

PSYCHOMETRIC VALIDATION STUDY

SALES BEHAVIORAL ASSESSMENT

Sales Assessment: a validation study using a Middle East financial services norm group.

Establishing the measurement structure, reliability, and construct validity of a sales-focused pre-employment assessment across 817 candidates in regulated financial services sales roles.

FINANCIAL SERVICES

UAE NORM GROUP

16PF FRAMEWORK

EFA + CFA

817

CANDIDATES ASSESSED

60 → 30ITEMS AFTER
REFINEMENT**2**

BEHAVIORAL FACTORS

.88STD. CRONBACH'S α **.843**COMPARATIVE FIT
INDEX

What's inside.

<p>01 Abstract 03</p> <hr/> <p>02 Introduction 03</p> <hr/> <p>03 Method 04</p> <hr/> <p>04 Item Reduction & Scale Refinement 05</p> <hr/> <p>05 Results 06</p> <hr/>	<p>06 Applicability to the Sales Norm Group 10</p> <hr/> <p>07 Discussion & Practical Implications ... 11</p> <hr/> <p>08 Limitations & Future Research 12</p> <hr/> <p>09 Conclusion 12</p> <hr/> <p>10 References & About the Authors 13</p> <hr/>
---	--

ABSTRACT

The present study examined the measurement structure of a sales-focused pre-employment assessment using a sample of 817 candidates assessed for sales roles within the financial services sector. An initial pool of 60 items was refined through an iterative item reduction process using principal component analysis, resulting in a final 30-item scale. Exploratory factor analysis supported a two-factor structure, which was subsequently evaluated using confirmatory factor analysis.

The findings supported two distinct yet related behavioral dimensions: **Process Orientation** and **Result Orientation**. Model fit indices indicated acceptable fit, and reliability was supported through composite reliability and Cronbach's alpha. The results provide evidence for the structural validity and internal consistency of the proposed measurement model and support its use for assessing sales-related behavioral tendencies in applied pre-employment contexts.

sales assessment

factor analysis

confirmatory factor analysis

process orientation

result orientation

Sales effectiveness is not a **single ideal profile**.

Sales effectiveness in regulated industries such as financial services depends on more than outcome achievement alone. Sales professionals are required to balance performance targets with procedural discipline, ethical conduct, and adherence to regulatory and organizational guidelines governing customer interactions, documentation, and risk exposure.

From an assessment design perspective, this creates a challenge: sales behavior may be effective through multiple behavioral pathways rather than a single ideal profile. Some individuals may demonstrate effectiveness through disciplined, process-aligned execution, while others may succeed through autonomous, achievement-driven effort. Treating these patterns as interchangeable risks reducing both interpretability and utility in pre-employment decision-making.

Psychometric approaches that empirically identify latent behavioral dimensions offer a means of addressing this challenge. By allowing underlying structures to emerge from data rather than imposing predefined competency labels, such approaches can yield constructs that are both theoretically coherent and practically meaningful.

The present study examines the latent behavioral structure of a sales-focused pre-employment assessment – establishing a parsimonious, interpretable model that differentiates key behavioral orientations relevant to sales roles.

STUDY OBJECTIVES

A**Latent structure**

Examine the latent behavioral structure underlying a sales-focused pre-employment assessment.

B**Model adequacy**

Evaluate the adequacy of a two-factor measurement model using confirmatory factor analysis.

C**Reliability & validity**

Assess reliability and construct validity of the resulting scales within a Middle East norm group of customer-facing sales roles.

A 817-candidate financial services sample.

The dataset comprised **817 pre-hire candidates** assessed for customer-facing sales roles within the financial services sector in the United Arab Emirates – roles involving revenue generation and adherence to regulatory and organizational standards. All participants completed the assessment as part of a structured recruitment process; no post-hire performance data were available.

<p>TOTAL CANDIDATES</p> <p>817</p> <p>Pre-hire applicants, UAE</p>	<p>MEAN AGE</p> <p>32.4 yrs</p> <p>SD 6.83 · range 18–56</p>	<p>MEDIAN / MODE AGE</p> <p>31 /30</p> <p>Early–mid career, right-skewed</p>	<p>REGION</p> <p>UAE</p> <p>Multinational workforce</p>
---	---	---	--

TOTAL WORK EXPERIENCE

1–3 years	28.7%
More than 8 years	25.8%
3–5 years	21.7%
5–8 years	15.8%
Less than 1 year	8.0%

GENDER DISTRIBUTION

Male 72.9% | Female 27.1%

Male — 596 | Female — 221

BIRTH ORDER

First-born	38.3%
Last-born	28.6%
Middle-born	28.5%
Only child	4.5%

NATIONALITY & REGION

55% INDIAN-ORIGIN

Indian-origin	~55%
Pakistani-origin	16.5%
Egyptian-origin	14.3%
Other ME / African / Asian	rest

PRIMARY WORK MOTIVATION

Job role / nature of work	51.5%
Recognition	41.9%
Job training	6.6%

Birth order, gender, nationality and work motivation were analyzed descriptively only and were **not** included in the factor analytic models.

