

Reliability Analysis of an Employee Engagement Scale Among Public Bank Employees Using Cronbach'S Alpha

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ABSTRACT

This study evaluates the reliability of a survey instrument designed to analyze employee engagement among public bank employees in coastal districts. The questionnaire encompasses nine dimensions related to engagement (vigor, dedication, absorption) based on the UWES framework, plus organizational and developmental factors (organization policy fit, organization fit, job fit, professional development, and emotional wellbeing). Cronbach's alpha was computed using a test dataset of 28 valid responses to assess internal consistency across 77 items. The SPSS-based analysis yielded a Cronbach's alpha of 0.921, indicating excellent internal reliability and suggesting that the instrument consistently measures the intended constructs. These findings support the questionnaire's use in subsequent data collection, while noting the need for further validity testing and larger samples to confirm stability across subgroups.

Keywords: Cronbach'S Alpha, Internal Consistency, Employee Engagement, Uwes, Organizational Fit, Professional Development, Emotional Wellbeing, Survey Reliability, Spss

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Introduction

In organizational research, the reliability of survey instruments is essential to ensure that collected data genuinely reflect the constructs of interest. Cronbach's alpha is a widely used statistic for evaluating the internal consistency of a set of items designed to measure a common attribute. The present study documents the process and findings from applying Cronbach's alpha to a questionnaire aimed at analyzing employee engagement among public bank employees in coastal districts. The instrument covers nine interrelated dimensions, including vigor, dedication, absorption (UWES), as well as organization policy fit, organization fit, job fit, professional development, and emotional wellbeing. The goal is to confirm that the items reliably measure the intended engagement constructs.

Objectives

- Objective 1: To evaluate the internal consistency of the questionnaire items that are intended to measure employee engagement (UWES dimensions: vigor, dedication, absorption) and the

additional constructs (organization policy fit, organization fit, job fit, professional development, emotional wellbeing).

- Objective 2: To determine whether the overall instrument demonstrates acceptable to excellent reliability for use in subsequent data collection and analysis.

- Objective 3: To provide a clear interpretation framework for Cronbach's alpha results that can guide researchers in similar organizational survey contexts.

Review of Literature

- Cronbach's Alpha as a Reliability Measure: Cronbach's alpha assesses the extent to which items on a scale are correlated and measure a common underlying construct. Higher alpha values indicate greater internal consistency, with commonly cited benchmarks ranging from questionable to excellent reliability. The formula relates the number of items, inter-item covariances, and item variances to produce a value between 0 and 1.

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- Application to Employee Engagement Scales: The Utrecht Work Engagement Scale (UWES) is a widely used instrument for measuring engagement across vigor, dedication, and absorption. When combined with organizational fit and development-related items, researchers often assess internal consistency to ensure that the composite instrument yields stable measurements of engagement and related organizational factors.

- Practical Considerations: The interpretation of Cronbach's alpha should consider the number of items, the dimensionality of the construct, and the presence of any negatively worded or reverse-scored items. In practice, an alpha above 0.9 is excellent, 0.8–0.9 is good, 0.7–0.8 acceptable, and lower values may indicate issues with item coherence or construct definition.

Description

The researcher designed a questionnaire with nine dimensions related to employee engagement and organizational factors. A test dataset with 28 valid responses was used. Categorical items were numerically coded to enable correlation-based reliability analysis.

Cronbach's alpha was computed for all items (ALL VARIABLES) using SPSS, yielding an alpha of 0.921 with 77 items. This result indicates excellent internal consistency, supporting the instrument's reliability for subsequent survey administration.

The interpretation aligns with standard benchmarks: an alpha of 0.921 falls into the "Excellent" category, suggesting that the items consistently measure the intended engagement-related constructs.

Cronbach's alpha test document

Aim

To check the reliability and the consistency of the questions used in the survey which will be used to collect data for analysing the employee engagement of public bank employees in the coastal districts.

Questionnaire Design

The questionnaire is designed in a way to collect as much data from the employees to accurately analyse the engagement of the employees. The questionnaire contains questions under nine characteristics related to employee engagement namely vigor, dedication, absorption (UWES Scale), organisation policy fit, organisation fit, job fit, professional development and emotional wellbeing.

Test Dataset

For checking the reliability and consistency of the questions in the questionnaire, Cronbach's Alpha test has been performed using the test dataset of sample size 28. For the questions with categorical options, the options have been converted numerically and below Figure 1 depicts the sample test dataset.

