



Society of Actuaries in Ireland

Innovation in Life Insurance Panel Discussion

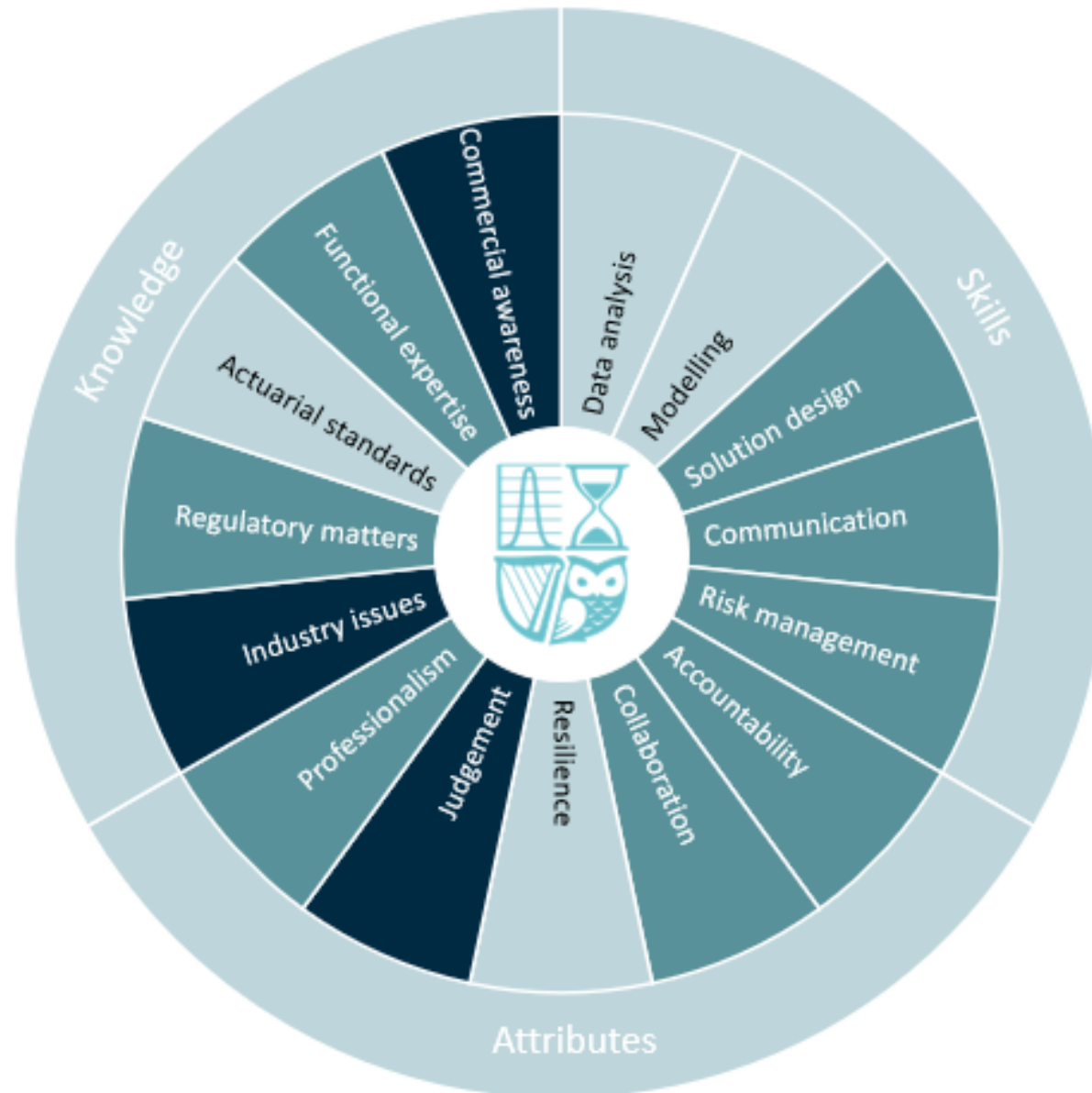
23 April 2021

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Disclaimer

The views expressed in this presentation are those of the presenter(s) and not necessarily those of the Society of Actuaries in Ireland or their employers.

SAI Competency Framework Wheel





Life Reinsurance & Innovation Committee – Innovation Series

- **Session 1: Wed 21st April 12.30pm:** [Life insurance pricing - the next frontier of innovation](#)

Speakers: **Shelley Cox**, Chief Customer Officer and **Stephen Carlin**, UK Customer Success Director & Product Owner, both from Montoux

- **Session 2: Fri 23rd April 10.00am:** [Innovations in Life Insurance – A Panel Discussion](#)

Speakers: **Jonathan Hughes**, Managing Director, RGAX EMEA, **Phil Edbrooke**, Director, Protection & Innovation at Pacific Life Re and **Chris Reynolds**, Chief Pricing Actuary - EMELA Region at PartnerRe

- **Session 3: Thurs 29th April 12.15 pm:** [Mental Health Underwriting – updating for current medical practices](#)

Speaker: **Scott Cadger**, Head of Protection Underwriting, Claims and Commercial Strategy at Lloyds Banking Group

- **Session 4: Wed 5th May 12.30 pm:** [Harvey Nash/KPMG CIO Survey 2020 – Everything changed. Or did it?](#)

Speakers: **Thorsten Schulz-Gerhardt**, Director at KPMG UK



Life Reinsurance & Innovation Committee – Innovation Series

Committee Members:

- Aisling Bradfield
- Ciaran Belton
- Cillian Ryan
- Clara Leahy
- Eoin King
- Gavin Maguire
- Niall Mulvey
- Philip Shier
- Sarah Lynch
- Sean Nangle
- Svilena Dimitrova



Today's panellists



Jonathan Hughes
Managing Director –
EMEA at
RGAx



Phil Edbrooke
Director – Protection
& Innovation at
Pacific Life Re



Chris Reynolds
Chief Pricing Actuary
– EMELA at
Partner Re



Society of Actuaries in Ireland

**Innovation:
A series of false choices?**

23 April 2021

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live longer, healthier,
more financially secure lives.
Everywhere.

RGAX is the **transformation engine** of RGA that leverages the talent, resources, and insight of RGA's 40+ years of innovation.

By **partnering with carriers and entrepreneurs**, we're incubating and accelerating new products and services to change the life insurance ecosystem.

TRANSFORMING LIVES. TOGETHER.

