

3.7.2. Model Identification

In the structural equation modeling, identification is also an important consideration because the unknown model parameters are equated to the known variances and covariances amongst the measured variables. Therefore, if the number of parameters to be estimated in a model exceeds the number of variances of, and covariances amongst the measured variables then the model can be categorized as “unidentified” (Smith, P.H.; 2001).

There are two steps approach to model identification, those steps are as follows:

- First, the *t*-rule should be applied. The *t*-rule for identification states that the number of unknown parameters to be estimated in the model must be less than or equal to the number of non-redundant elements in the sample variances-covariance matrix of the observed variables. That is:

$$t \leq \frac{1}{2} k(k + 1)$$

Where *t* is the number of free parameters to be estimated and *k* is the number of observed variables.

- Second, if the model meets the *t*-rule condition, run the model in a SEM software package and utilize the information matrix technique within the program to check for model identification. If specified parameters are identified as being potentially unidentified then again look for ways in which parameters could be constrained.

3.7.3. Estimation

In the last few years, several estimation methods have been developed including:

- Unweighted Least Squares (ULS)