INTERPRETATION BOUNDARY

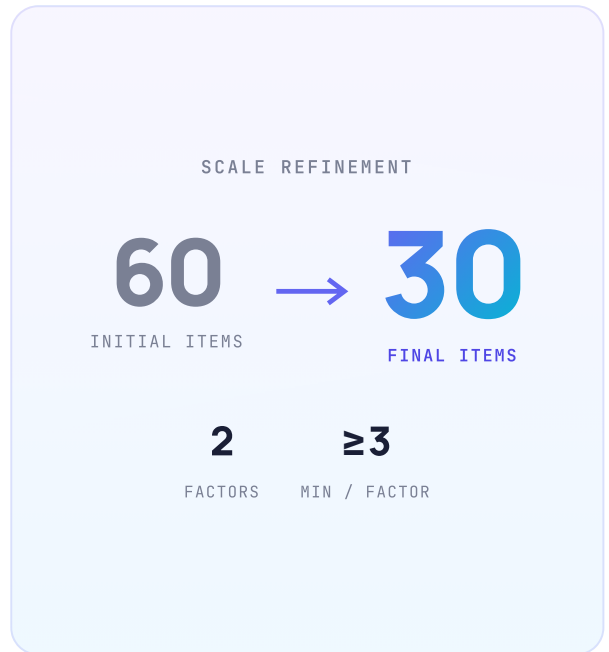
All descriptive statistics reflect pre-employment applicant data and should not be interpreted as representative of incumbents or job performance outcomes. No causal or predictive claims are made based on demographic variables.

From 60 items to a robust 30-item scale.

The initial assessment consisted of **60 items** designed to broadly represent sales-related behavioral tendencies. To refine the scale and establish a robust measurement structure, principal component analysis (PCA) with oblimin rotation and Kaiser normalization was employed, consistent with the assumption of correlated latent dimensions. Although PCA was used as the extraction method, the analysis served an exploratory latent-structure identification purpose.

CRITERIA FOR ITEM DELETION

- ≥ .30 Cross-loadings**
 Items loading $\geq .30$ on multiple components with insufficient separation were removed.
- Negative loadings**
 Items introducing conceptual ambiguity through negative loadings were excluded.
- < .25 Low communalities**
 Items with communalities below $\sim .20-.25$ were removed once adequate factor coverage was ensured.



Final scale composition

Following multiple PCA iterations, the scale was reduced from 60 to 30 items. The final item set demonstrated clear primary loadings, minimal cross-loadings, adequate communalities, and conceptual alignment with the intended constructs. Throughout refinement, a minimum of three indicators per factor was retained to support model identification and estimation stability in confirmatory factor analysis.

CONFIDENTIALITY

Item content is not reproduced in this manuscript to protect the integrity of a commercially deployed assessment instrument. Item identifiers are reported in exploratory and confirmatory analyses to ensure transparency of factor structure without disclosing item wording.

Two factors, clearly separated.

Prior to extraction, the Kaiser–Meyer–Olkin measure of sampling adequacy and Bartlett’s test of sphericity indicated that the data were suitable for factor analysis. PCA with oblimin rotation was conducted using a loading suppression threshold of .30; rotation converged in three iterations, yielding a stable solution. Two factors were retained based on eigenvalues, variance explained, and interpretability.

<p>KMO ADEQUACY</p> <p>.929</p> <p>Excellent sampling adequacy</p>	<p>BARTLETT'S χ^2</p> <p>6815.5</p> <p>Sphericity supported</p>	<p>ROTATION</p> <p>Oblimin</p> <p>Converged in 3 iterations</p>	<p>TOTAL VARIANCE</p> <p>34.6%</p> <p>Across both factors</p>
---	--	--	--

EIGENVALUES & VARIANCE EXPLAINED

Factor 1 · Process Orientation λ 7.97

Factor 2 · Result Orientation λ 2.41

The factor solution aligned with the theoretical foundations of the 16PF framework, with traits clustering into higher-order behavioral orientations rather than isolated trait groupings.