Jonathan Hughes FIA
Managing Director, RGAX EMEA

5th Floor, 24 Chiswell Street
London, EC1Y 4TY

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E jhughes@rgax.com



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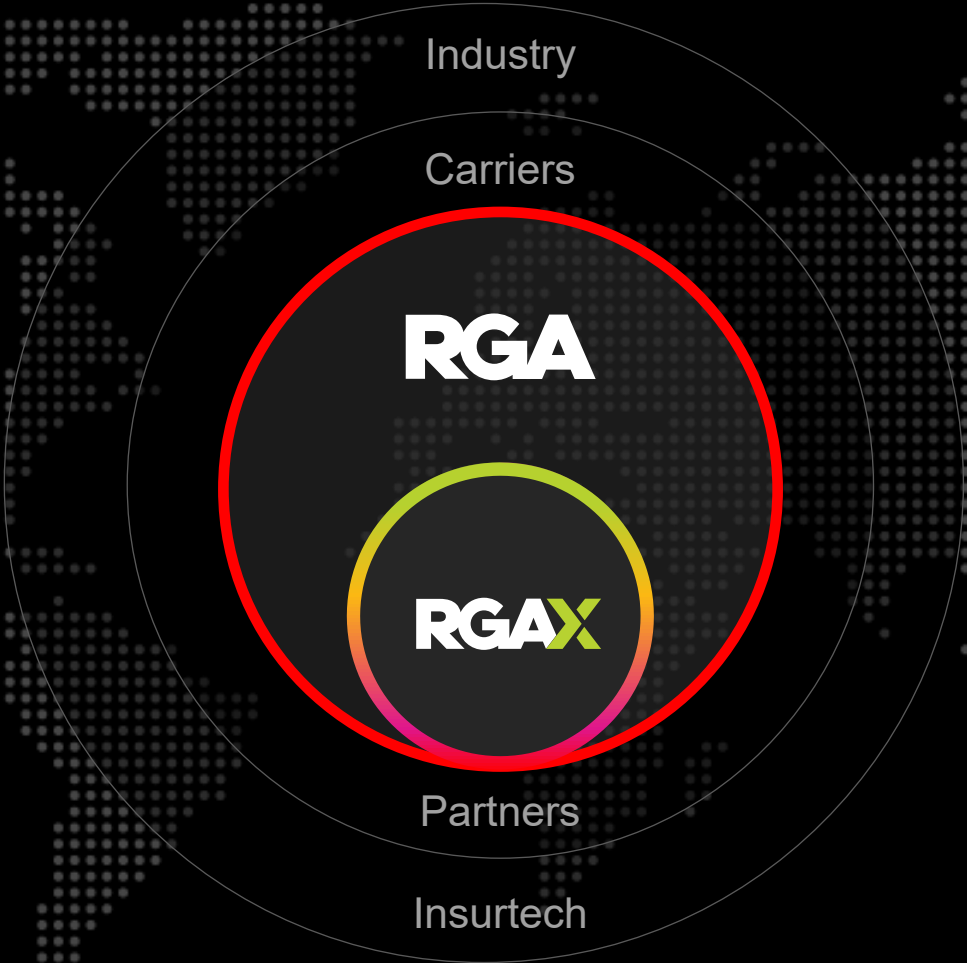
\$3.5 Trillion
In Force

\$76 Billion
In Assets

Transformational
Engine
of RGA

7 Services
Entities

Invested in
30+ Startups



Highlights

Multiple initiatives that each now cover hundreds of thousands of lives

Catalysing a start-up that arguably has the world's most engaging life insurance app

Getting stuff done

Lowlights

Precariousness of the existence of the start-ups that are key partners

Negotiating across the table from millionaires who can make instant decisions

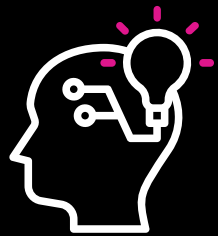
Getting stuff done slowly

“Actuarial lights?”

Dealing with financial uncertainty

Knowing what data and solutions are (and are not) valuable to the industry

Being comfortable with long time horizons before you know if what you did was successful

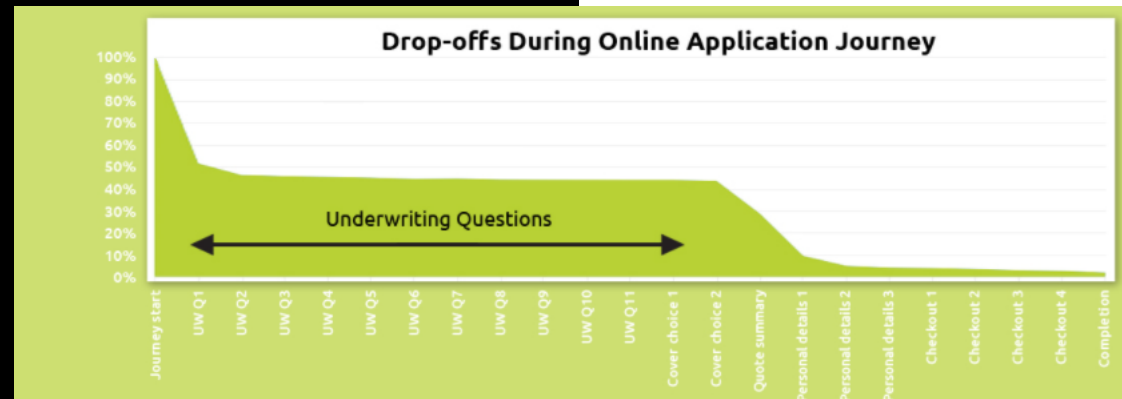


“Where do I start?”



Love solutions

Love problems



Source:
<https://www.rgax.com/blog/future-digital-life-insurance>

“How do I lead?”



Wicked
leadership

Tame & critical
leadership

CRITICAL

- Short term
- Decisive action needed
- No time for analysis

EXAMPLES:
Fire
Systems failure

TAME

- Causes are known
- Processes are known
- Time for management

EXAMPLES:
Moving home
Updating product suite

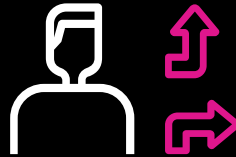
WICKED

- Complex and messy
- Multiple causes
- Can't be entirely solved

EXAMPLES:
Global warming
Protection gap

Source: <https://www.rgax.com/blog/wicked-problems-how-to-approach>

“Who can help?”