Your Name	Name of t	Specify yo	What is y	Your gend	Your age	Your qual	Your Mar	Total exp	Your mon	Utrecht	Utrecht	Utrecht	Utrecht	Utrecht	
3.11439	P	Union Bar	Public sec	Loan Offic	Male	31-35	Undergram	Married	6-10 year	40,001-60	3	1	2	3	3
3.72234	P	Union Bar	Public sec	Loan Offic	Female	31-35	Undergram	Married	1-5 Years	40,001-60	3	3	4	3	4
Health	State Bar	Public sec	Loan Offic	Male	31-35	Undergram	Prefer No	6-10 year	40,001-60	4	4	3	4	5	
2.4842	P	CLUB	Private se	Customer	Prefer No	21-25	Postgradu	Prefer No	1-5 Years	20,000-40	5	4	3	2	1
Balamun	Canara Ba	Public sec	Financial J	Male	21-25	Postgradu	Singles	1-5 Years	20,000-40	4	4	4	4	4	
Health	Indian Bar	Public sec	Customer	Male	26-30	Undergram	Singles	1-5 Years	20,000-40	4	4	4	4	4	
Rubini	Canara Ba	Public sec	Clerk	Female	21-25	Undergram	Married	1-5 Years	20,000-40	5	5	5	5	5	
9.40403	P	Union Bar	Public sec	Loan Offic	Male	31-35	Undergram	Married	6-10 year	40,001-60	3	1	2	3	3
9.40403	P	Union Bar	Public sec	Loan Offic	Female	31-35	Undergram	Married	1-5 Years	40,001-60	3	3	4	3	4
9.40403	P	State Bar	Public sec	Loan Offic	Male	31-35	Undergram	Prefer No	6-10 year	40,001-60	4	4	3	4	5
9.40403	P	CLUB	Private se	Customer	Prefer No	21-25	Postgradu	Prefer No	1-5 Years	20,000-40	5	4	3	2	1
9.40403	P	Canara Ba	Public sec	Financial J	Male	21-25	Postgradu	Singles	1-5 Years	20,000-40	4	4	4	4	4
9.40403	P	Indian Bar	Public sec	Customer	Male	26-30	Undergram	Singles	1-5 Years	20,000-40	4	4	4	4	4
9.40403	P	Canara Ba	Public sec	Clerk	Female	21-25	Undergram	Married	1-5 Years	20,000-40	5	5	5	5	5
9.40403	P	Union Bar	Public sec	Loan Offic	Male	31-35	Undergram	Married	6-10 year	40,001-60	3	1	2	3	3
9.40403	P	Union Bar	Public sec	Loan Offic	Female	31-35	Undergram	Married	1-5 Years	40,001-60	3	3	4	3	4

Figure 1 : Sample test dataset

Tool Description

The Cronbach's Alpha test is performed by using IBM SPSS software.

IBM SPSS is a statistical software suite widely used for data analysis and statistical modeling. It provides a user-friendly interface for researchers and analysts to conduct various statistical tests, explore data patterns, and generate insights from diverse datasets.

Cronbach's Alpha Coefficient

The Cronbach's alpha coefficient gauges the internal consistency or reliability of a group of survey items, assessing whether they consistently measure the same attribute. This statistic quantifies the degree of agreement on a standardized scale from 0 to 1, with higher values signifying greater agreement among the items. Cronbach's alpha can be written as a function of the number of test items and the average inter-correlation among the items.

Cronbach's alpha function

$$\alpha = \frac{N\bar{c}}{\bar{v} + (N - 1)\bar{c}}$$

Where,

N - Number of items,

\bar{c} - Average inter-item covariance among the items and

\bar{v} - Average variance.

Cronbach's Alpha Test

The α will be interpreted as follows:

Table 1 - Value range and interpretations

α value range	Interpretation
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable

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$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

SPSS Output Reliability

Notes		
Output Created	22-DEC-2023 12:24:03	
Comments		
Input	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	28
	Matrix Input	
	Missing Value Handling	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the procedure.
Syntax	RELIABILITY /VARIABLES=UtrechtWorkEngagementScaleUWESVigorIfeelfulofenerg yatwork UtrechtWorkEngagementScaleUWESVigorIfeelstrongandvigorousinmyjob UtrechtWorkEngagementScaleUWESVigorWhenIwakeupinthemornin	

