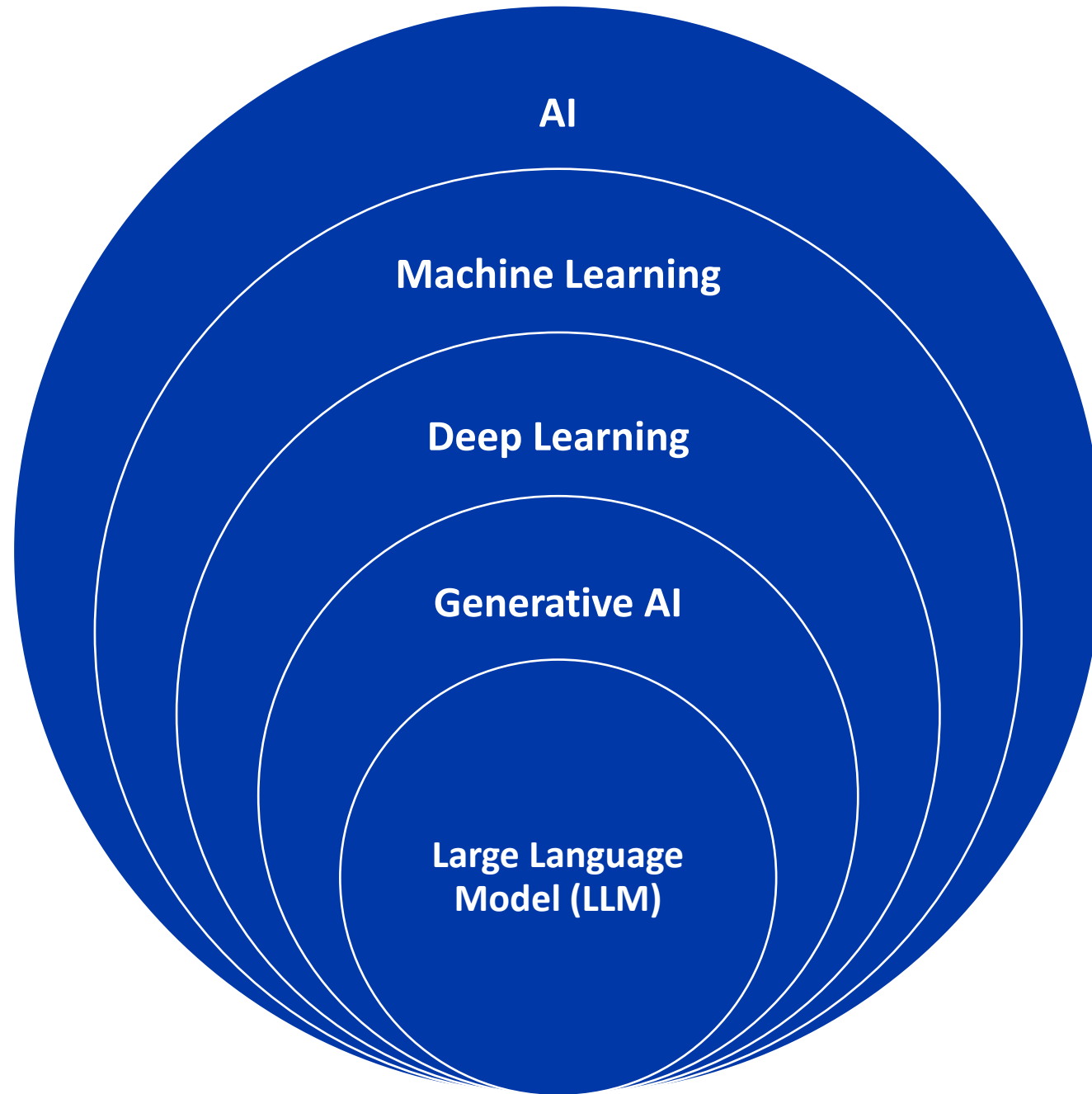Different AI-related events could impact various lines of insurance business.