C-suite

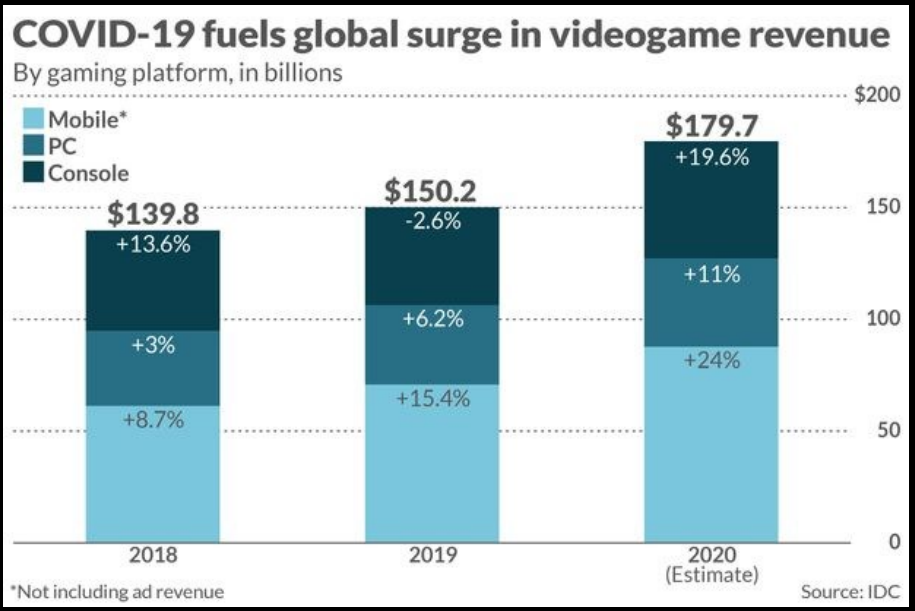
Decide who to invite

Identifying and engaging a productively diverse group of seven to eight stakeholders can be daunting, so follow these steps to help you select the right participants.

- **Invite the right people:** Once you've defined the problem (in the step above), you need to identify job roles that are impacted by it or are knowledgeable about it. The roles should be diverse. Think about who should be involved in implementing the solution across all dimensions, such as underwriting, claims, IT, administration and digital distribution.
- **Select backups:** After defining the roles, identify one person (and a backup) for each role. The people you select should have a strong line of sight into their area of the business and be able to articulate how their team functions and how it would be involved in or affected by a solution.
- **Choose a decider:** The decider is someone who can break ties in the sprint and often is the ultimate project owner, the sponsor, or the champion who will lead the project.

Source: <https://www.rgax.com/blog/design-sprints-checklist>

Middle
management



Outsiders



“Who else can help?”

Insiders

Source: <https://www.marketwatch.com/story/videogames-are-a-bigger-industry-than-sports-and-movies-combined-thanks-to-the-pandemic-11608654990>

“How best to fail?”



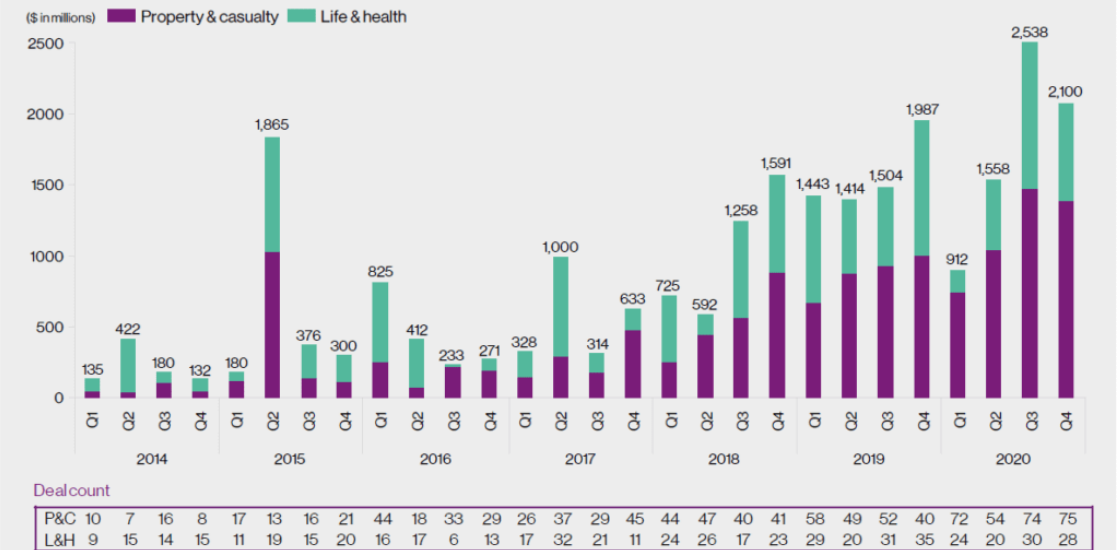
Cheap



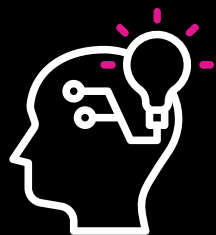
Fast



Quarterly InsurTech funding volume – all stages



Source: <https://www.cbinsights.com/research/report/insurance-tech-q4-2020/>



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Society of Actuaries in Ireland

Innovation in Life Insurance Panel Session

23 April 21

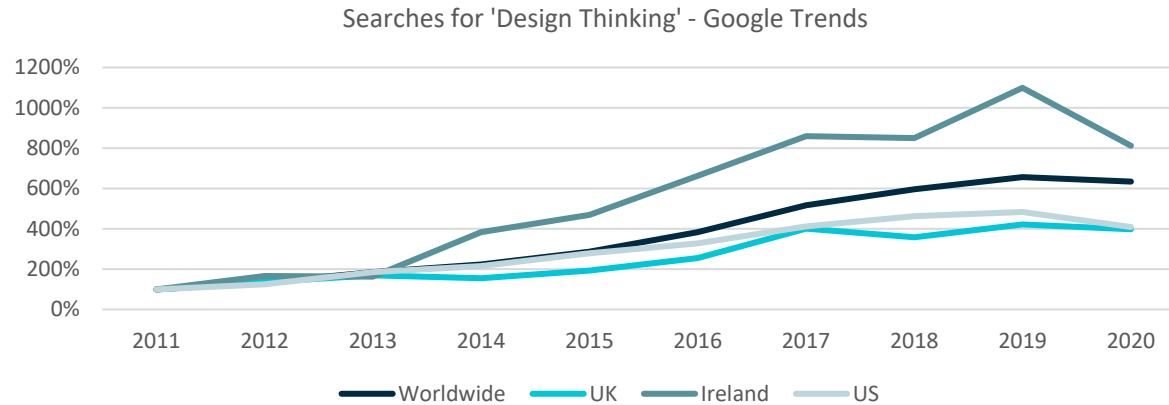
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Innovation in Life Insurance

