

Models are said to be valuable to policy makers (McIntosh et al., 2007), but there exists a gap in the potential and actual uptake of these tools (Syme et al., 2010). Moreover, several **incidents with model use** in policy have drawn attention to the importance of understanding how such models are developed and used. This research draws on eight case studies of models that are used in government.

Developing models for government: Some lessons and considerations from practice

The kick-off

- Model development is time consuming and requires a lot of resources at the start. Despite this being well-known, modelling projects tend to overshoot their deadlines.
- Model development is **not just technical**; procedures for things as versioning and communication also require attention.
- Leading up to the first operational model, formal external reviews are conducted to ensure model quality.
- Model credibility and **comprehensibility** are paramount to securing internal buy-in and external acceptance of a model.

Credibility?

- Models that produce novel insights that are incompatible with other sources struggle to gain acceptance.
- While often seen as a means towards credibility, **transparency does not equal quality**. Very few people will take the time to read all documentation.
- Communication on model outputs can often seem like a game of **rumors**, caveats and limitations are dropped as information travels up the chain of command.
- Standards of quality are less standardized in government, but can be **more stringent than academic norms**.

Ongoing development

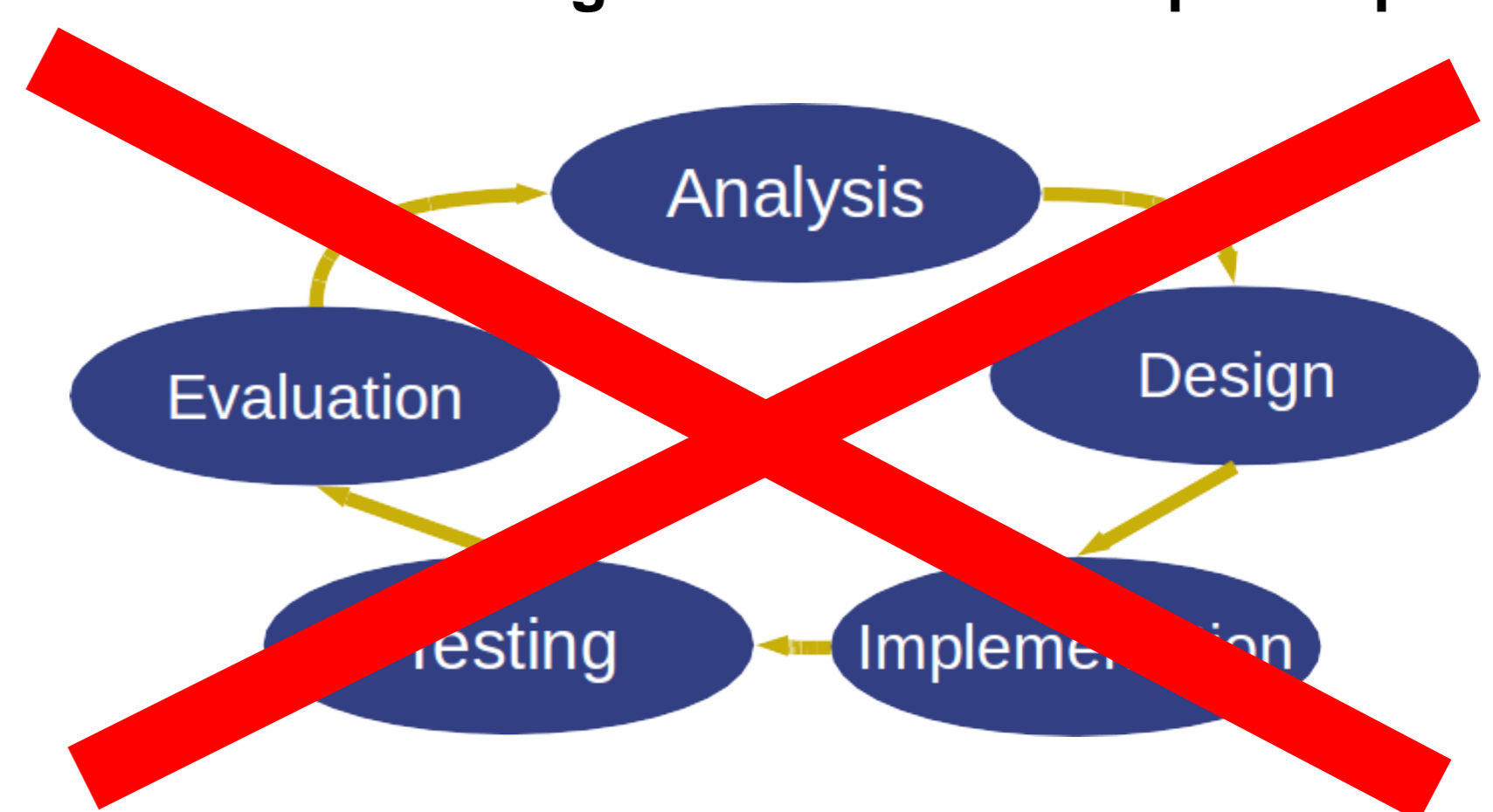
- Models undergo constant adaptation to remain up to date with the latest data and insights. At this stage, formal **audits, such as external reviews, are less common**. Procedures, like checklists, become more central to quality assurance.
- Turnover of staff puts pressure on ensuring model quality; new model users may require months of training.
- **Outsourcing** model development, or placing it in a separate unit contributes to safeguarding model quality.

Methods

Data was collected in the form of 36 semi-structured interviews with model developers and policy analysts, and an archival study of 27 documents.

The interviews and documents were analysed using qualitative data analysis software following the principles of *grounded theory* coding. In a nutshell, this approach consists of iteratively attributing labels to fragments of text. In this fashion, commonalities and differences between the cases are identified.

Is there such a thing as a model development process?



Each of the eight models studied had a different development process. Amongst other things, development differed in terms of client-developer relationship and level of quality assurance.

Despite the differences between the eight models, there are commonalities in model development. For instance, the duration of the development process tends to be underestimated.

Model development is not a linear process and development of a model continues well after its initial release.

Proceed with caution?

Model outcomes are often compared to other models. Inconsistencies between the outcomes of models are perceived as problematic. Because model developers tend to be part of a community of modelers, this can cause **lock in**.

New models are subject to a high degree of scrutiny. As a model gets wider acceptance, less effort goes into quality assurance; e.g. no further formal audits are conducted.

For financial markets, models have been shown to **affect the system they represent**. It remains unclear to what degree such effects are present in other domains.