- AI-driven hiring practices that inadvertently introduce bias could trigger discrimination lawsuits and claims against employers for unfair employment practices.
- Copyright violations and/or patent infringement as a result of leveraged training data or from the AI model itself could result in claims in liability coverages.
- Increased use of AI in healthcare diagnostics could change insurance demand, but also give rise to potential gaps in coverage.
- Insurers could face claims increases due to erroneous advice or misinterpretations delivered by AI-driven underwriting tools. AI-driven underwriting models that inadvertently introduce bias could trigger discrimination lawsuits and claims against insurance companies.
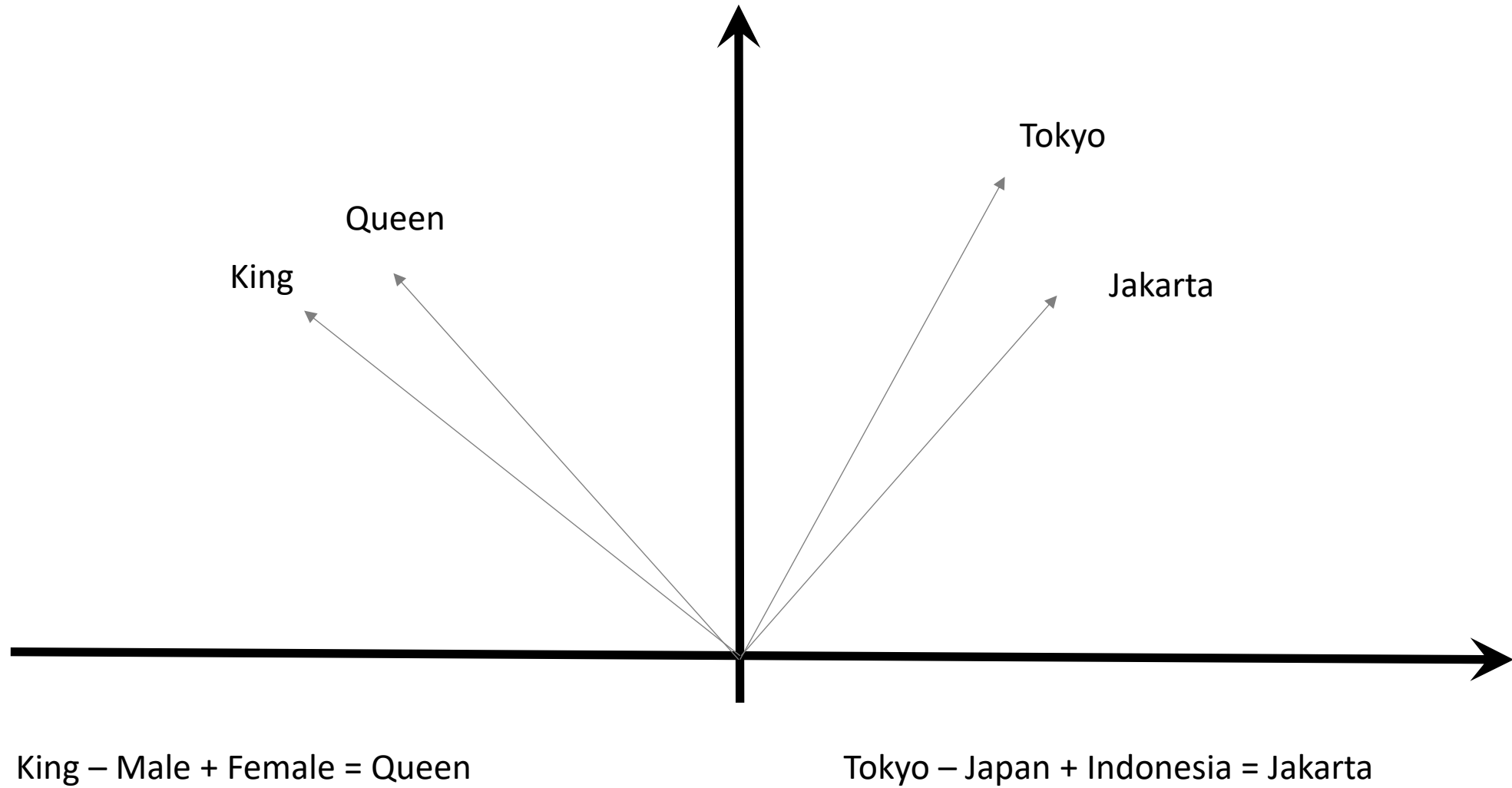
Survey of workers on generative AI use

- More than 40% have higher expectations than concerns about generative AI.

Q11: Do you have more expectation or concerns about "generative AI"? [SA] (N = 1409)

| 13.2 | 28.6 | 35.3 | 16.1 | 6.7 |

0% 20% 40% 60% 80% 100%

- High Expectations
- Somewhat High Expectations
- Neutral
- Somewhat High Concerns
- High Concerns

Q12: Do you use "generative AI" tools, applications, or software for business operations? Also, are you considering if you can use it? [SA] (N = 2000)

| 4.4 | 7.8 | 10.3 | 56.7 | 21.0 |

0% 20% 40% 60% 80% 100%

- Actually Using it in Business Operations
- Testing its Applicability in Business Operations
- Considering its Applicability in Business Operations
- Not Specifically Considering it
- Not Sure

Source: Nomura Research Institute

AI

Machine Learning

Deep Learning

Generative AI

Large Language
Model (LLM)

Natural language converted into vectors, enabling calculation.

King – Male + Female = Queen

Tokyo – Japan + Indonesia = Jakarta

- More data, more model parameters, more computing resources, and more and more accuracy.
- In other words, the bigger it is, the better it performs.
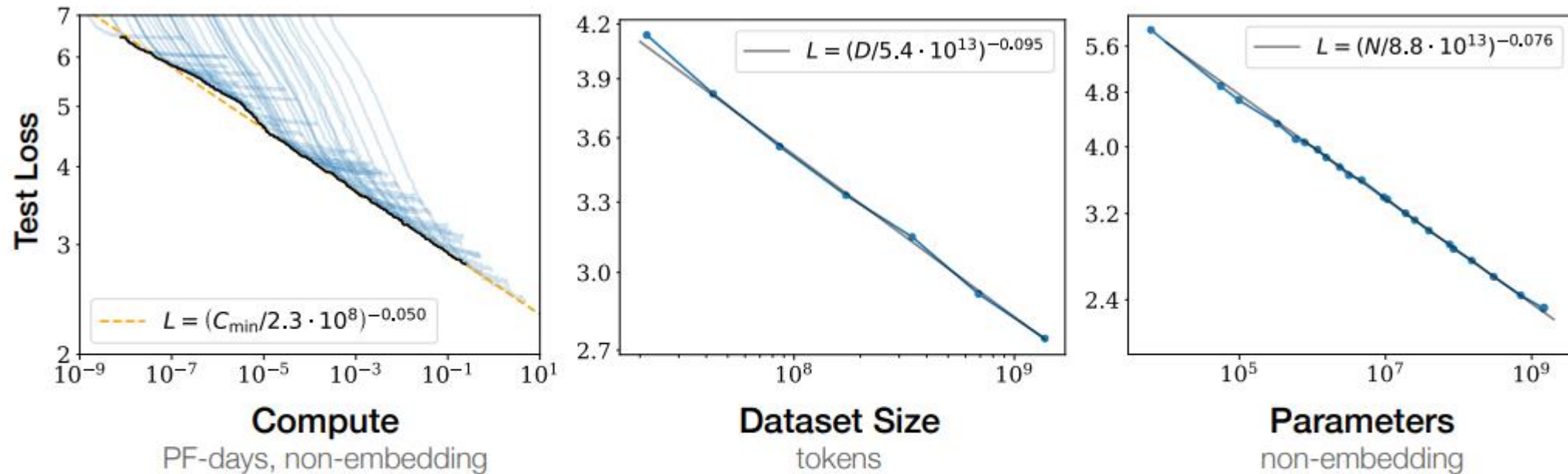- GPT-3 is pre-trained on large data (400 billion words) on the web. 175 billion parameters. Cost millions to hundreds of millions of dollars for training.