Embracing the uniqueness of the life insurance proposition



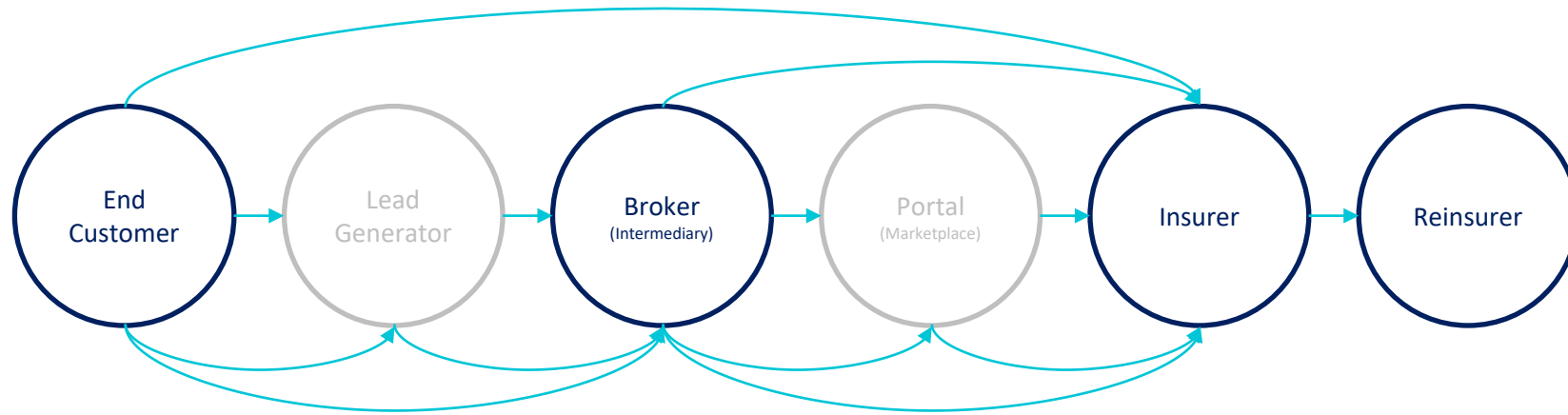
Design Thinking



					
Customer		Empathize	Empathize	Empathy	Empathy
		Define	Define	Inspiration	Expansive Thinking
		Ideate	Ideate	Ideation	
Feedback Loops		Prototype	Prototype	Implementation and Prototyping	Experimentation
		Test	Test		



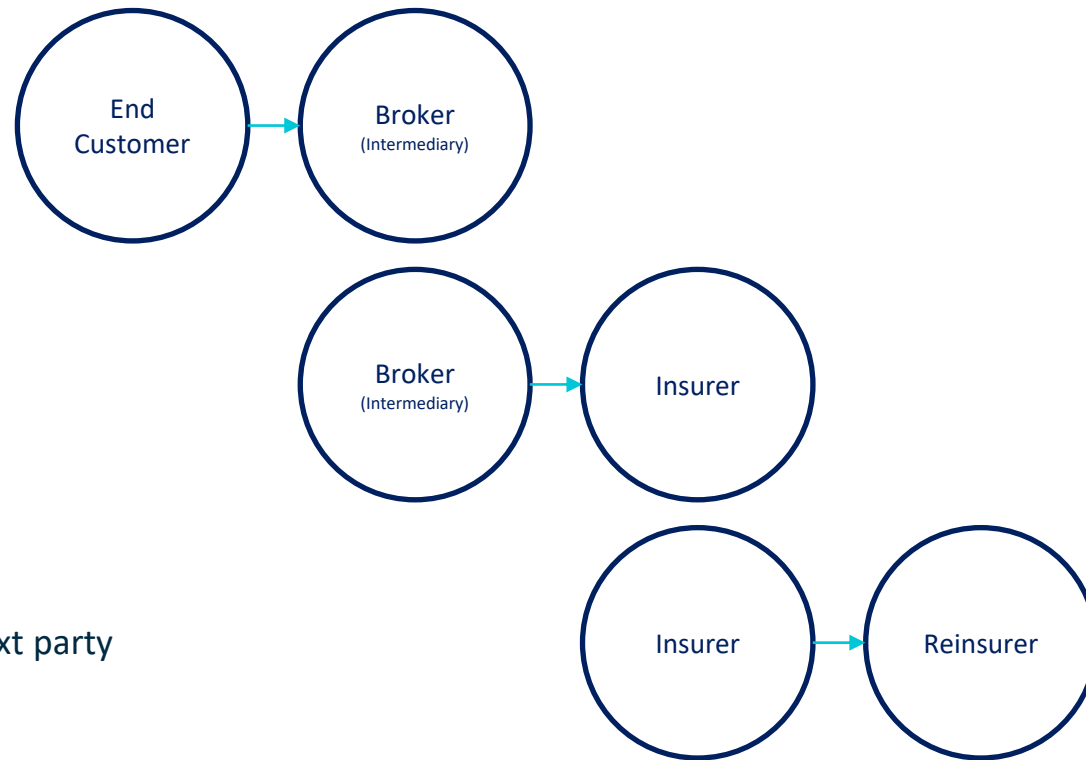
Who is the Customer?



The protection market value chain is long and in most cases involves many parties who represent experts in their own field



