Quantitative Research

2016 ANZAM Doctoral Workshop

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Important questions

- **What is your research question** (RQ)? (What? How? Why?)
- **Does the research design suit the RQ**? (Do you need data from just one group? Or do you need data from, for example supervisors and employees about each other) ... that affects the analysis required?
- **Should you collect all of your survey data at the same time**?
- **Should you use validated surveys or make up your own**?
- **How many surveys should you collect?** (PLS advantage is that it is ok with small numbers, whereas SEM requires 200-250)
- **Who should be in your population sample**? (random but targeted) eg, if you want a sample of professionals, it is no good targeting the general public

Validity Checks of Quantitative Analysis

- **Content/face validity** examines whether items (statements) within a scale adequate captures the meaning of the construct/concept being measured .. Done before data collection
- **Internal validity**: is there causality between the independent and dependent variables (different types of analysis).
- **Reliability** – can you replicate the study?
- **External validity** –are the findings generalizable? (depends on sampling decisions)
- ***Scale development process***: Hinkin (1998) in ORM Journal – if you INSIST of creating new scales for your study

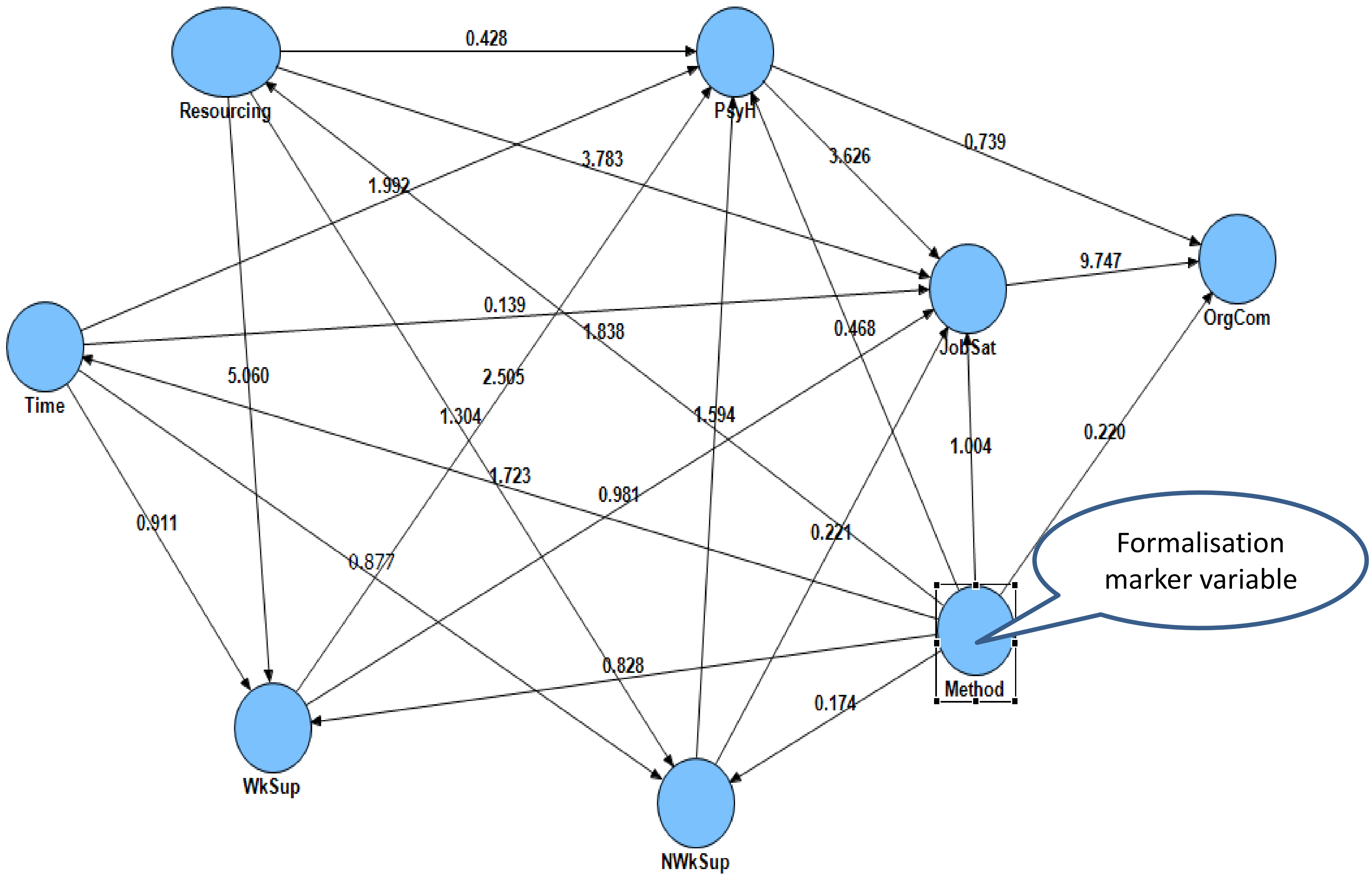
Construct Validity - Does the theory match / reflect what is being measured (right instrument or procedure) … (Hair et al. 2010)

