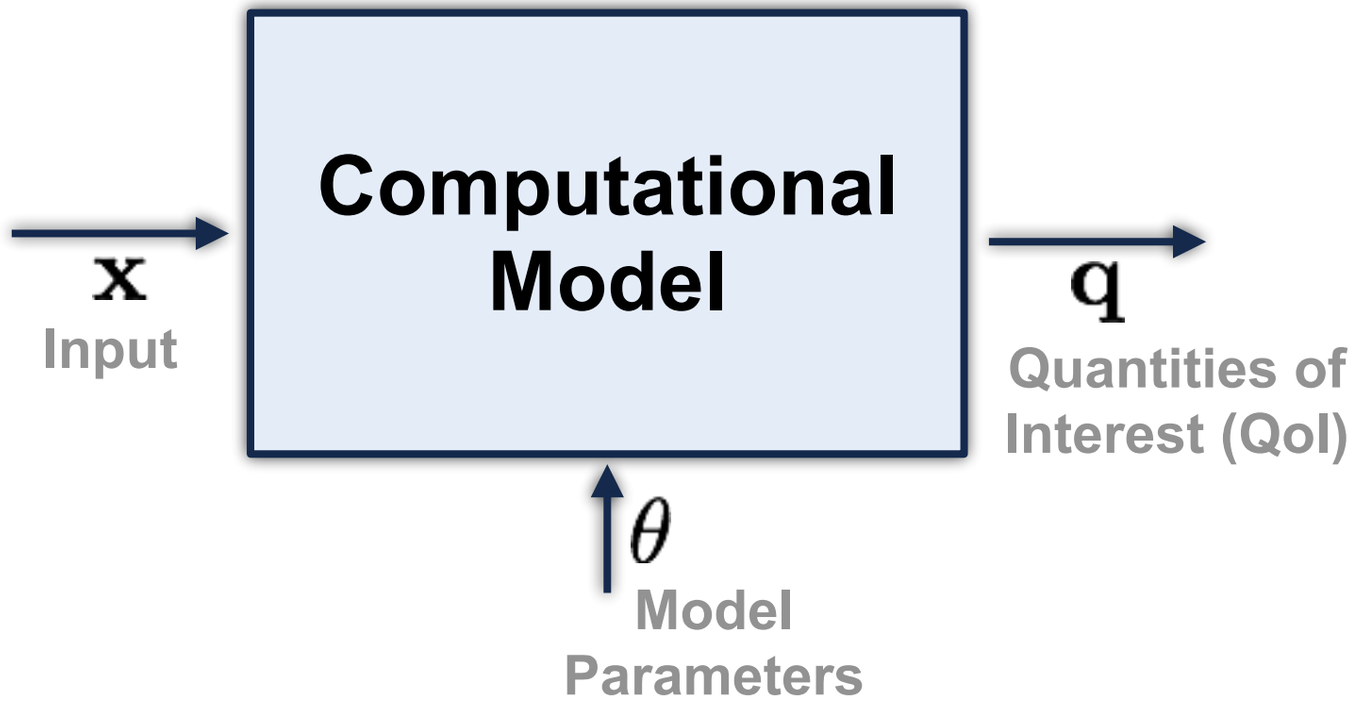
# Introduction

"The ultimate purpose of most computational models is to make predictions, commonly in support of some decision-making process (e.g, for design of operation of some system)." [1]




**Reliability Assessment** of the Computational Model

- **Verification**: Computer Simulation vs Mathematical Model
- **Uncertainty Quantification**: Determining uncertainties on the QoIs
- **Validation**: Deciding whether the model is a sufficient representation of reality for the purpose for which it will be used

**[1]** Oliver et al., "*Validating Predictions of Unobserved Quantities*", Computer Methods in Applied Mechanics and Engineering, Vol. 283, 2015.