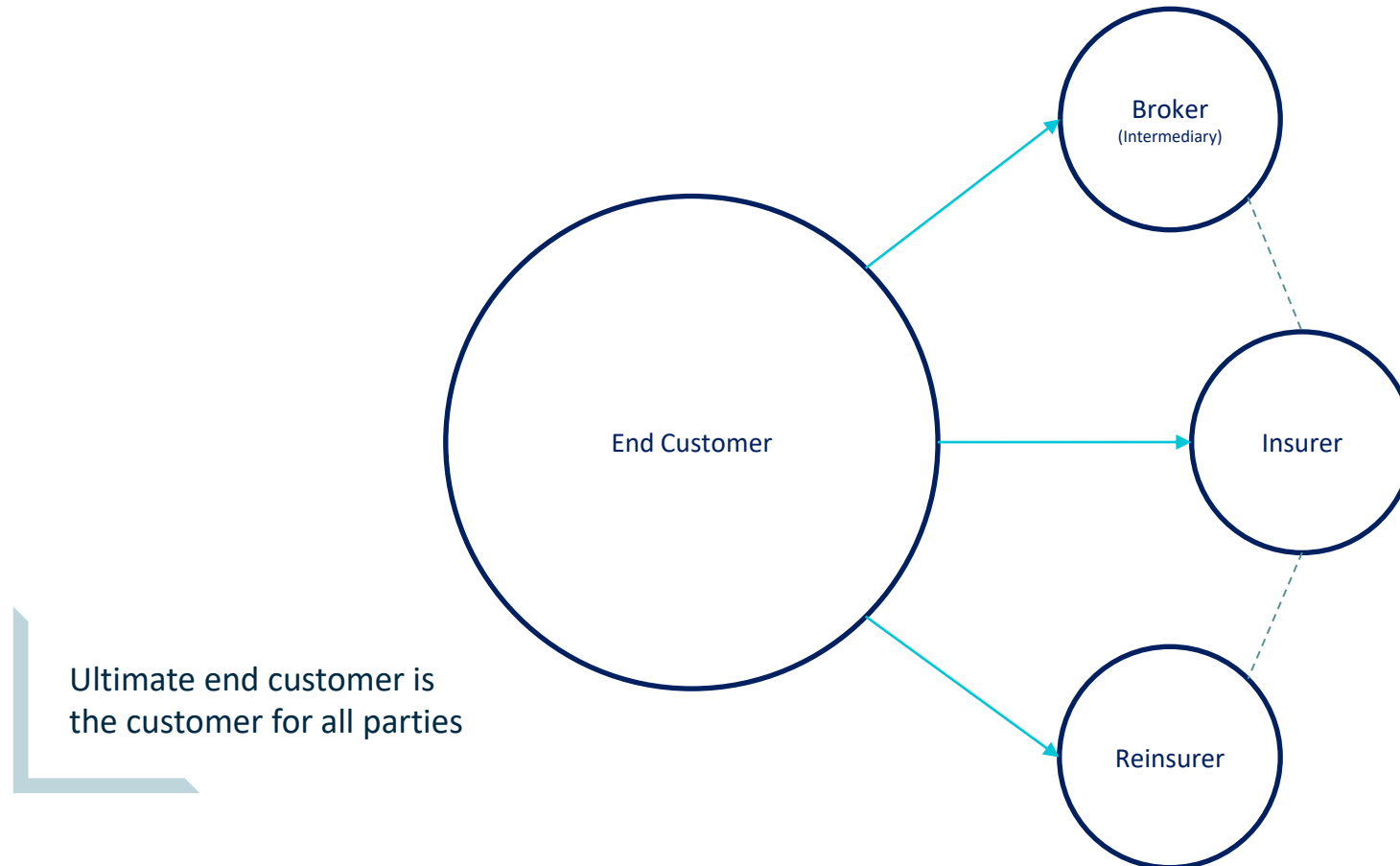
Who is the Customer?



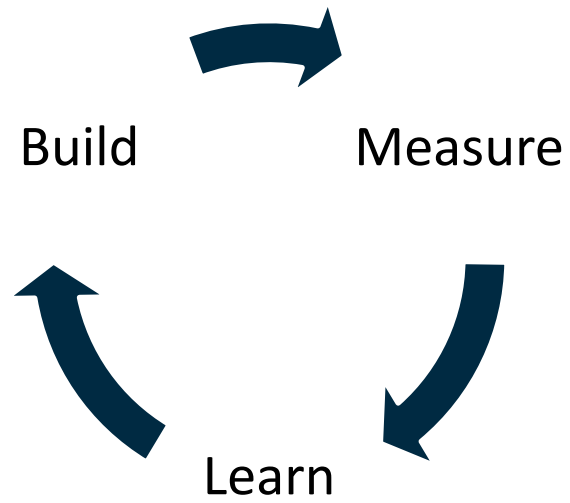
Customer is the next party
in the value chain



Who is the Customer?



Prototyping (Feedback Loops)



If we're dealing with rare events long in to the future when are we going to know if we got it wrong?



Conclusion

Customer - Innovation in Product Development requires alignment. The next party in your value chain is important but allowing all parties to treat the end customer as a shared customer is crucial.

Feedback Loops - Creating feedback loops on long term business is a challenge, but not an insurmountable one. Widespread investment in data science provides one potential breakthrough solution.





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Innovation in Life Insurance Panel Session

23/4/21

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Innovation in Life Insurance



*Two roads diverged in a wood, and I—
I took the one less traveled by,
And that has made all the difference.*
- Robert Frost



Pricing Function Challenges

Increasing Complexity

- Ever evolving industry and competitive pressure
- Pricing on new structures, new risk pools, etc.
- Blurring of lines between underwriting and pricing

Data integration and quality

- Need for accurate and timely data to make decisions
- Merged and integrated from multiple source
- Use of alternative data (e.g. health & wellness)

Advanced Analytics

- Lot of discussion and advances in recent years.
- Complementary (or competition?) to the actuaries
- Pushing pricing to the next level

Technology

- Too much manual processing in many business practices
- Improvements to data management, technology systems and operational processes.