Figure 1 Language modeling performance improves smoothly as we increase the model size, datasetset size, and amount of compute^2 used for training. For optimal performance all three factors must be scaled up in tandem. Empirical performance has a power-law relationship with each individual factor when not bottlenecked by the other two.
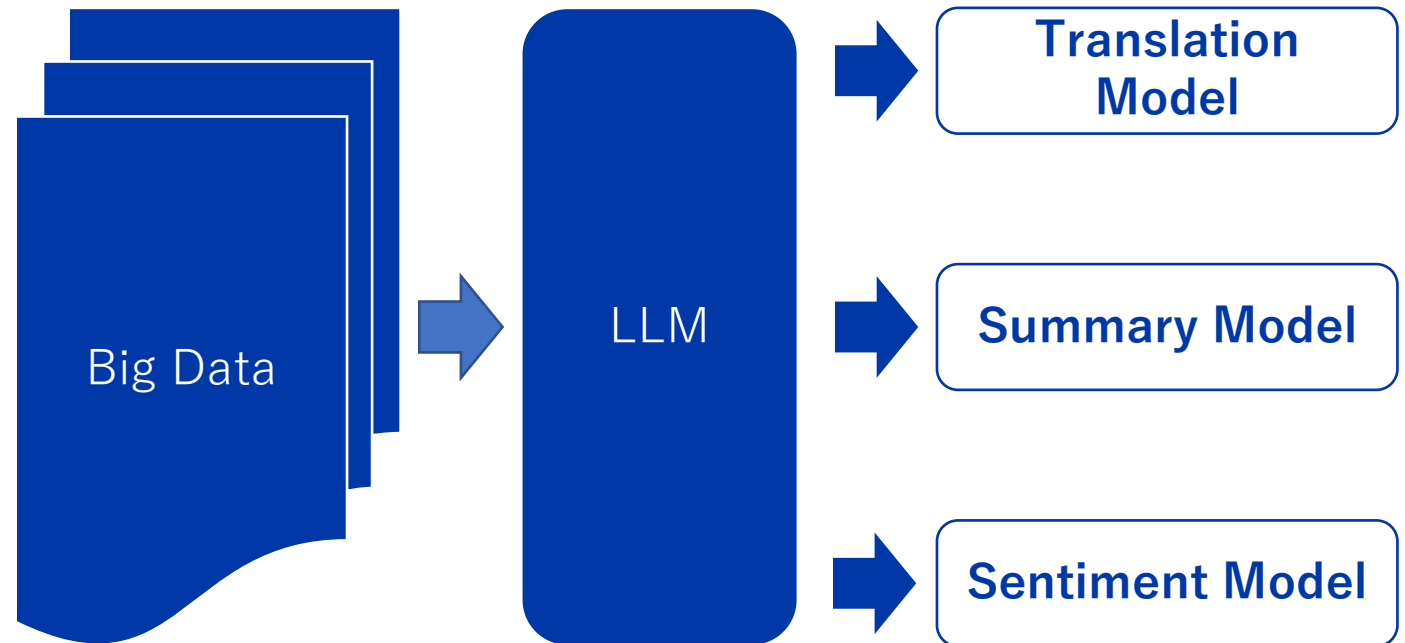
Source: Scaling Laws for Neural Language Models

What has changed from before: versatility.
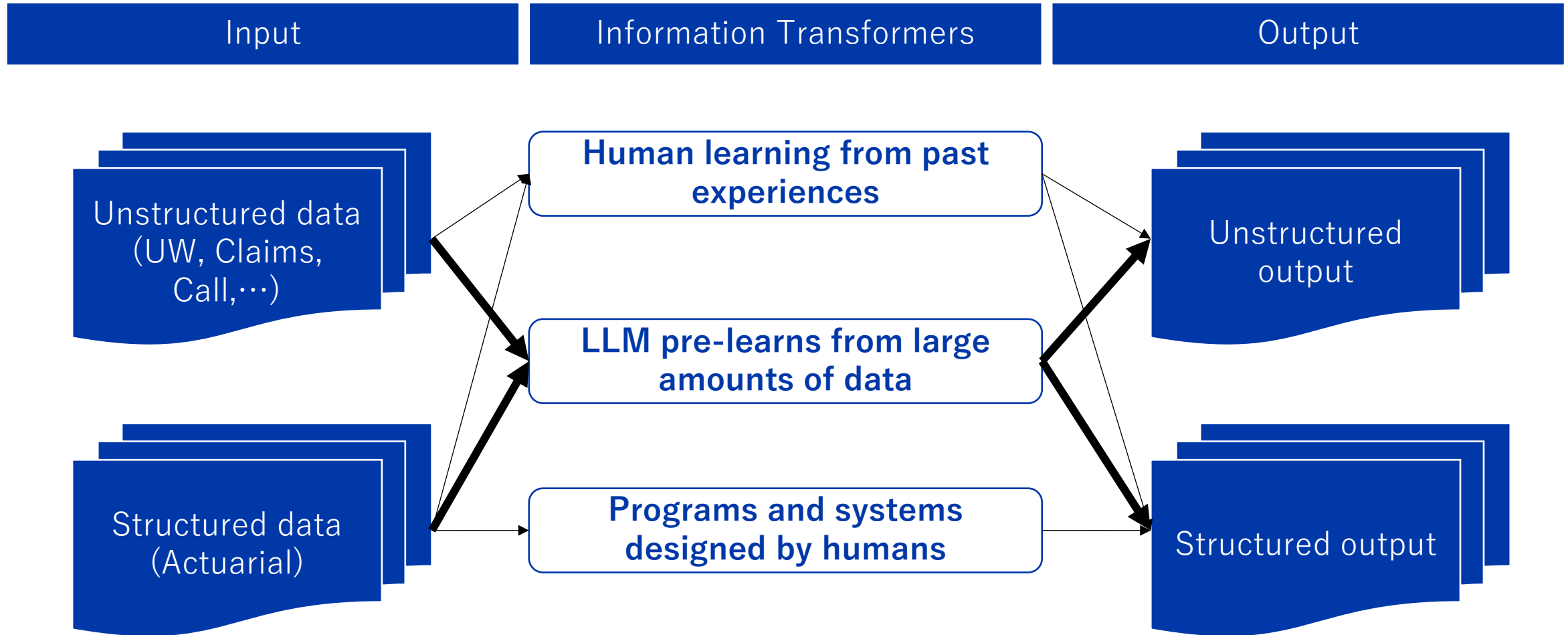
Before LLM
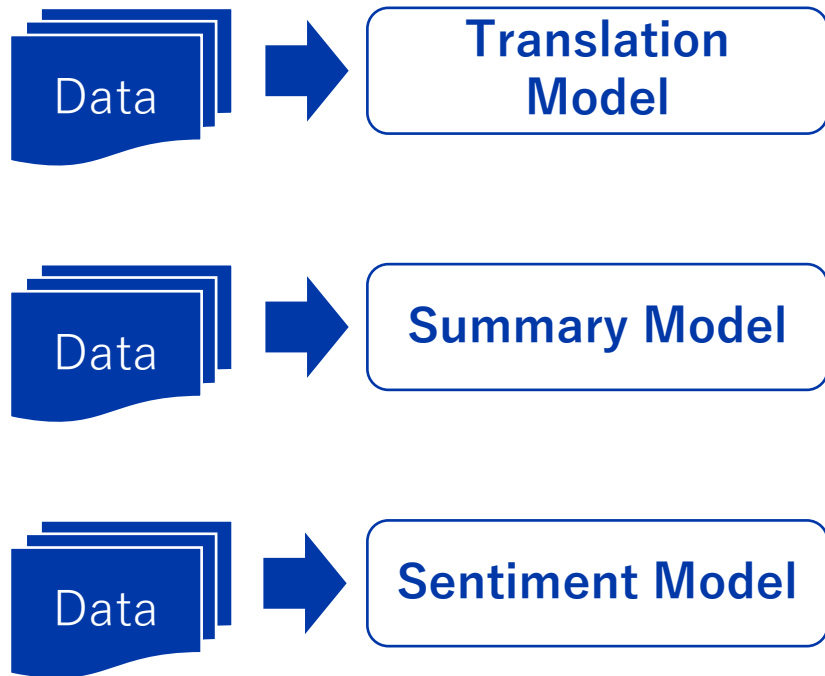
After LLM