RELATIONSHIP BETWEEN THE FACTORS

$r \approx .20$ MODEST CORRELATION

Both factors relate to effective work behavior but capture **distinct behavioral tendencies**. Individuals may be highly disciplined and process-focused without being strongly achievement-driven, or highly result-driven without being particularly process-oriented — underscoring the value of assessing both orientations separately in regulated sales contexts.

04.1 · FACTOR INTERPRETATION

FACTOR 1

Process Orientation

A behavioral tendency toward structured, careful, and rule-aligned execution of work, supported by emotional steadiness and cooperative interpersonal behavior — describing how an individual approaches tasks, authority, and work standards.

λ 7.97

EIGENVALUE

26.57%

VARIANCE EXPLAINED

24

INDICATOR ITEMS

CR .91

COMPOSITE RELIABILITY

DEFINING TRAITS (16PF)

Q3+

Perfectionism

A preference for order, organization, and attention to detail. Seen in double-checking work, following step-by-step procedures, and valuing precision over speed.

G+

Rule-Consciousness

A tendency to respect rules, policies, and organizational guidelines — reflected in honesty, policy adherence, respect for compliance, and doing what is right over what is convenient.

E-

Agreeableness

A non-confrontational, compliant interpersonal style. More likely to accept supervisory guidance, seek clarity on expectations, and prefer alignment over asserting control.

C+

Emotional Stability

The ability to remain calm and emotionally regulated under pressure — less reactive to stress, setbacks, or criticism, reinforcing reliable task execution.

A+

Warmth

A helpful, supportive, people-oriented approach expressed through willingness to assist others and maintain positive working relationships. While not dominant in driving task behavior, it supports cooperative functioning within structured environments.

Process Orientation reflects careful execution (Q3+), respect for rules and ethics (G+), cooperative compliance (E-), emotional composure (C+), and supportive engagement (A+) — prioritizing accuracy over speed and consistency over experimentation in regulated sales environments.

04.2 • FACTOR INTERPRETATION

FACTOR 2

Result Orientation

A behavioral tendency toward achievement, independence, and outcome-focused effort — driven by personal motivation and self-direction rather than reliance on structure or guidance. This factor captures why and how forcefully individuals pursue goals in performance-driven roles.

λ 2.41

EIGENVALUE

8.05%

VARIANCE EXPLAINED

6

INDICATOR ITEMS

CR .66

COMPOSITE RELIABILITY

DEFINING TRAITS (16PF)

Q2+

Self-Reliance

A preference for working independently and making decisions autonomously — comfortable planning work independently, relying on personal judgment, and maintaining ownership over task execution.

Type A

Achievement Motivation

A strong drive to achieve, compete, and succeed. Energized by targets and measurable outcomes; sets ambitious goals and derives satisfaction from accomplishment over procedural adherence.

H+

Social Boldness

Confidence in evaluative and performance-exposed situations — comfortable with visibility, pressure, and scrutiny, supporting assertive goal pursuit in demanding sales environments.

Behavioral profile

Independent planning, strong achievement motivation, confidence under evaluation, and sustained focus on outcomes — prioritizing results over process and autonomy over guidance.

This orientation is particularly relevant in target-driven financial services sales roles, where initiative, persistence, and performance accountability are central to success.

TABLE 1 · ROTATED PATTERN MATRIX

EFA item loadings.

PCA with oblimin rotation, loading suppression threshold .30. The rotated pattern matrix revealed a clear, interpretable structure with minimal problematic cross-loadings.

FACTOR 1 · PROCESS ORIENTATION · 24 ITEMS

ITEM	F1
Item 6	.656
Item 56	.631
Item 25	.627
Item 1	.604
Item 60	.603
Item 21	.598
Item 55	.591
Item 30	.589
Item 4	.587
Item 5	.584
Item 64	.577
Item 58	.571
Item 22	.568
Item 28	.567
Item 24	.565
Item 27	.548
Item 47	.542
Item 12	.539
Item 15	.537
Item 26	.529
Item 16	.509
Item 54	.495
Item 63	.478
Item 9	.475

FACTOR 2 · RESULT ORIENTATION · 6 ITEMS

ITEM	F2
Item 20	.663
Item 32	.637
Item 48	.627
Item 2	.599
Item 33	.564
Item 61	.555

SOLUTION SUMMARY

<p>KMO</p> <p>.929</p> <p>EIGENVALUES</p> <p>7.97 / 2.41</p>	<p>BARTLETT'S X²</p> <p>6815.53</p> <p>VARIANCE EXPL.</p> <p>.27 / .08</p>
--	---

Table 1 · Rotated pattern matrix (loadings ≥ .30 shown). Item content withheld to protect a commercially deployed instrument.

