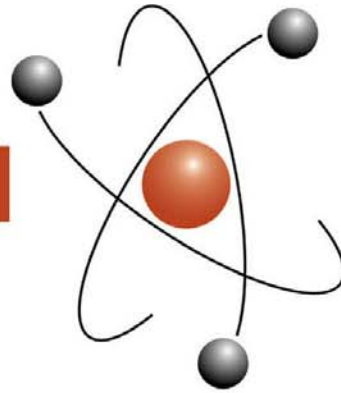


S U S T A I N



A B I L I T Y

ACTUARIES AND THE FUTURE

Modelling Risk:

**Right Plan + Wrong Doing
= Wrong Answer**

Jules Gribble & Sean McGing



Institute of Actuaries of Australia



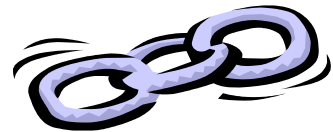
Roadmap

- **Models**
- **Model Risks**
- **Model Management**



Models

? Plan + ... = ...





What is a Model?

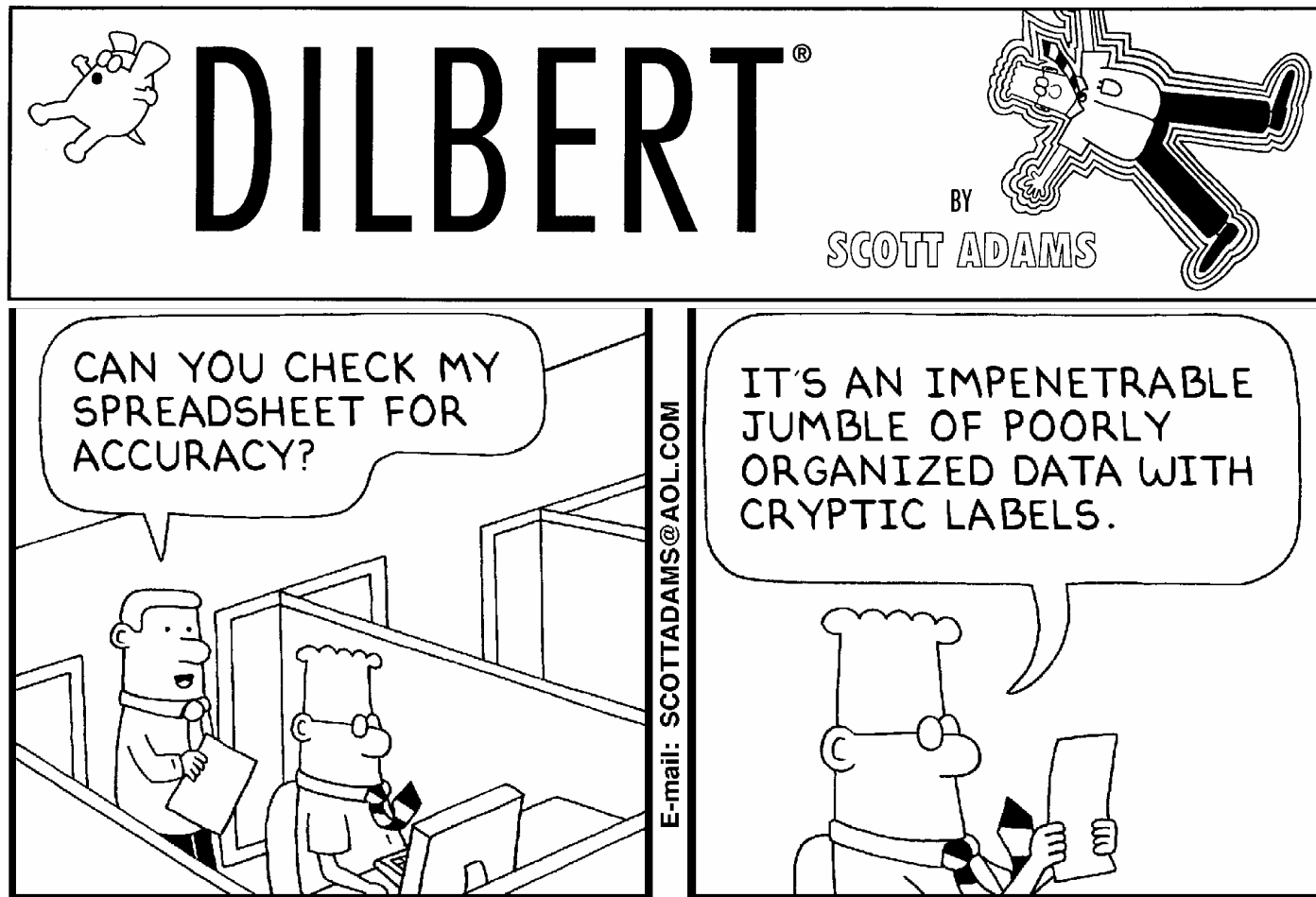
- **Formalisation of processes used**
- **Abstractions of reality**
- **Tend to reflect current paradigms**