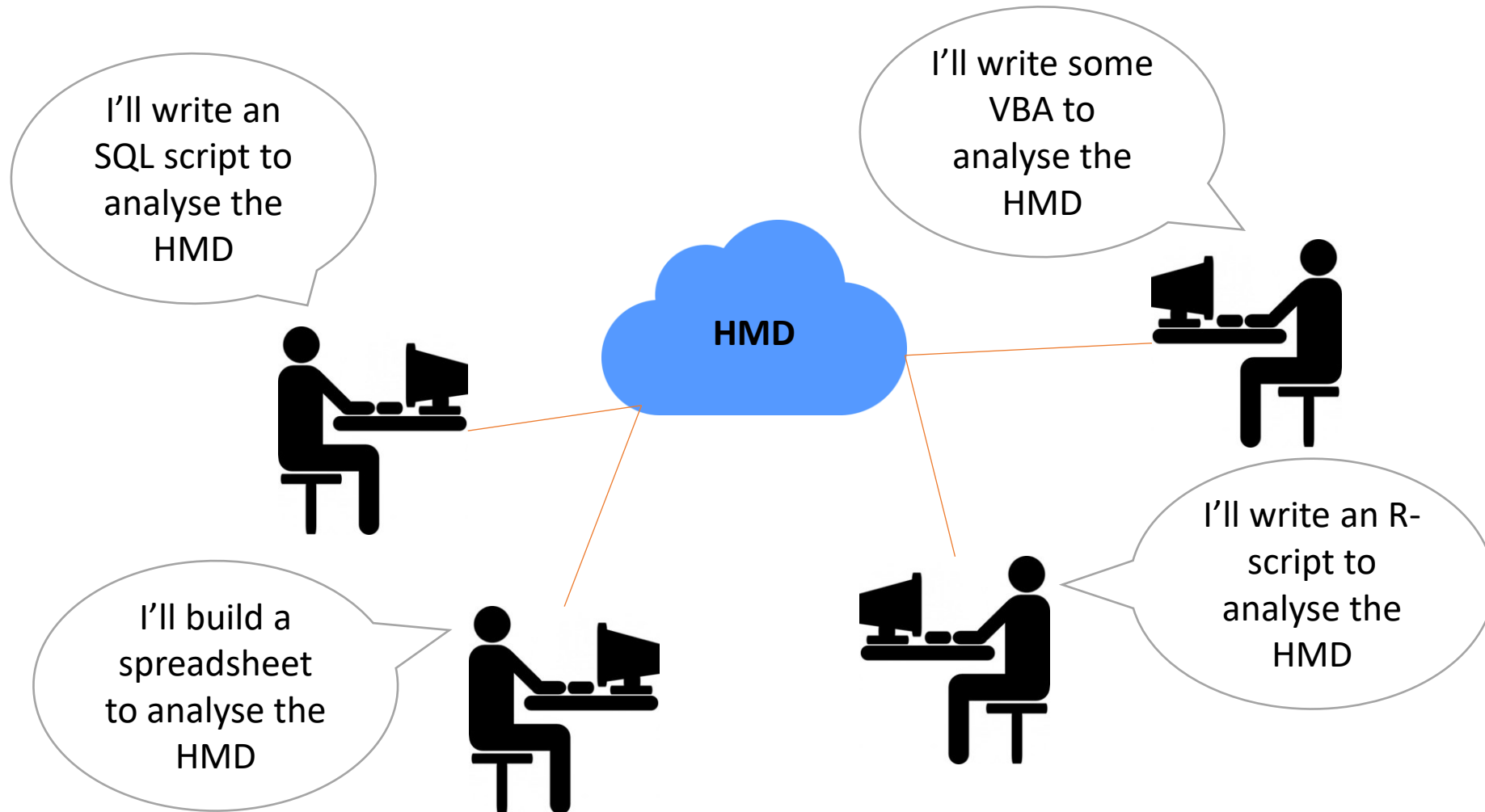


A Real World Example



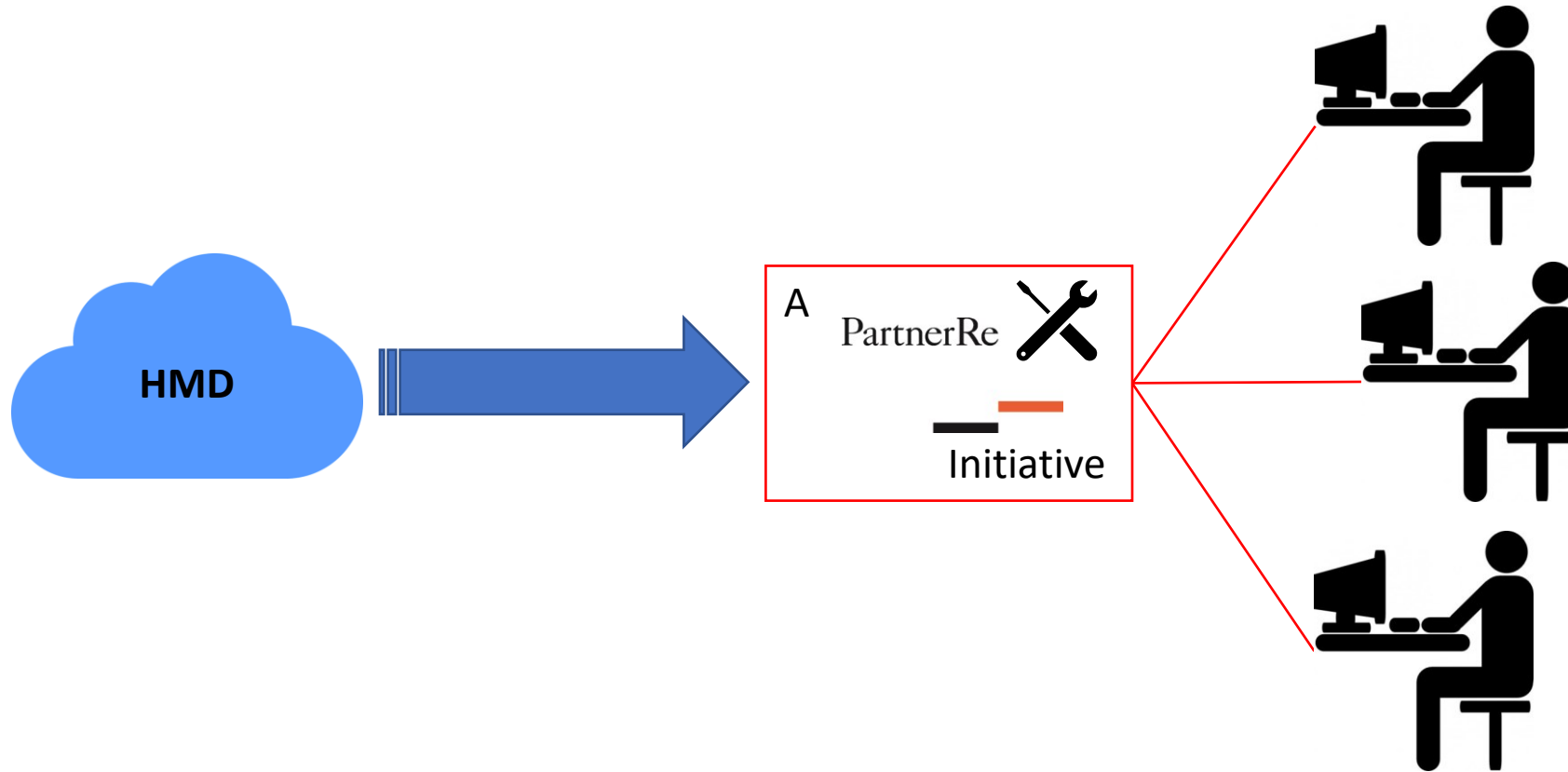


A Real World Example



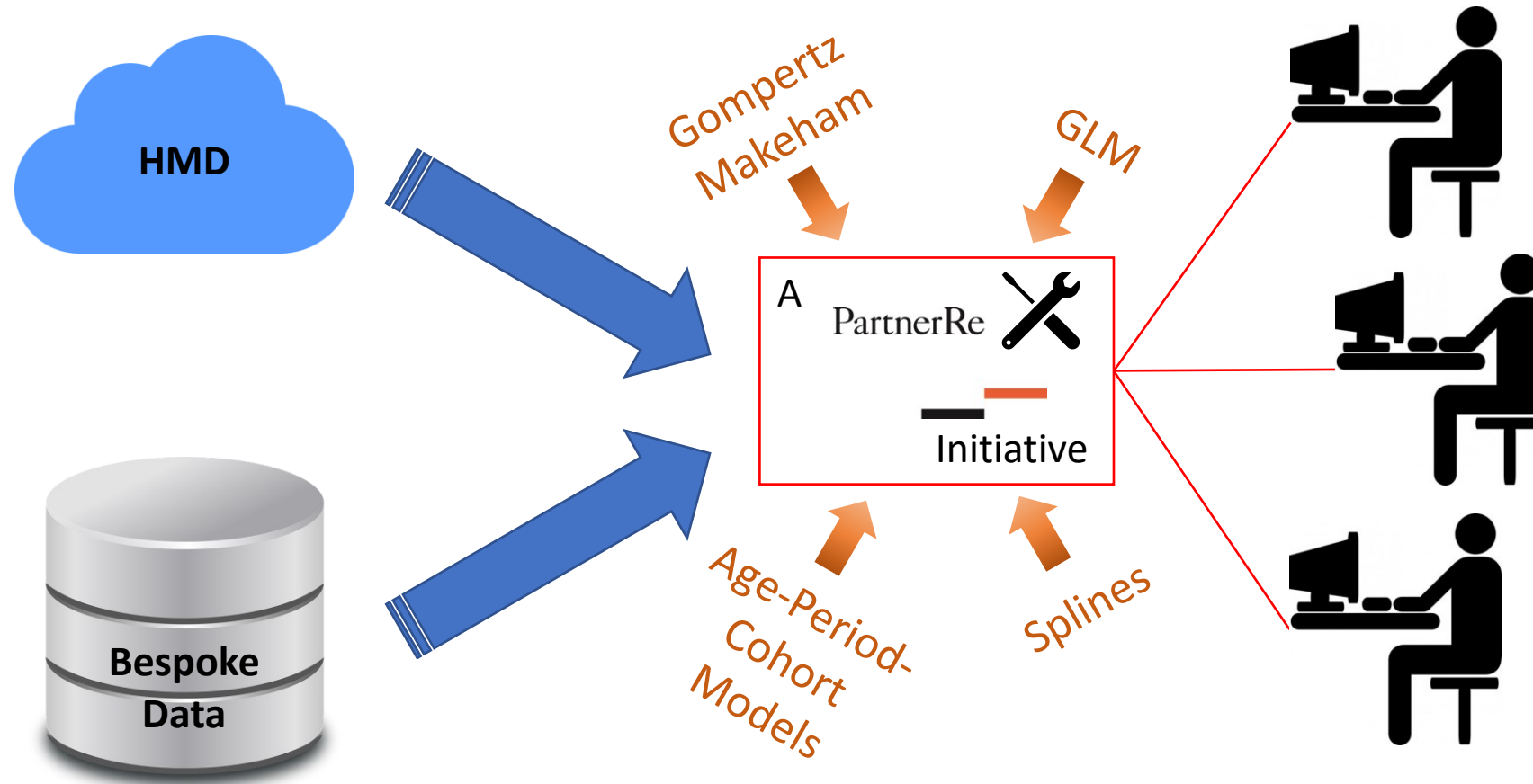


A Real World Example





A Real World Example





Mortality Toolkit

- Load **HMD** data
- Load **bespoke** datasets

Death Toolbox

Data

Exposure Adjustment

GLM

Splines

Gompertz-Makeham

AP/APC Models

Information

GLM Settings

Data

When you change something on the data tab please refresh using the buttons below.

Use raw data

Use exposure-adjusted data

You are currently using the adjusted data.

Weights

Use weights to indicate that different observations have different dispersions, with the values in weights being inversely proportional to the dispersions. For a lives-based analysis with a Poisson assumption, they are not recommended.

☐ Use weights vector

Covariates options

Restrict covariate variables

Year Age

Select the type of terms you want on the r.h.s. of the GLM

☒ Linear terms (e.g. X)

☒ Square terms (e.g. X^2)

☐ Cube terms (e.g. X^3)

☐ Log terms (e.g. log(X))

☐ Product terms of two vars (e.g. X * Y)

Use the field below to manually add additional terms (separate by ,). Use I() for operator inhibition.

I(sqrt(Age))

Fit GLMs

Select family of model

☒ poisson ☐ quasipoisson

Fit all models

Summary statistics of fitted models

Click on model for further analysis below!

Show 20 entries

Search:

Model Number	Formula	Deviance	AIC	Residual DoF	Null DoF	Dispersion	Rank	N Coeff	Min. Dev. Res	Median Dev. Res	Max. Dev. Res	Converged	
model15	Deaths ~ Year + Age + I(Year^2) + I(Age^2)	332\730	359\371	3075	3075		1	5	5	-14.502089	-2.49598	129.864548	true
model12	Deaths ~ Year + Age + I(Age^2)	336\575	363\215	3076	3076		1	4	4	-15.125112	-2.671326	130.790896	true
model14	Deaths ~ Age + I(Year^2) + I(Age^2)	336\710	363\349	3076	3076		1	4	4	-15.136297	-2.67116	130.808176	true