- Need task-specific models

- More data, more model parameters, more computing resources, and more and more accuracy.

LLM as information transformers

- Input and/or output are of different modalities (e.g. text-to-image, image-to-text)

LLM as information transformers

Prompt:
Imagine that you are an expert in evaluating the car damage from car accident for auto insurance reporting. Please evaluate the damage seen in the image below. For filing the incident report, please follow the following format in JSON (note xxx is placeholder, if the information is not available in the image, put "N/A" instead). {"make": xxx, "model": xxx, "license plate": xxx, "damage description": xxx, "estimated cost of repair": xxx}

GPT-4V:
{"make": "Toyota", "model": "Corolla", "license plate": "N/A", "damage description": "Front bumper and hood damage, driver side fender damage, driver side headlight damage", "estimated cost of repair": "$2,500-$3,500"}

Source: The Dawn of LMMs: Preliminary Explorations with GPT-4V(ision)

Security

Data Breach

Let's consider a case where a consulting actuary inputs the client's (Company A) corporate name and detailed information about a new product under development into **ChatGPT** to create a draft proposal. In the future, if a third party asks **ChatGPT**, "What kind of product is Company A developing?" it might respond based on the information provided by the actuary. Such an information leak poses a risk not only to the client's information security but also to the actuary's credibility.

Adversarial Attack

An **adversarial attack** is a technique used to intentionally manipulate the input to a machine learning model so that it produces an incorrect output with a high level of confidence.

"panda"
57.7% confidence

+ε

=

"gibbon"
99.3% confidence
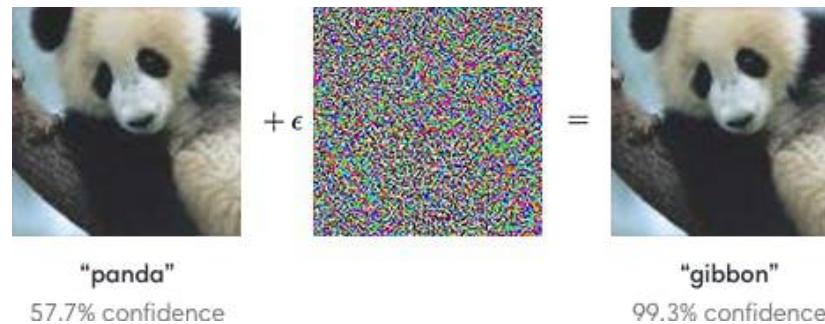
Source: Attacking machine learning with adversarial examples on Open AI website

Autonomous vehicles are vulnerable to **adversarial attacks**, such as manipulating traffic signs to deceive AI systems. This can cause the vehicles to behave unpredictably and put lives at risk. There are concerns that attackers could exploit these vulnerabilities for destructive purposes beyond just traffic accidents.

Security

DeepFake

Fraudsters Used AI to Mimic CEO's Voice in Unusual Cybercrime Case

Criminals used artificial intelligence-based software to impersonate a **chief executive's voice** and demand a fraudulent transfer of €220,000 ($243,000) in March in what cybercrime experts described as an unusual case of artificial intelligence being used in hacking.

The CEO of a U.K.-based energy firm thought **he was speaking on the phone with his boss**, the chief executive of the firm's German parent company, who asked him to send the funds to a Hungarian supplier. The caller said the request was urgent, directing the executive to pay within an hour, according to the company's insurance firm, Euler Hermes Group SA.

Source: https://www.wsj.com/articles/fraudsters-use-ai-to-mimic-ceos-voice-in-unusual-cybercrime-case-11567157402

Ethical

Fairness

Lemonade Insurance faces backlash for claiming AI system could automatically deny claims

"When a user files a claim, they record a video on their phone and explain what happened. Our AI carefully analyzes these videos for signs of fraud. It can pick up non-verbal cues that traditional insurers can't, since they don't use a digital claims process," the company wrote.

"This ultimately helps us lower our loss ratios (aka how much we pay out in claims vs. how much we take in) and our overall operating costs. In Q1 2017, our loss ratio was 368% (friggin' terrible), and in Q1 2021 it stood at 71%," the company added in the now-deleted thread.