Why Have Models?

- **Seek to manage future outcomes**
- **Future uncertain**
- **Means to an End**

Dilbert: Initial View ...



COPYRIGHT: UNITED FEATURE SYNDICATE INC.



Model Characterisation

The Tool:

- **Generic issue to address**
- **Set mathematical/logical relationships**
- **Computations/processes**
- **Parameters**
- **Data**

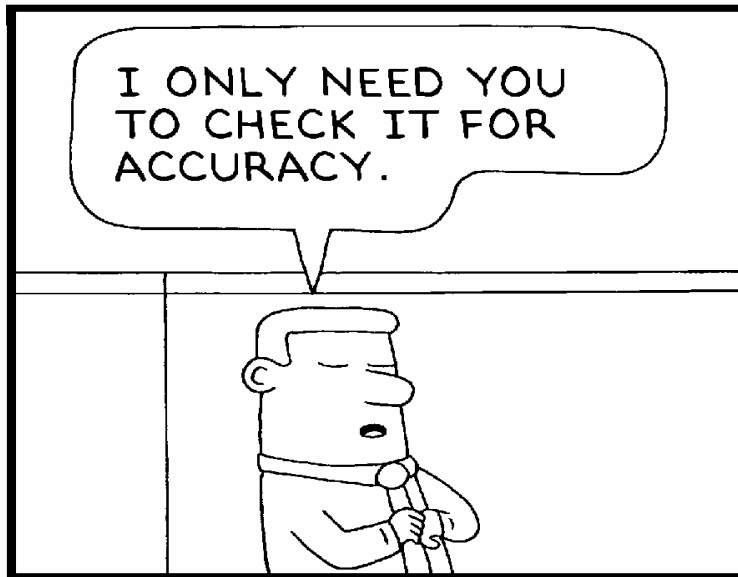


Model Management

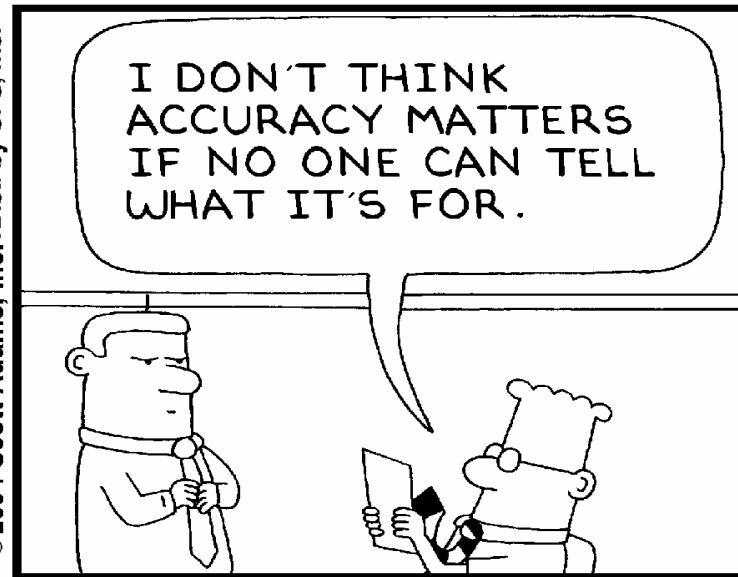
- **The Use of the Tool'**
- **Initial Development / Ongoing**
- **Implementation**
- **Control and accountability**