Convergent validity	Discriminant validity	Nomological validity
Measures composite reliability - factor loading (AVE) Average Variance-Extracted - total of all squared multiple correlations divided by the number of items … Do scale items have high variance? Are scale items reliable indicators of the construct? Standardised loadings need to be statistically significant > .5 and ideally ≥ .7	Provides check to ensure the scale items are different from other similar scales Combined AVE of any two variables compared to the squared multiple correlation (R^2) between the variables If greater than the squared correlation estimate between the variables, then there is no discriminant validity issue	Does scale reflects that the hypothesised relationships as per theory? Is correlations between the variables expected? Logical?

Common Method Bias

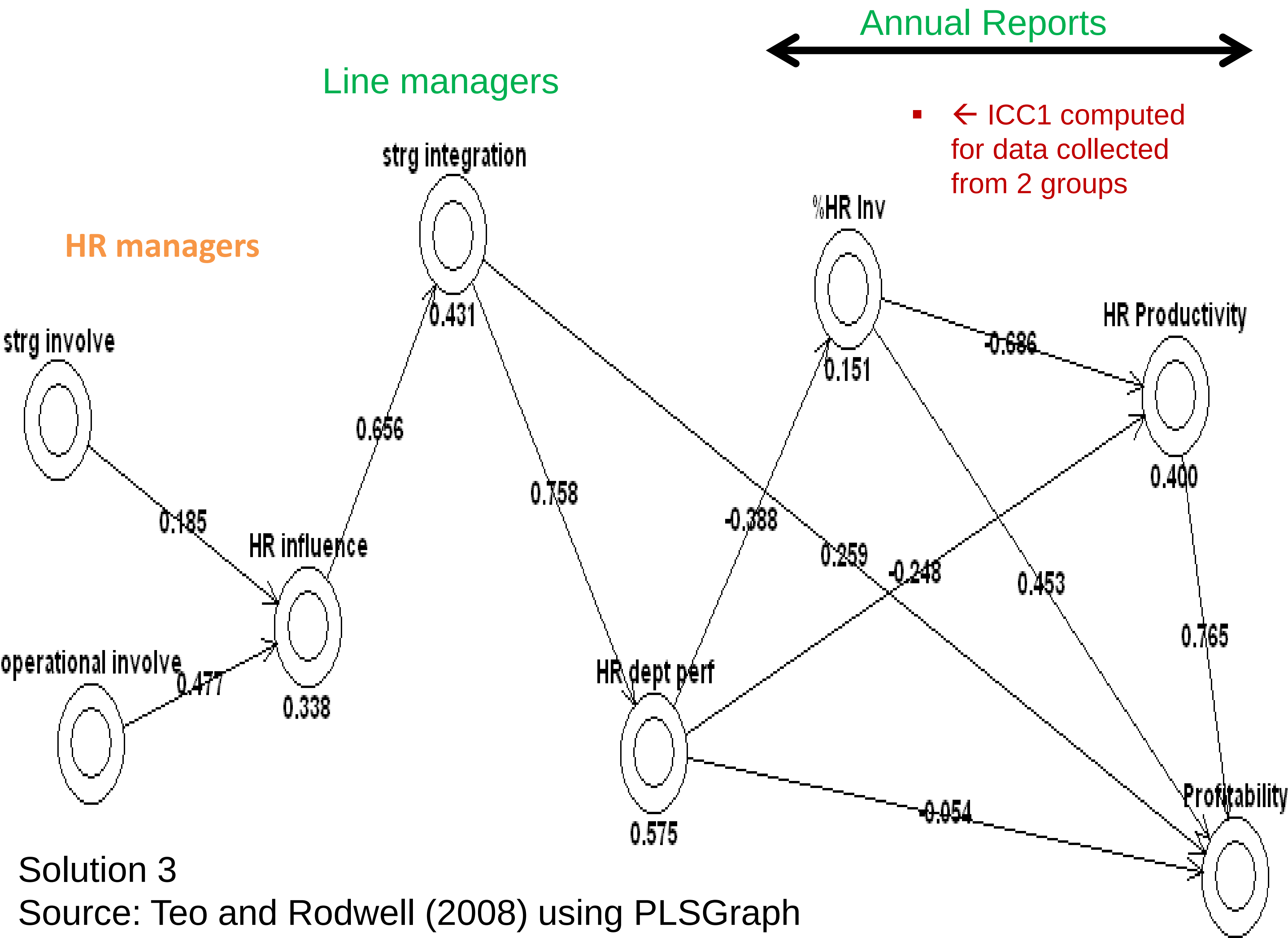
- Common method bias – perceptions are subjective, especially when attempting to measure perceptions at one point in time, with the same methodology and instrument
- Irrespective of which technique (AMOS or PLS), researchers must consider the threat of **Common method bias** (Podsakoff et al., 2003)
- Single respondent, single method, one point in time
  - Typical post-hoc solution, unrotated exploratory factor analysis, if one factor greater than at least 50 percent, then, common method bias
  - Another solution is to undertake a confirmatory factor analysis of all of the constructs predicting a common method factor

- Typically, using post-hoc statistical checks – Harman’s single factor test
- Apart from good research design, “Best” solutions: incorporate CMV into research design
  - *Solution 1*: use Lindell and Whitney (2001) marker variable, a construct is not related to most of the constructs in the path model
    - Job stress research: bureaucracy, PANAS, self efficacy, social desirability
  - *Solution 2*: marker variable comprised of gender, age, education, tenure ← but not recommended in the lit
    - Draw path from MV to the rest of the constructs in the path model: (1) R-square must not be increased by too much after incorporating MV, and (2) paths must not be statistically significant (< 1.965)



Solution 1, Source: Teo et al (2011)