These tweets caused immediate backlash from members of the **disabled community** who questioned how an AI system would be able to determine fraud based on videos, while others **questioned the legality** of touting a system that helped save the company money by denying more claims outright.

Source:https://www.zdnet.com/google-amp/article/lemonade-insurance-faces-backlash-for-claiming-ai-system-could-automatically-deny-claims/

Accuracy

Hallucination

Hallucination in AI refers to the generation of outputs that may sound plausible but are either factually incorrect or unrelated to the given context. These outputs often emerge from the AI model's inherent **biases, lack of real-world understanding, or training data limitations**. In other words, the AI system "hallucinates" information that it has not been explicitly trained on, leading to unreliable or misleading responses.

Data Drift

Machine learning models are trained with historical data, but once they are used in the real world, they may become outdated and lose their accuracy over time due to a phenomenon called drift. **Drift** is the change over time in the statistical properties of the data that was used to train a machine learning model. This can cause the model to become less accurate or perform differently than it was designed to.
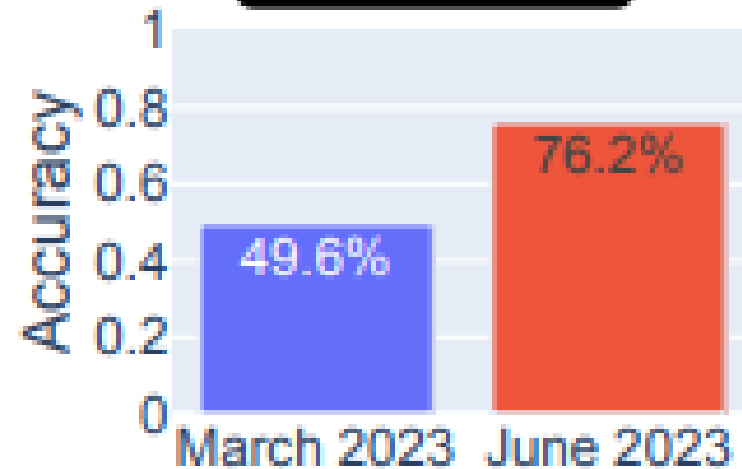
Accuracy

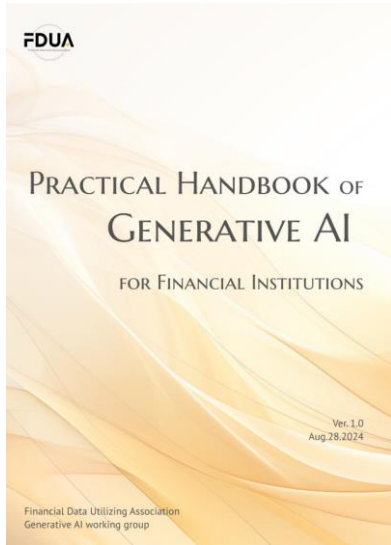Is 17077 a prime number? Think step by step and then answer [Yes] or [No].
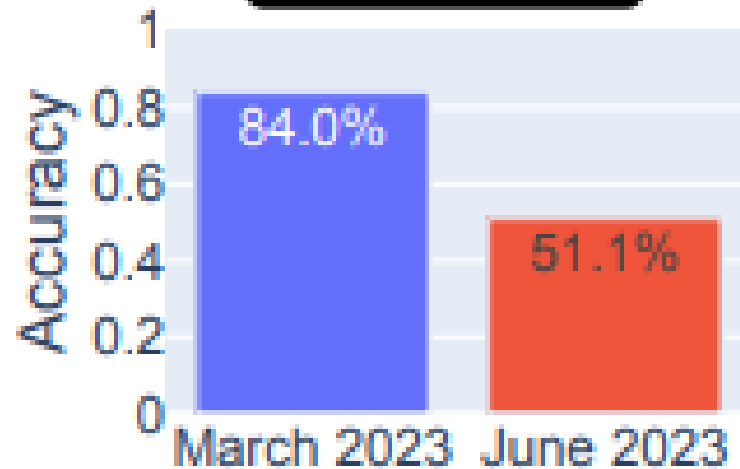
(a) Math I: Prime vs Composite (n=1000)

GPT-4: March 2023 — 84.0%, June 2023 — 51.1%

GPT-3.5: March 2023 — 49.6%, June 2023 — 76.2%

Source：How is ChatGPT's behavior changing over time?

Opportunities of GenAI

Level 3

- Providing services to external customers using GenAI.
- Use cases: customer inquiries support

Level 2

- Incorporating internal information through the RAG mechanism to build applications for specific domains.
- Use cases: drafting responses to customer inquiries, sale support, etc.

Level 1

- Using GenAI within a company at an individual level.
- Use cases: drafting documents and emails, coding, meeting minutes, etc.

Source: Practical Handbook of Generative AI for Financial Institutions

Opportunities of GenAI: Level 1

- Using GenAI within a company at an individual level.