04.3 · CONFIRMATORY FACTOR ANALYSIS

The two-factor model holds up.

CFA evaluated the two-factor model — Process Orientation and Result Orientation — against a baseline. The specified user model demonstrated a substantial improvement over baseline (estimated using 61 model parameters), with incremental and absolute fit indices supporting model adequacy for an applied behavioral assessment involving broad, heterogeneous constructs.

BASELINE VS. SPECIFIED MODEL

<p>Baseline model df = 435</p>	<div style="background-color: #e67e22; padding: 5px; border-radius: 10px; display: inline-block;"> χ^2 6915.69 </div>	<p>poor fit</p>
<p>Two-factor model df = 404 · 61 params</p>	<div style="background-color: #2980b9; padding: 5px; border-radius: 10px; display: inline-block;"> χ^2 1424.68 </div>	<p>↓ 79%</p>

<p>CFI</p> <p>.843</p> <p>Moderate</p>	<p>TLI</p> <p>.830</p> <p>Moderate</p>	<p>RMSEA</p> <p>.056</p> <p>Acceptable</p>	<p>SRMR</p> <p>.069</p> <p>Acceptable</p>
---	---	---	--

STANDARDIZED LOADINGS

Standardized factor loadings indicated that retained items were **meaningfully associated** with their respective latent factors, supporting the structural coherence of the measurement model. Absolute fit indices (RMSEA = .056, SRMR = .069) suggest residual discrepancies between observed and model-implied covariance structures were within acceptable limits.

FACTOR CORRELATION

r = .20



The constructs are related yet **empirically distinguishable** — consistent with their interpretation as complementary but non-redundant behavioral orientations within the same sales context.

04.4 · RELIABILITY & CONSTRUCT VALIDITY

Internally consistent and distinct.

Reliability and construct validity were evaluated using Composite Reliability (CR), Average Variance Extracted (AVE), and Cronbach's alpha — providing evidence from both a latent-variable and scale-level perspective.

COMPOSITE RELIABILITY (CR)

Process Orientation	.91
	
Result Orientation	.66
	

Strong internal consistency for Process Orientation and acceptable consistency for Result Orientation, particularly given its broader, more heterogeneous behavioral content.

AVERAGE VARIANCE EXTRACTED (AVE)

Process Orientation	.32
	
Result Orientation	.37
	

Marginal convergent validity; however, given satisfactory composite reliability, convergent validity can still be considered acceptable in line with Fornell and Larcker (1981).

CRONBACH'S ALPHA · 30-ITEM SCALE

.84	.88
RAW ALPHA	STANDARDIZED A

Good scale-level internal consistency across the full 30-item scale.

DISCRIMINANT VALIDITY

r = .20

The modest correlation between Process and Result Orientation indicates the two constructs represent **distinct yet complementary** behavioral orientations.

Mapping factors to **role demands**.

The factor structure should be interpreted in relation to the norm group assessed — pre-hire candidates for sales roles within the UAE financial services sector. These roles are characterized by regulatory oversight, fiduciary responsibility, performance targets, and sustained customer engagement, creating behavioral demands that extend beyond generic sales competencies.

Process Orientation

COMPLIANCE-SENSITIVE · EXECUTION-FOCUSED

- ◆ Adhere to organizational policies and follow prescribed procedures.
- ◆ Ensure accuracy in documentation and maintain ethical standards in customer interactions.
- ◆ Careful task execution, respect for rules and authority, emotional composure under pressure.
- ◆ Higher scorers contribute to procedural reliability, service consistency, and risk mitigation.

Result Orientation

PERFORMANCE-DRIVEN · AUTONOMOUS

- ◆ Manage their own pipelines and persist through rejection.
- ◆ Maintain motivation in competitive environments with clearly defined targets.
- ◆ Independent planning, achievement motivation, confidence in evaluative situations.
- ◆ Higher scorers demonstrate self-initiated effort and proactive performance behaviors that support revenue generation.

The modest correlation between the orientations ($r = .19$) underscores their relevance: sales roles in financial services do not uniformly require maximizing both simultaneously. Depending on role scope, product complexity, and organizational emphasis, different profiles may be more effective.

Taken together, the extracted factors demonstrate clear contextual applicability to the financial services sales population assessed. Their alignment with both the structural constraints and performance expectations of regulated roles supports the interpretability and practical relevance of the factor solution for pre-employment assessment and talent evaluation.

Two orientations, not one ranking.