model13	Deaths ~ Year + I(Year^2)	513\979	540\618	3076	3076		1	4	4	-23.550039	-6.538872	93.110638	true



Mortality Toolkit

Death Toolbox

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Select the type of terms you want on the r.h.s. of the GLM

☒ Data Selection

Data

When you change something on the data tab please refresh using the buttons below.

Use raw data

Use exposure-adjusted data

You are currently using the adjusted data.

Restrict years

Select years

2017 2014 2015 2016

☐ Use weights

Apply averaging

Fit GLMs

Select family of model

☒ poisson ☐ quasipoisson

Fit all models

Summary statistics of fitted models

Click on model for further analysis below!

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model13	Deaths ~ Year + I(Year^2)	513\979	540\618	3076	3076		1	4	-23.550039	-6.538872	93.110638	true

•Fit **Gompertz Makeham** graduations

•Dynamically select the **parameters**

•Select the years to analyse



Mortality Toolkit

Death Toolbox

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☐ Use weights vector

Covariates

Restrict years

Select the GLM

☒ Data Selection

☒ Splines

☐ Gompertz-Makeham

☐ AP/APC Models

Use the term inhibition

Information

Options for general plot

Select variable for x-axis

Year

Select variable to plot

Mortality rate

☒ Plot mortality on log-scale

☒ Plot curves in different colours

☒ Make colour variable categorical

Select colour variable

Age

Restrict values for the colour

20 40 60

☐ Use faceted plot

Download fitted values as csv

Plot

Mortality in %

Age

Year

• Dynamically fits **GLMs**

• Choose the basic GLM **structure** (e.g., linear, square, etc.)

• Tool fits all possible model **variants**

Summary statistics of fitted models

Click on model for further analysis below!