Source: Sumitomo Life

Opportunities of GenAI: Level 2

RAG (Retrieval-Augmented Generation)
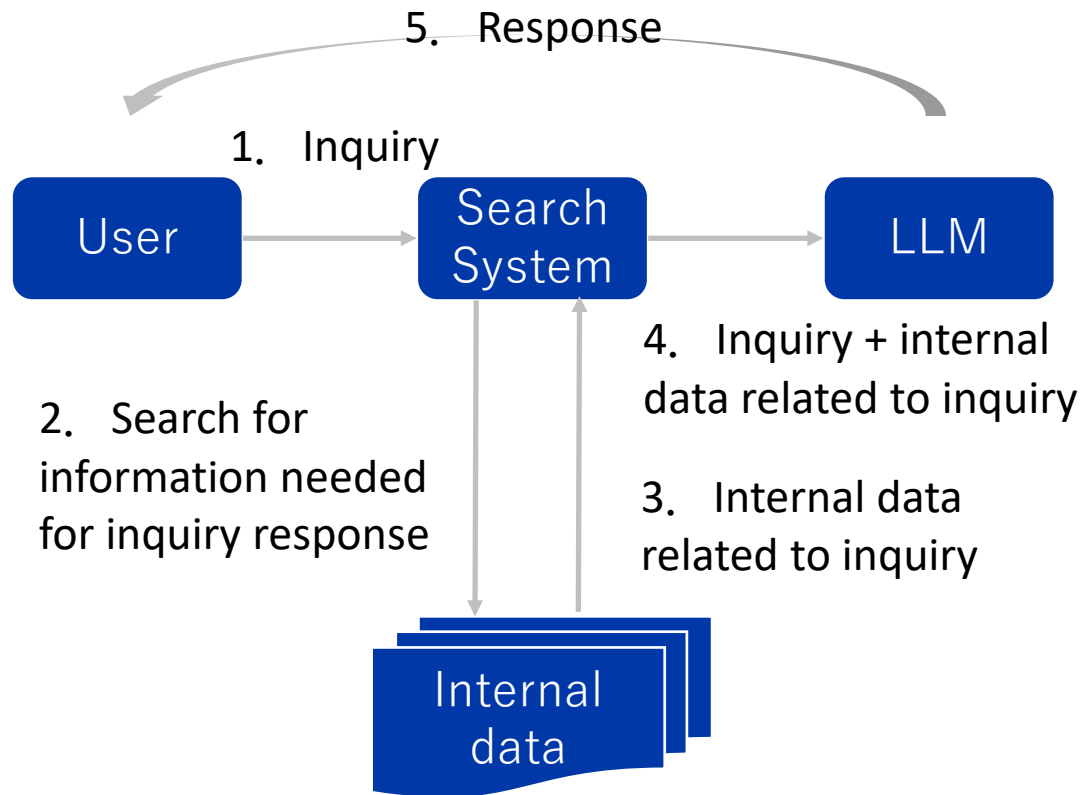
- RAG is a technology that enhances the quality and accuracy of outputs by adding relevant information to the input for LLMs.
- Key considerations when implementing RAG include:
  - Ensuring the accuracy of the added information
  - Confirming that the added information is not outdated
  - Considering search algorithms that can retrieve appropriate responses to questions, etc.

Source: Practical Handbook of Generative AI for Financial Institutions

Opportunities of GenAI: Level 3

- Disease prediction model using Vitality data was released in 2023.
- Capable of assessing risk for diabetes, stroke, cardiovascular disease, kidney disease, and cancer.
- Scores vary on a weekly basis.
- Combining Machine Learning and Actuarial Science.
- Logic-based generation of comments for health, but generative AI could be used to generate more personalized comments.
- This is one of the ideas for future level ups.

Source: Sumitomo Life

AI regulation by European Commission

EU parliament vote to adopt World's first comprehensive rulebook on 11th May 2023. The proposed regulation aims to make **AI system** safer and ensure the protection of individual's rights.

Source: https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai
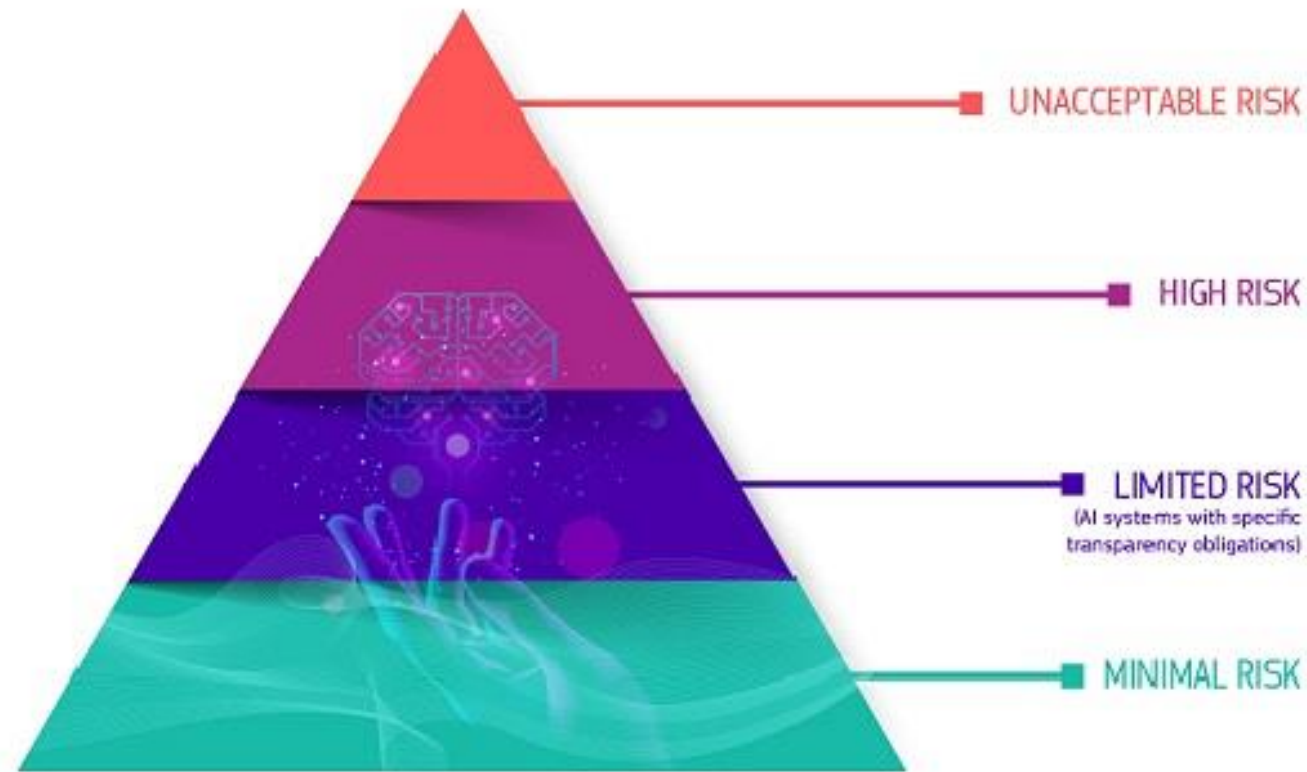
AI regulation by European Commission

Definitions

For the purpose of this Regulation, the following definitions apply:

'artificial intelligence system' (AI system) means software that is developed with one or more of the techniques and approaches listed in Annex I and can, for a given set of human-defined objectives, generate outputs such as content, predictions, recommendations, or decisions influencing the environments they interact with;

ANNEX I
ARTIFICIAL INTELLIGENCE TECHNIQUES AND APPROACHES
referred to in Article 3, point 1

(a)**Machine learning approaches**, including supervised, unsupervised and reinforcement learning, using a wide variety of methods including deep learning;

(b)**Logic- and knowledge-based approaches**, including knowledge representation, inductive (logic) programming, knowledge bases, inference and deductive engines, (symbolic) reasoning and expert systems;

(c)**Statistical approaches, Bayesian estimation, search and optimization methods**.

