# RESEARCH METHODS

## Research Idea/ Question
- Observation
- Experience
- Literature Review
- Peer Critiques
- Pilot Studies

## Research Hypothesis
- Explanation/ Conjecture about
  - Model
- Observation
  - Variables [Independent; dependent; control]
  - Relationships [causal; directional]
  - Covariation [direct, inverse, non-linear]

## Research Design
### 1. How to provide the explanation?
- Experimental
- Quasi experimental
- Non experimental

### 2. What type of observation (evidence)?
- Cross sectional design
- Longitudinal design
- Time series (long term trends, cyclical, seasonal, irregular, forecasting)
- Panel design, cohorts

### 2. How convincing is the explanation?
- Internal validity
  - [Threats: History; Maturation; Statistical Regression; Selection; Experimental mortality; Testing; Instrumentation; Design contamination]
- External validity
  - [Threats: uniqueness; selection; setting; history; testing; reaction]

### 2. How convincing is the observation (evidence)?
- Measurement issues:
  - Reliability (stability; equivalence; Internal consistency)
  - Operational validity (face; content; criterion)
  - Sensitivity
- Scales: nominal; ordinal; interval; ratio

## Research Methods
### 3. How to select observations?
- Sampling techniques
- Probability samples [random; systematic; stratified; cluster]
- Nonprobability [convenience; purposive; quota; snowball]
- Sample size: \( n = \frac{p(1-p)z^2}{a^2} \)  
  \( a = \text{accuracy} \)  
  \( z = \text{z-score for confidence level} \)