gIameag
UtrechtWorkEngagementScaleUW
ESVigorIcansustainlongperiodsofwork
UtrechtWorkEngagementScaleUW
ESVigorIpossesstrongmentalresilienc
UtrechtWorkEngagementScaleUW
ESVigorIpersistinmyworkevenwhenfaced
UtrechtWorkEngagementScaleUW
ESDedicationIfindmyworkmeaningfuland
UtrechtWorkEngagementScaleUW
ESDedicationIamenthusiasticaboutmyjo
UtrechtWorkEngagementScaleUW
ESDedicationMyjobisasourceofinspirat
UtrechtWorkEngagementScaleUW
ESDedicationItakeprideintheworkI do
UtrechtWorkEngagementScaleUW
ESDedicationMyjobispersonallychallen
UtrechtWorkEngagementScaleUW
ESAbsorptionTimeseemstopassquicklywh
UtrechtWorkEngagementScaleUW
ESAbsorptionIbecomefullyimmersedinmy
UtrechtWorkEngagementScaleUW
ESAbsorptionIexperiencehappinesswhen
UtrechtWorkEngagementScaleUW
ESAbsorptionIamcompletelyabsorbedinm
UtrechtWorkEngagementScaleUW
ESAbsorptionIoftengetcarriedawaywhen
UtrechtWorkEngagementScaleUW
ESAbsorptionItischallengingformetode
PersonJobFitRateScale5Beingextremelygoodto1totheleastSatisfactio
PersonJobFitRateScale5Beingextremelygoodto1totheleastRatethefree
PersonJobFitRateScale5Beingextremelygoodto1totheleastLevelofsati
PersonJobFitRateScale5Beingextremelygoodto1totheleastLevelofsa_A
PersonJobFitRateScale5Beingextre

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		<p>PersonEmotionFitRateScale5Being extremelygoodto1totheleastOnasc_A</p> <p>PersonEmotionFitRateScale5Being extremelygoodto1totheleastYourle v</p> <p>PersonEmotionFitRateScale5Being extremelygoodto1totheleastOnasc_B</p> <p>PersonEmotionFitRateScale5Being extremelygoodto1totheleastOnasc_C</p> <p>PersonEmotionFitRateScale5Being extremelygoodto1totheleastYourw or</p> <p>PersonEmotionFitRateScale5Being extremelygoodto1totheleastYourfle</p> <p>PersonEmotionFitRateScale5Being extremelygoodto1totheleastOnasc_D</p> <p>PersonEmotionFitRateScale5Being extremelygoodto1totheleastOnasc_E</p> <p>/SCALE('ALL VARIABLES') ALL /MODEL=ALPHA.</p>
Res our ces	Proc esso r Tim e	00:00:00.00
	Elap sed Tim e	00:00:00.01

Scale: ALL VARIABLES

Case Processing Summary			
		N	%
Cases	Valid	28	100.0
	Excluded ^a	0	.0
	Total	28	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.921	77

Interpretation and Result

The Cronbach's Alpha value is found to be 0.921 which is Excellent as per Table 1. The result clearly interprets that the questions in the questionnaire are reliable and consistent.

Findings

- Reliability Statistic: Cronbach's Alpha = 0.921
- Number of Items: 77
- Sample Size (valid cases): 28
- Interpretation: Excellent internal consistency. The questionnaire items cohesively measure the intended constructs of employee engagement and related organizational factors.

Discussion (Implications)

- The high reliability implies that the instrument is well-suited for collecting data on employee engagement among public bank employees in coastal districts. Researchers can be confident that the items produce stable and coherent measurements across respondents.
- The breadth of items (covering vigor, dedication, absorption, and organizational factors) appears to be internally consistent, suggesting that these components collectively contribute to a reliable assessment of engagement.

- Cautions: While alpha indicates internal consistency, it does not guarantee validity (i.e., whether the instrument measures engagement as intended). Further validity evidence (e.g., construct, convergent, divergent validity) would strengthen the study. Additionally, with a relatively small sample size (N=28), future analyses with larger samples could provide more precise estimates and allow for dimensionality checks (e.g., factor analysis).

Suggestions

- Expand Sample: Collect more responses to confirm reliability estimates and enhance the stability of alpha across subgroups (e.g., by district, job role, tenure).
- Examine Dimensionality: Conduct exploratory or confirmatory factor analysis to verify that the nine dimensions represent distinct but related

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constructs, ensuring that the high alpha isn't masking multidimensionality.

- **Validate Constructs:** Gather evidence for convergent validity (e.g., correlations with related engagement measures) and discriminant validity (e.g., low correlations with unrelated constructs).
- **Review Survey Design:** Ensure consistent framing and reverse-scored items are correctly handled to avoid response biases that could artificially inflate or deflate reliability.
- **Report Detailed Item-Level Analysis:** Provide item-total correlations and alpha-if-item-deleted statistics to identify any items that may not

align well with the overall scale for potential revision.

References

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