AI regulation by European Commission

insurance europe

Position paper

Response to EC proposal for a Regulation on AI

Our reference:	COB-TECH-21-083
Referring to:	EC public consultation on its proposal for a Regulation on AI
Related documents:	
Contact person:	Arthur Hilliard Senior Policy Advisor, Conduct of
Pages:	2

The definition of an AI system as currently proposed in Article 3 of the draft Regulation, however, significantly widens the OECD definition by also including software within its scope. This will result in the inclusion in its scope of systems, techniques and approaches that should not be considered as AI and will generally create confusion and a lack of legal certainty. For example, the use of statistical output from a linear regression model in the actuarial function would be covered by this proposed definition, as would statistical approaches such as exploratory data analysis that mostly involves using graphical techniques to analyse datasets, or task allocation systems that form part of the back-office functions of companies.

Guidelines for Business Ver 1.0 in Japan

Support for voluntary efforts by business operations

Show directions for AI business actors founded on the risk-based approach.

Coordination with international discussions

Ensure consistency with trends and contents of domestic and overseas relevant principles.

Understandability for readers

Readers can check risks and handling policies that should be considered regarding AI, for each of AI developers, AI providers, and AI business users.

Horizontal Guideline
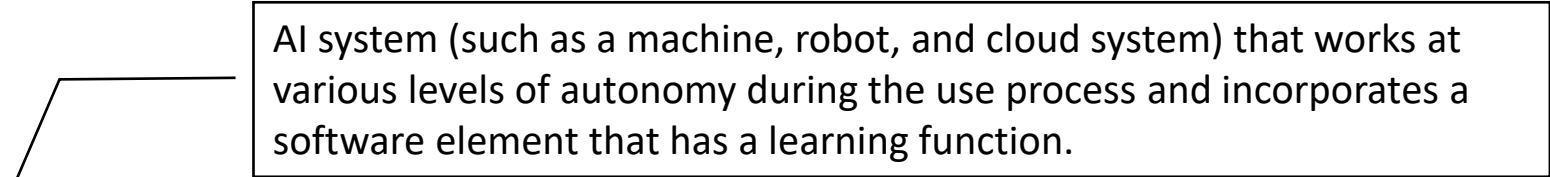
AI Guidelines for Business Ver.1.0 (living document)

Foundation

Social Principles of Human-Centric AI by Cabinet Office

Guidelines for Business Ver 1.0 in Japan

AI

No agreed definition has been existed as of now, and it is difficult to strictly define artificial intelligence in a broad sense. AI in the Guidelines is an abstract concept, which includes AI systems themselves or software or programs that perform machine learning.

AI system (such as a machine, robot, and cloud system) that works at various levels of autonomy during the use process and incorporates a software element that has a learning function.

AI model (ML model)

A model incorporated into an AI system and acquired through machine learning using training data. It produces prediction results in accordance with the input data. (For reference, it is defined in JIS X 22989:2023 based on ISO/IEC 22989:2022 as follows.)

A mathematical structure that produces inferences or predictions based on input data or information.

Example: When a univariate linear function $y = \theta_0 + \theta_1 x$ is trained using the linear regression, the result model is $y = 3 + 7x$ or the like.

Note 1: A machine learning model is acquired as a result of training based on a machine learning algorithm
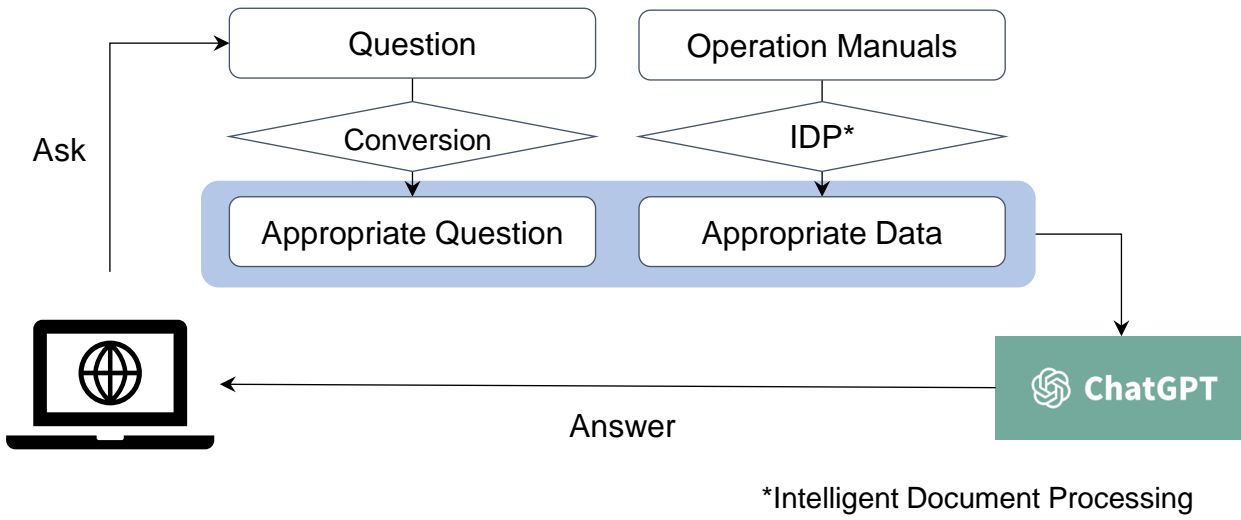
Level of interest and response of financial institutions to the AI principles