Show 20 entries

Search:

Model Number	Formula	Deviance	AIC	Residual DoF	Null DoF	Dispersion	Rank	N Coeff	Min. Dev. Res	Median Dev. Res	Max. Dev. Res	Converged
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• Dynamically select the **parameters**

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Mortality Toolkit

Death Toolbox

- Data
- Exposure Adjustment
- GLM
- Splines
- Gompertz-Makeham
- AP/APC Models
- Information

• Load **HMD** data

• Load **bespoke** datasets

GLM Settings

Data

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Use raw data

Use exposure-adjusted data

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Weights

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☐ Use weights vector

Options for general plot

Select variable for x-axis: Year

Select variable to plot: Mortality rate

☒ Plot mortality on log-scale

☒ Plot curves in different colours

☒ Make colour variable categorical

Select colour variable: Age

Restrict values for the colour: 20 40 60

☐ Use faceted plot

Download fitted values as csv

Plot

Mortality in %

Age

Year

• Dynamically fits **GLMs**

• Choose the basic GLM **structure** (e.g., linear, square, etc.)

• Tool fits all possible model **variants**

Model Settings

Data

When you change something on the data tab please refresh using the buttons below.

Use raw data

Use exposure-adjusted data

You are currently using the adjusted data.

Model

Select model type: Lee-Carter

Set constraints: Cairns et al. (2009)

Perform fitting

Restrict years

Select years: 2017 2014 2015 2016

Tick the box below for a weighted average. Otherwise, a simple average over the years is taken.

☐ Use weights

Apply averaging

Current data

mx on log-scale

Age

• Fit **Gompertz Makeham** graduations

• Dynamically select the **parameters**

• Select the years to analyse

Summary statistics

Click on model for details

Show 20 entries

Model Number	Formula
model15	Dea I(Yea
model12	Dea I(Ag
model14	Dea I(Ag
model13	Dea

Estimated parameters

Model formula: $\log m(x, t) = a_{x,t} + b_{x,t} \cdot t$

Number of parameters: 248. Total deviance: 1041.

Download parameters as csv | Download fitted data as csv

Estimated parameters for model15

Estimated parameters for model12

Estimated parameters for model14

Estimated parameters for model13

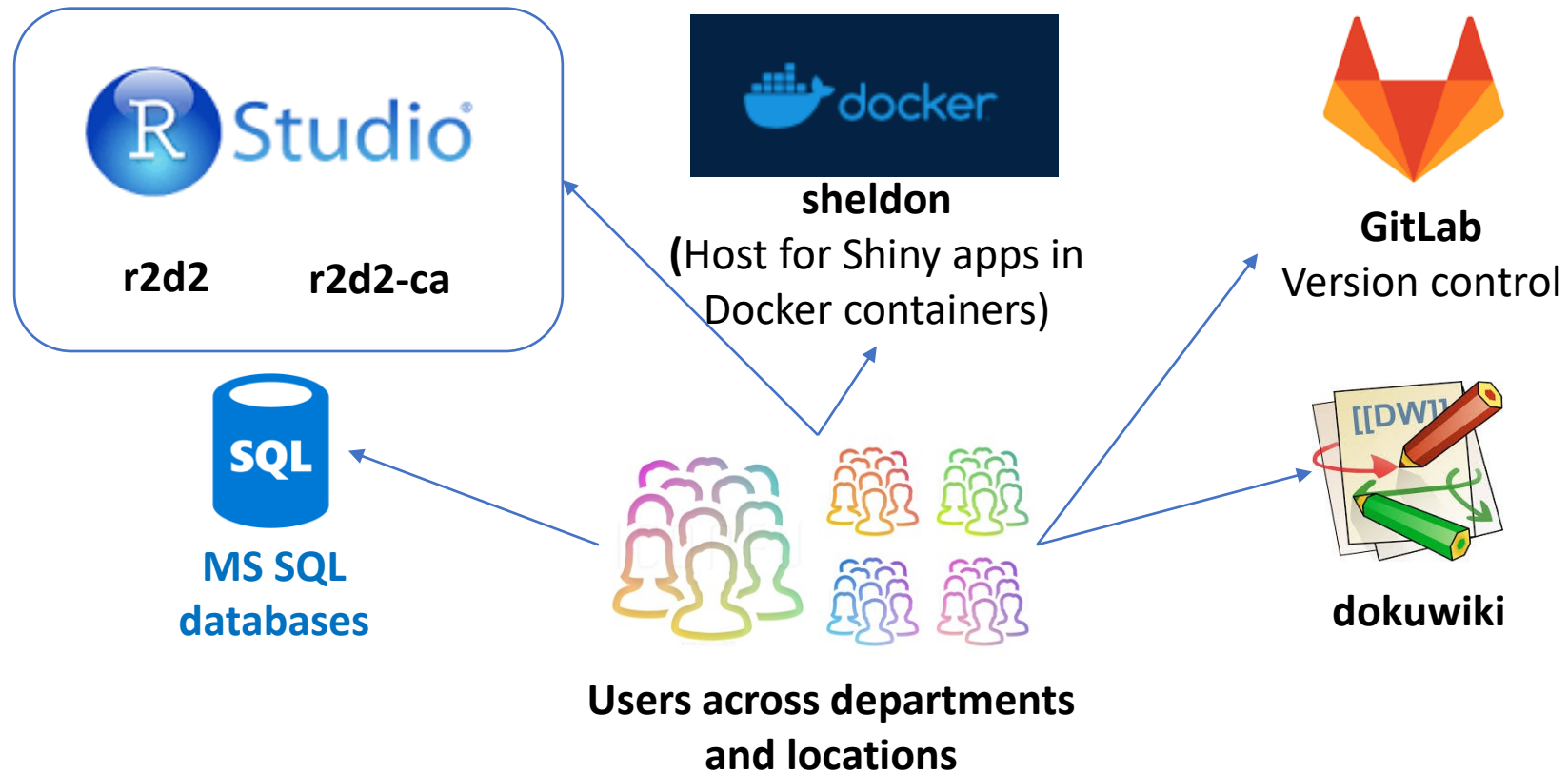
• Fit **Cairns Blake Dowd** and **Lee Carter** models

• Graphically see the fitted parameters

4 4 -23.550039 -6.538872 93.110638 true



Investment in Infrastructure



Sources:
<https://rstudio.com>
<https://www.docker.com>
<https://about.gitlab.com>



Choose your Path



***Two roads diverged in a wood, and I—
I took the one less traveled by,
And that has made all the difference.***

- Robert Frost

Questions

Please click on the 'Raise Hand' icon
to ask a question

and

wait to be unmuted

or

Use the Q&A function