Dilbert: Builder vs Receiver ...



© 2004 Scott Adams, Inc. / Dist. by UFS, Inc.



COPYRIGHT: UNITED FEATURE SYNDICATE INC.

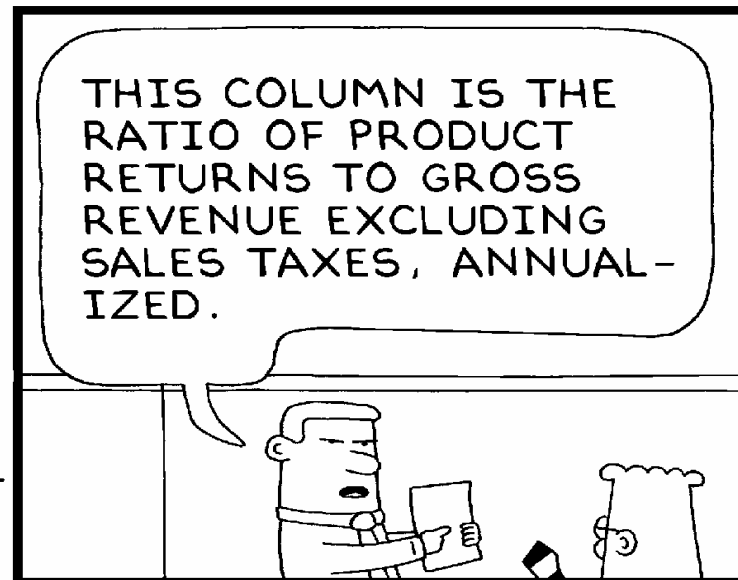
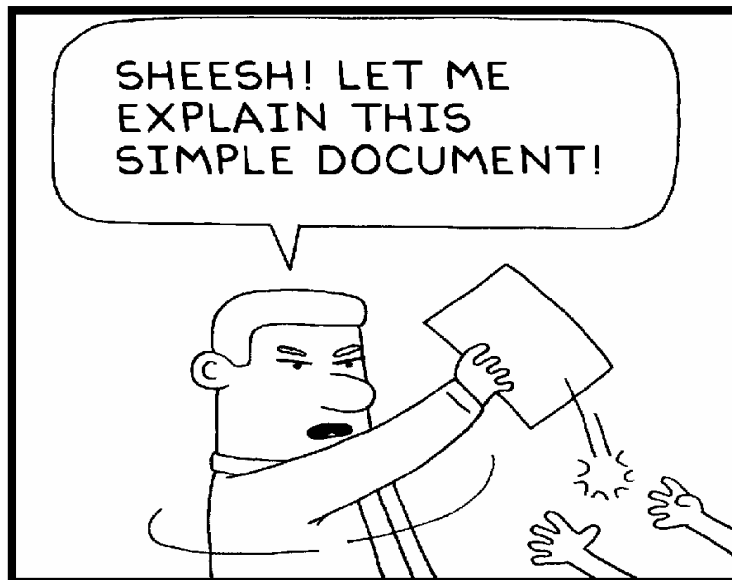


Model Implementation Process

- **Identify:** Specific scope & purpose
- **Approach:** Choose model (in 'budget')
- **Implement:** Build, reliances (sub-models)
- **Assess:** Valid, robust, stable
- **Parameters:** Instances are link to reality
- **Data:** Useable & valid actual data
- **Compute:** Specific results
- **Interpret:** Messages & limitations
- **Communicate:** Consequences & options
- **Decision:** Users / owners



Dilbert: You Idiot ...