Source: Results of FDUA member survey
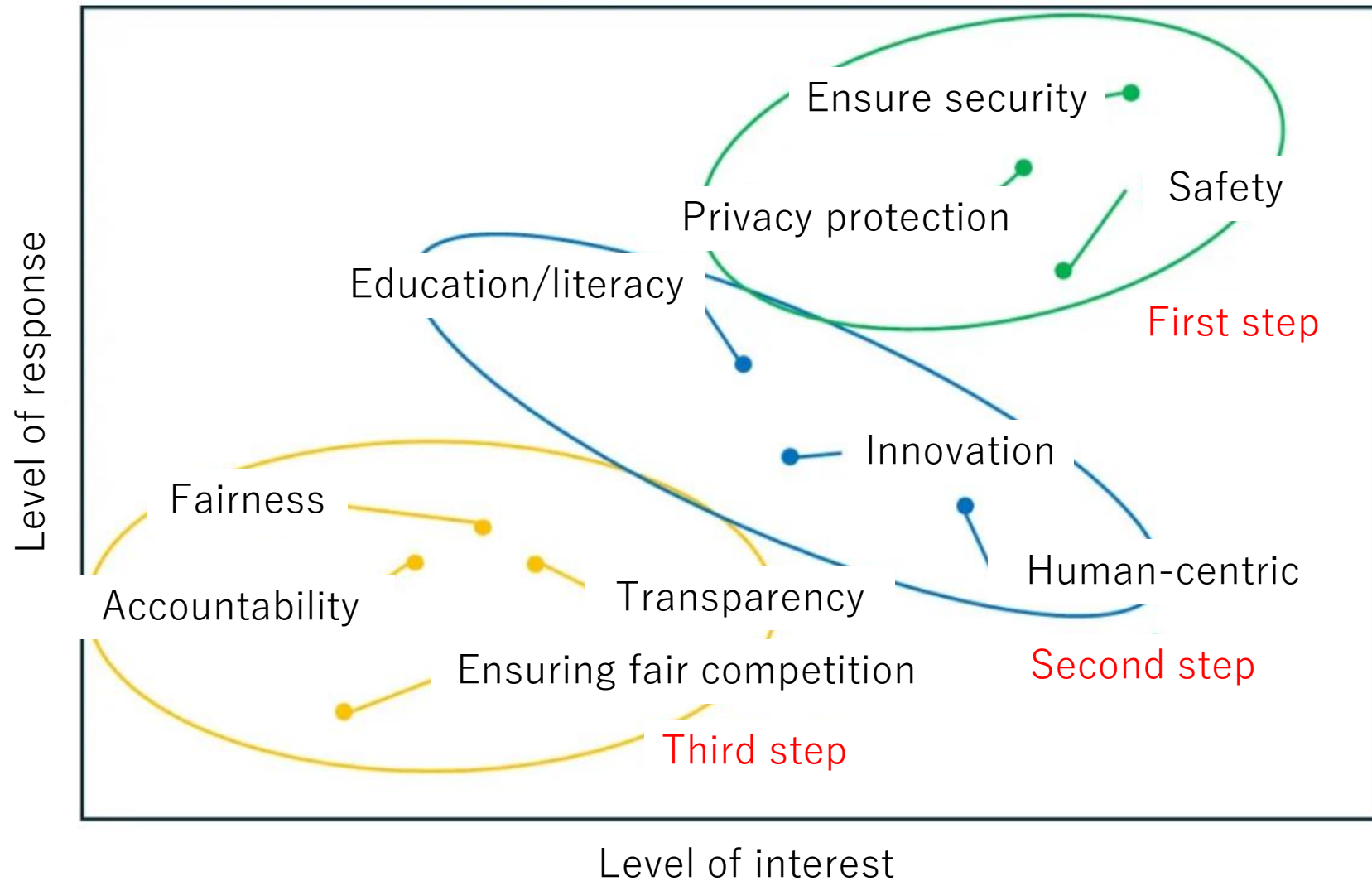
Summary

Narrow AI

- 2018: Vitality insurance launch (comprehensive health & wellness product)
- From Protection to Prevention
- 2020: Data analytics team set up
- 2023: Disease risk model developed (see below)
- 2024: Quantifying the impact of Vitality
  - Causal Analysis with ML

Question → Conversion → Appropriate Question

Operation Manuals → IDP* → Appropriate Data

Ask

Answer

ChatGPT

*Intelligent Document Processing

Nov, 2022 ChatGPT

総合健康スコア ❓

749点/1000点　前週比 +2点 😊

18〜29歳 男性Vitality会員の中で
上位 20% です。

0　　　　　　　　　　1000点

【健康になるためのヒケツ】

有酸素運動の効果
有酸素性運動の基本は「歩くこと」「走ること」です。脂肪がエネルギーとして燃焼されるため、肥満の改善に有効です。歩行の質を高めるためには、姿勢を正して、いつもより少し速く歩くことを心がけましょう。腕を軽く曲げ、しっかり振ることも大事です。

※一般社団法人　日本健康生活推進協会監修

生活習慣病リスク・健康診断履歴

生活習慣病リスク評価 ❓

糖尿病

18〜29歳男性Vitality会員の中で
やや低リスク（上位40%）です。

高リスク　　　　　　　　低リスク

脳卒中

18〜29歳男性Vitality会員の中で
やや低リスク（上位40%）です。

高リスク　　　　　　　　低リスク

「糖尿病・脳卒中・心血管疾患・腎臓病・がん」のリスク評価を確認出来ます。

Personalized Recommendation

General AI

- Internal ChatGPT rolled out in July 2023
- Customized Prompt Engineering Training to solve problems in each department:
  - 3Rs（**R**ole, **R**ule, **R**eference）
  - Training of sales staff, scenario generation
- ABC risk (**A**ccuracy, **B**ias, **C**yber/**C**opyright)
- RAG to deal with accuracy risk (see above)
- Bias - Actuarial Fairness vs. ML fairness
- Cyber - Allow to use internal ChatGPT only, developed on the Microsoft azure environment.

Thank you for your attention. I'm happy to answer any questions.