The findings contribute to the sales assessment literature by demonstrating that sales-related behavioral effectiveness within regulated financial services environments is underpinned by **distinct behavioral orientations rather than a single dominant profile**. This has important implications for how sales assessments are conceptualized, interpreted, and applied in selection contexts.

01

Not interchangeable

Process-aligned and outcome-driven behavior should not be treated as interchangeable indicators of sales potential. Individuals may score highly on one orientation while remaining moderate on the other, without this indicating deficiency.

02

Differentiate suitability

Roles emphasizing compliance-sensitive execution may require a different behavioral alignment than roles emphasizing pipeline ownership and autonomous acquisition. The framework enables differentiating suitability rather than ranking on a single continuum.

03

Avoid compensatory scoring

High performance on one orientation does not inherently offset lower scores on the other, nor imply developmental weakness. Orientations should be interpreted against role demands, organizational controls, and risk tolerance.

04

Empirically derived

Allowing latent orientations to emerge from data — rather than imposing predefined competency labels — enhances interpretability while remaining grounded in established personality theory, supporting nuanced, role-relevant decisions.

Many sales assessments aggregate behavioral tendencies into composite scores, implicitly assuming higher scores uniformly signal better fit. The current findings challenge that assumption.

07 · LIMITATIONS & FUTURE RESEARCH

Scope & what comes next.

01 Single region

Conducted using a single UAE applicant norm group. Generalizability to other regions, industries, or cultural contexts remains to be established.

02 No criterion data

The sample comprised applicants, not incumbents, with no performance data. Conclusions are limited to internal structure and construct validity — not predictive validity.

03 Self-report

Responses may be influenced by impression management. Future studies may explore multimethod validation to strengthen evidence.

Future research should examine the relationship between the identified behavioral orientations and objective or supervisory performance outcomes.

08 · CONCLUSION

THE TAKEAWAY

A structured basis for evidence-based sales hiring.

This study advances sales assessment practice by empirically demonstrating that sales-related behavioral effectiveness in regulated financial services environments is underpinned by distinct orientations rather than a single dominant profile. The identification of Process Orientation and Result Orientation provides a structured basis for interpreting assessment results in relation to regulatory demands and performance expectations — supporting more nuanced, role-relevant, and evidence-based hiring decisions.

This manuscript has been prepared in accordance with the APA Publication Manual (7th edition).

References.

- 1 Barrick, M. R., & Mount, M. K. (1991). **The Big Five personality dimensions and job performance: A meta-analysis.** *Personnel Psychology*, 44(1), 1–26. <https://doi.org/10.1111/j.1744-6570.1991.tb00688.x>
- 2 Cattell, R. B., Cattell, A. K., & Cattell, H. E. P. (1993). **Sixteen Personality Factor Questionnaire (16PF) (5th ed.).** Institute for Personality and Ability Testing.
- 3 Fornell, C., & Larcker, D. F. (1981). **Evaluating structural equation models with unobservable variables and measurement error.** *Journal of Marketing Research*, 18(1), 39–50. <https://doi.org/10.2307/3151312>
- 4 Rapp, A., Bachrach, D. G., Flaherty, K. E., & Hughes, D. E. (2017). **The role of salesperson compliance and control systems.** *Journal of Business Research*, 76, 75–85.



Chaitali Joshi

LEAD PSYCHOLOGIST · PMAPS

An Organizational Psychologist with academic training in psychological assessment and applied psychometrics. Her work focuses on assessment design, factor-analytic validation, and the application of personality frameworks to evidence-based hiring — informed by her engagement with professional bodies such as the American Psychological Association.

 [linkedin.com/in/chaitali-joshi-0544109a](https://www.linkedin.com/in/chaitali-joshi-0544109a)



Akshada Khopade

STATISTICIAN & PEOPLE ANALYTICS · PMAPS

A Statistician and People Analytics Specialist applying statistical testing, psychometric methods, and predictive analytics to behavioral and cognitive assessments, as well as audio/text-based data. Her research centers on developing rigorous, data-driven approaches to enhance human assessment and support evidence-based organizational decision-making.

 [linkedin.com/in/akshada-khopade-572818211](https://www.linkedin.com/in/akshada-khopade-572818211)

EVIDENCE-BASED HIRING

Assess the behavior that **actually drives sales.**

PMaps builds psychometrically validated assessments that differentiate behavioral orientations — so financial services teams hire for the right profile, not a single ranking.

[BOOK A DEMO →](#)[EXPLORE PMAPS ASSESSMENTS](#)**817**

CANDIDATES

2

VALIDATED FACTORS

.88STANDARDIZED α **.929**

KMO ADEQUACY