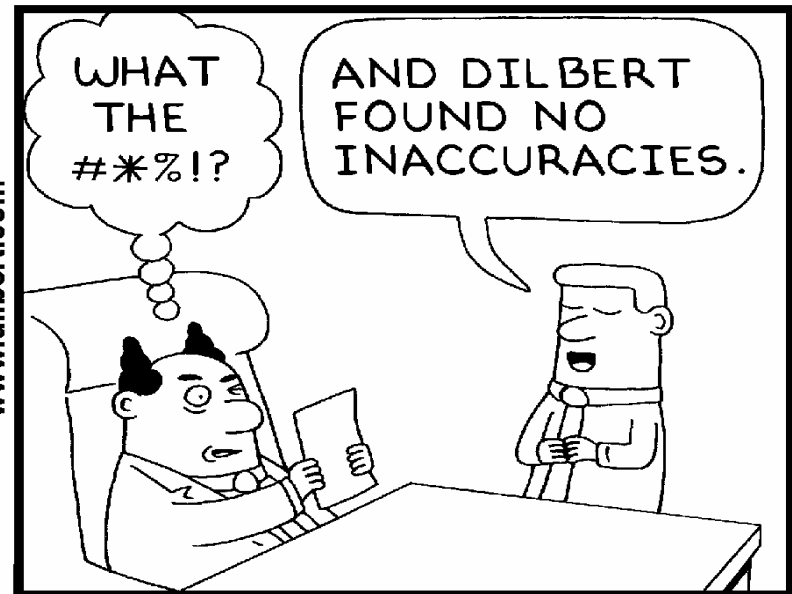
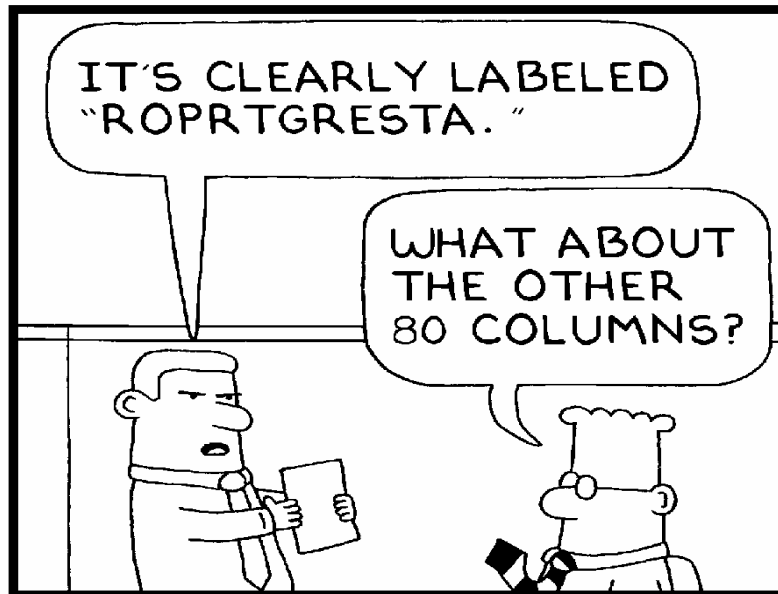


Chain for Model Use

- **Model**
 - Theory (designers)
 - Computational engine (mechanics)
 - Parameters (petrol, brake fluid ...)
 - Data (passengers, destination ...)
- **Model Usage (Owners & car drivers)**
 - Control: Changes, new applics (roadworthy)
 - Interpretation (how to drive)
 - Communication (driving)
 - Decision (arriving safely)
- **Failure: Weakest link in chain**