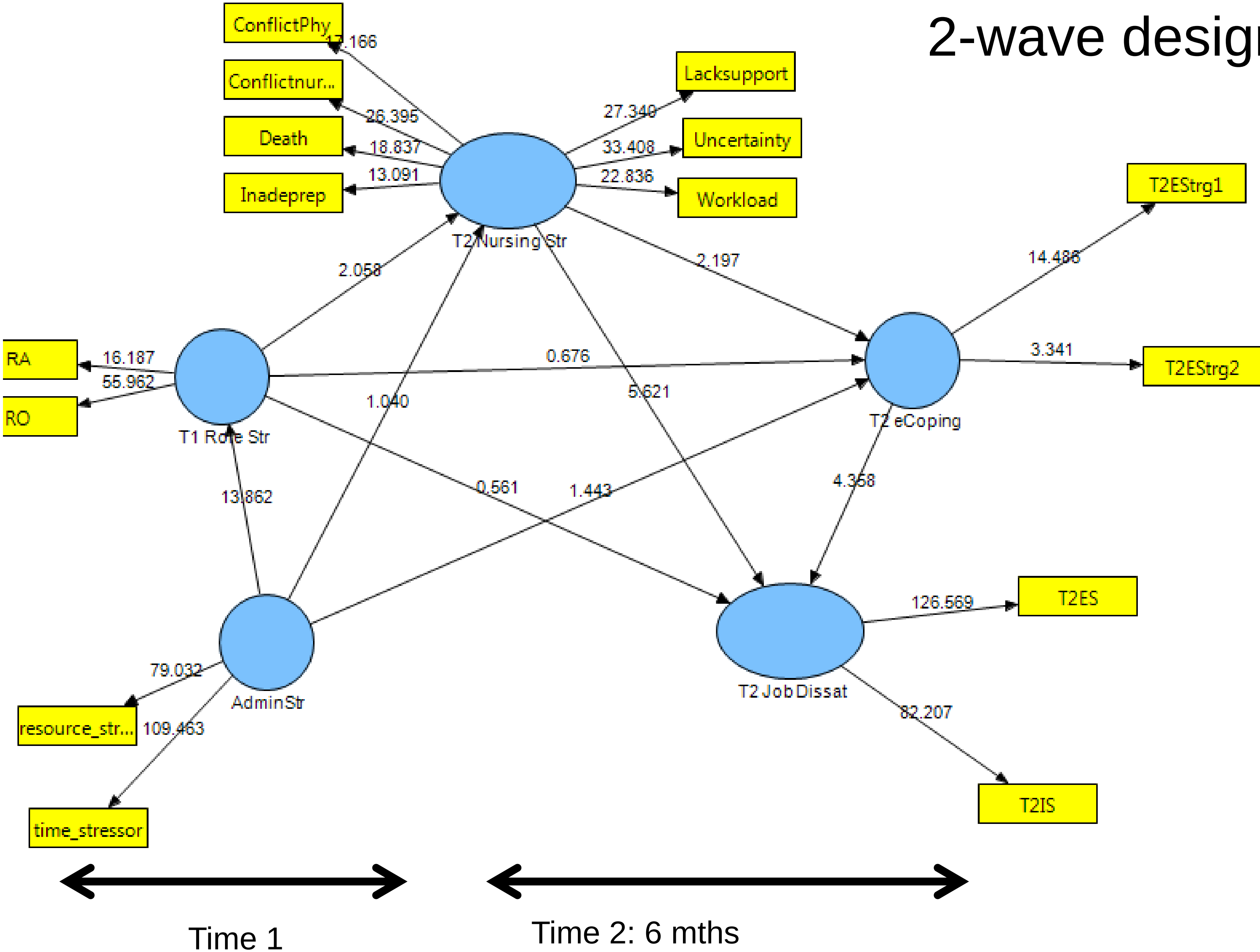
- ❑ *Solution 3*: Collect data from multiple stakeholders (Teo and Rodwell, 2008), DV from financial report and IVs from two sets of stakeholders, needs to calculate inter-rater reliability: ICC1, ICC2
- ❑ *Solution 4*: Collect multiple wave data (even longitudinal), predicting T1 → T2 data (Teo et al., 2011; Soo, Tian, Teo and Cordery, 2016 in-press)
- ❑Solution 5: Calibration and validation model: using one sample to develop model and using second sample to validate the results of study 1 (Pick and Teo, 2016 in-press) – same population or different



