Test of Reliability and Internal Consistency

Investigating Knowledge Management through a Socio-Technical Systems Lens

Methodology

This document provides the result and evaluation of a Reliability Analysis using Cronbach's Alpha. Reliability analysis describes internal consistency or how well indicators that measure the same construct are associated with each other.

The study included one construct about knowledge management. Before the analysis, were coded from 5 to 1 in this order: Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree. None were adjusted for reverse scoring.

The analysis used the *psych* package in R and results were exported and summarized in Excel tables.

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Test of Reliability

The table below shows the overall raw Cronbach's alpha and approximate standard error (ASE) from the reliability analysis of the constructs. It also shows, mean and SD of the total scale score, a composite score formed by summing or averaging all items in your dataset.

From the results, the construct shows reliability and internal consistency with an alpha of 0.70.

Table. Internal consistency coefficients of the constructs

Constructs	Alpha	ASE	Mean	SD
KM	0.70	0.16	4.0	0.44

Cronbach's alpha is a statistical measure of internal consistency, often used to assess the reliability of a scale or test composed of multiple items. The usual threshold is 0.70 to say that each construct is reliable and consistent. However, it is important to take note that the pretesting has smaller sample size. In this case, the measure for reliability when an item is dropped can be further analyzed if the threshold can be met by removing or editing statements deemed problematic by the analysis.

ASE quantifies the uncertainty or variability in your alpha estimate due to sampling error. Smaller ASE values suggest that the alpha estimate is more stable and precise. On the other hand, larger values suggest greater uncertainty, often due to small sample size, low inter-item correlation, or heterogenous item variances.

The mean is the average score across all items for each respondent, then averaged across all respondents, while the SD is the standard deviation of those total scores, showing how much variability exists in overall scale scores. These values help you understand the distribution of the scale. A high mean might suggest ceiling effects (respondents scoring near the top), while a low mean might suggest floor effects. Meanwhile, a high SD indicates greater spread in responses, which can affect reliability estimates.

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Item-Drop and Item-Level Statistics

The table below shows item-drop statistics such as alpha, ASE, and item-rest correlation (correlation with total score when the item is excluded) when the specific statement is dropped. It also shows item-level statistics like item-total correlation (correlation between the item and total score).

Table. Item-drop and item-level statistics from the test of reliability.

Item	Item-Drop			Item-Level
	Alpha	ASE	Item-Rest	Item-Total
S1	0.57	0.24	0.59	0.72
S2	0.72	0.15	0.35	0.42
S3	0.60	0.22	0.54	0.66
S4	0.63	0.20	0.48	0.59

Item S2 showed signs of not aligning well with the rest of the scale. It had the lowest item-total correlation, and when removed, both the item-rest correlation and approximate standard error (ASE) got smaller, and Cronbach's alpha went up slightly by 0.02. This suggests that dropping S2 could help improve internal consistency, though the change is very minimal.

Instead of removing the item outright, it may be more useful to review and reword S2 to reduce any possible confusion. This approach preserves the scale's content while addressing reliability concerns. Ultimately, whether to revise or retain the item depends on both the statistical evidence and the conceptual importance of S2 within the study framework.

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