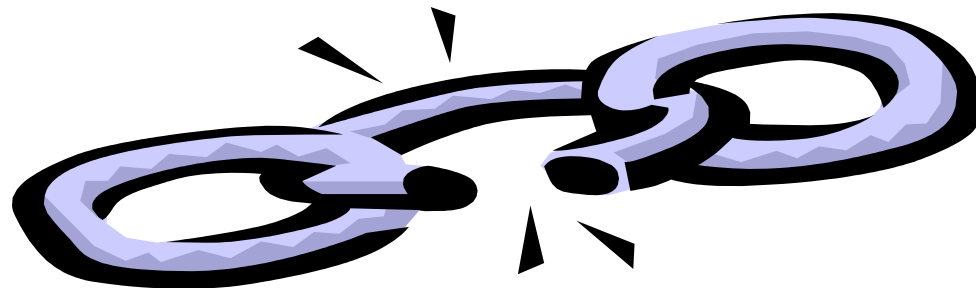
Dilbert: Trust Me ...





Model Risks

... + ? Doing = ...





Model Risks

- **5% Theory, 95% Implementation**
- **Beyond the Results**
 - **Model bigger than Computation**
- **Well maintained cars don't cause road carnage, the drivers do**



Risk of Outsmarting Self

- **1/n Pension Investment Puzzle**
- **Investment portfolios:**
 - ‘Naïve’ 1/n asset allocation
- **Consistent with Markowitz efficient portfolios *given limited information***

Windcliff & Boyle, NAAJ 2004



Model Limitations

- **Purpose (of question) change**
- **Extreme values of parameters**
- **Granularity**
- **Underlying assumptions violated**

- **What does it NOT do / tell?**



Data

- **HIH Royal Commission**
- **Explicit need to validate data**
- **GIGO**



Model Management

... + ... = ? Answer





Modelling Errors?

- **Spreadsheets**
- **Unit pricing**
- **Business reliance on ‘the expert’**
- **Experience**



Operational Risk

- **The risk of loss resulting from**
 - **Inadequate or failed internal processes, people or systems****or**
 - **From external events**

Source: BIS, APRA



Application Risk

- **Implementing it wrong**
- **vs knowing what to do**

- **The 95% perspiration**
- **After the 5% inspiration**



What to Do?

- **Model validation**
 - **Independent expert review**
 - **Complexity**
- **Not audit or compliance**
- **Understand the whole chain**
 - **Expect 'errors' and change**



Key is Management

- **Recent EU work examining failures and near failures of insurers**
 - **Primary cause of failure is poor management**
 - **Other ‘reasons’ are symptoms**
- **Not fault of model – but of users**



Common Model Perspective:

	Theory	Implement'n
Scope		
Computation	Dilbert Actuarial	
Use		



Future Model Perspective:

	Theory	Implementation
Scope		
Computation		
Use		Actuarial



Actuarial Capabilities - FIAA

- Cognitive
- Expertise
- Actuarial Judgement
- Innovative & Flexible
- Rigour & Holistic
- Strategic
- Integrity
- Personal Management
- Influence and interpersonal Skills
- Communication
- Business Acumen

Source: IAAust 2001



Non-Mathematical Models

- **Corporate Governance**
- **Actuarial ‘Control Cycle’**
- **etc**



Actuarial (Modelling) Practice

Problem:

Computational Tools

+ Analytic Cycle

+ Professional Cycle

= Modelling Process

+ Application to Financial Services

= Model Management

+ Actuarial Capabilities

= Actuarial Practice

Source: Gribble 2003



Summary

- **Models**
 - **Tools: Means to an end**
- **Model Risks**
 - **Application Risk: 5% Theory, 95% Implementation**
- **Model Management**
 - **‘Chain’ beyond the computations**
 - **Ongoing independent validation**



A Final Thought

- ‘The future of the actuarial profession is a matter of putting models into practice’

MacDonald 1997



Contact Details

- **Jules Gribble**
 - **Jules_Gribble@askit.com.au**
 - **(3) 9605-4602**
- **Sean McGing**
 - **Sean_McGing@askit.com.au**
 - **(3) 9605-4601**