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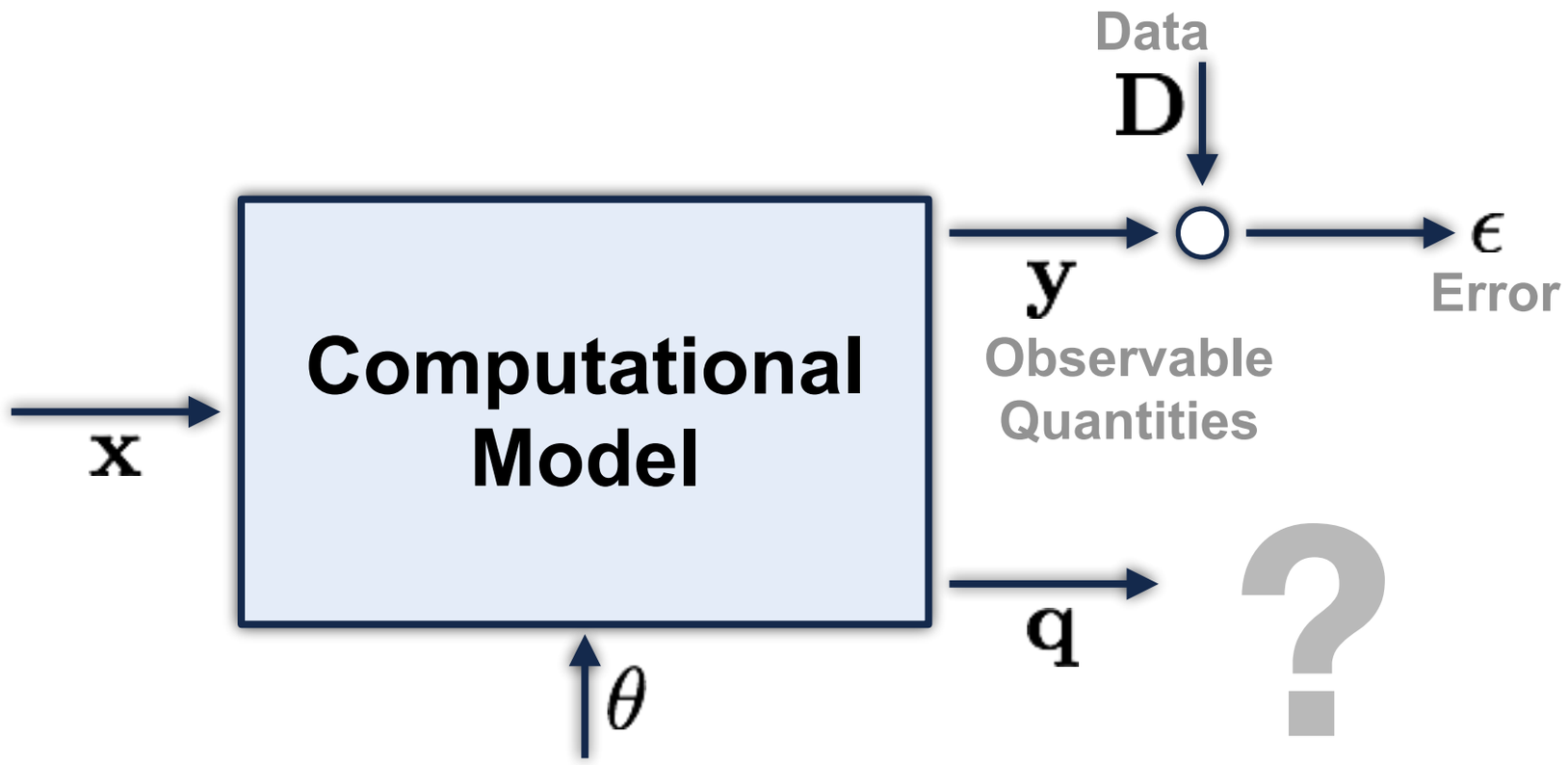
**Generally, there is no observational data available for the QoIs for the scenarios of interest; this fact forces us to make extrapolative predictions.**




In order to asses the validity of the model, classical approaches to validation compare some observable outputs to observations.
This only ensures that the model can predict:

- the observable quantities,
- under the conditions of the observations,
- under the assumption of no observation error.

The need to extrapolate raises concerns about the reliability of predictions.
**What entitles us to make such predictions?**