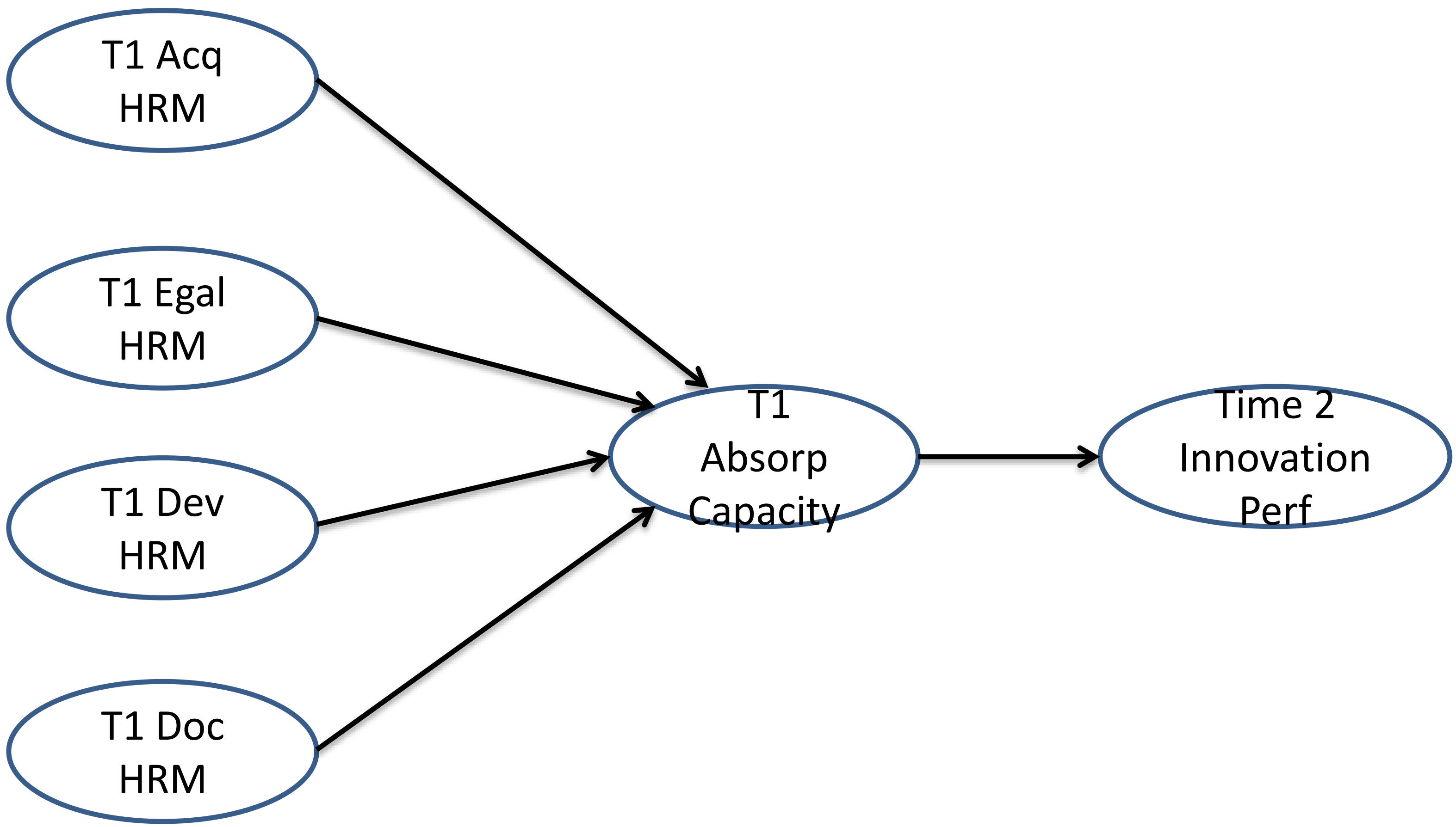
Solution 3

Source: Teo and Rodwell (2008) using PLSGraph

2-wave design



Solution 4, Source: Teo et al. (2011)



Source: Soo, Tian, Teo and Cordery (2016, in-press): DOI:10.1002/hrm.21783

- Podsakoff, N. P., MacKenzie, S.B., Lee, J-Y, and Podsakoff, N.P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies, *Journal of Applied Psychology*, 88: 879–903.