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RESEARCH ARTICLE

**PICE AS A COMPETENCY-BASED EXTENSION OF AUTHENTIC LEADERSHIP:
INTERNAL CONSISTENCY, CONVERGENT VALIDITY, AND DEVELOPMENTAL
UTILITY BEYOND THE ALQ**

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ABSTRACT

Background: Authentic Leadership has been linked to sustainable organizational outcomes. Yet its most common measure, the ALQ, provides a factor-level diagnosis that does not always translate into precise development targets. This study introduces PICE as a competency-based extension of Authentic Leadership that disaggregates the four factors into 50 competencies and ethical values to support actionable development.

Methods: A three-phase mixed-method design was used: an exploratory review to frame the model, an ALQ field study, and a multi-source (leaders and followers) convergent validation of PICE against ALQ. Internal consistency was examined using Cronbach’s alpha. Convergent validity was assessed via factor-level correlations and simple linear regressions.

Results: PICE showed adequate internal consistency by factor and moderate-to-strong convergence with ALQ, particularly in the Ethical, Personal, and Interpersonal domains. Cognitive convergence was comparatively lower, consistent with PICE’s deeper competency-level operationalization of this factor. Multi-source ratings supported a stable pattern across leader self-ratings and follower ratings.

Conclusion: PICE preserves the conceptual structure of Authentic Leadership while improving diagnostic granularity and developmental usefulness by linking assessment results to individualized competency-based learning pathways and workplace transfer evidence. Recent leadership development research underscores the importance of impact and transfer when designing leadership interventions (Day, 2021; Restivo et al., 2022).

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Introduction:-

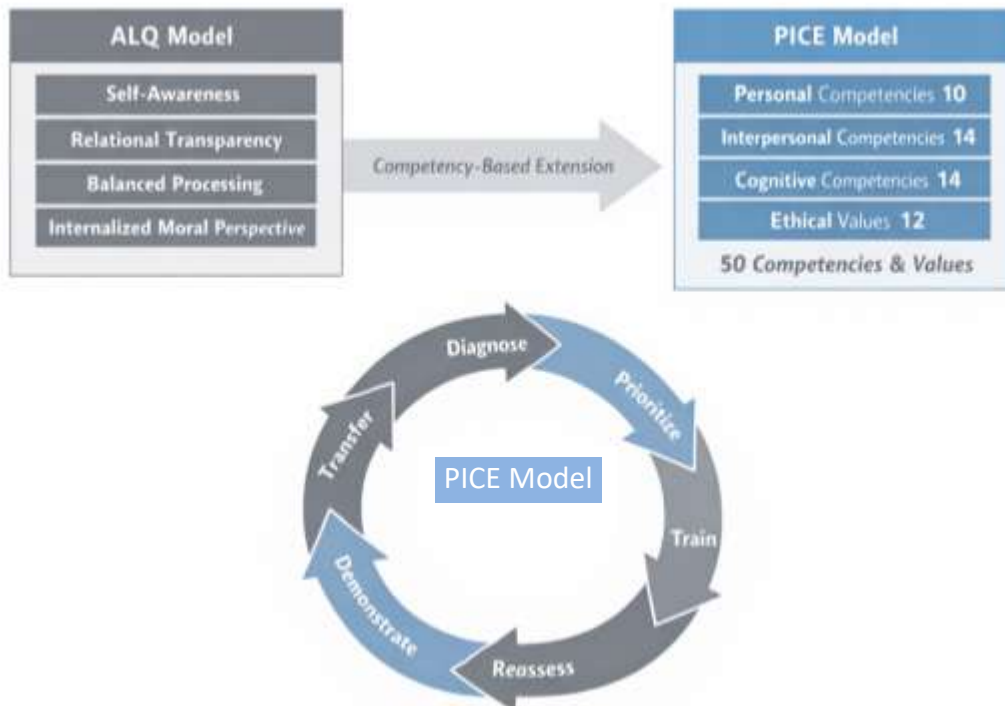
Authentic Leadership has attracted sustained research attention due to its integration of personal, relational, cognitive, and ethical elements and its associations with positive outcomes at the individual and organizational levels. As Zhang et al. (2022) note in their meta-analytic review, authentic leadership relates to a broad range of outcomes and operates in interaction with antecedents and contextual conditions. More recent work has also emphasized that authentic leadership effects may not be uniformly positive across settings. For instance, Macamo et al. (2024) discuss how authentic leadership can yield beneficial or adverse effects depending on psychosocial mechanisms and contextual boundaries.

From a measurement standpoint, the ALQ remains a widely used tool. At the same time, the measurement landscape continues to evolve through contemporary validation efforts and adaptations in different contexts. Grobler (2024), for example, reports evidence for an adapted ALQ in the South African context, while Justiniano et al. (2022) examine psychometric properties of a Spanish ALQ version. These studies support the continued relevance of ALQ for factor-level assessment, but they also highlight a practical limitation frequently encountered in applied settings: factor scores provide a broad diagnosis yet often do not specify which concrete behaviours should be trained to improve leadership effectiveness.

This limitation matters because leadership development is increasingly judged by impact and transfer. Day (2021) argues that leadership development investments should be grounded in evidence-informed design, deliberate practice, and transfer to work. In a complementary direction, Restivo et al. (2022) synthesize evidence on leadership effectiveness interventions and stress the importance of robust designs and meaningful outcome metrics beyond immediate perceptions. Similarly, Cotrim et al. (2024), reviewing longitudinal leadership development studies, call for designs that capture change trajectories and sustainability over time.

Against this backdrop, PICE (Personal, Interpersonal, Cognitive, Ethical) is introduced as a competency-based extension of Authentic Leadership. PICE preserves the four-factor logic while operationalizing it into 50 trainable elements: 10 personal competencies, 14 interpersonal competencies, 14 cognitive competencies, and 12 ethical values. This disaggregation enables three complementary outputs: an overall leadership score, factor-level scores, and competency/value-level profiles that can be directly translated into individualized development plans supported by progressive evidence of learning and workplace transfer.

Figure 1. From ALQ to PICE: competency-based operationalization and development cycle



PICE preserves the four-domain structure of Authentic Leadership (Personal, Interpersonal, Cognitive, Ethical) and operationalizes it into 50 trainable competencies and ethical values. Assessment results are translated into a development cycle from diagnose, to prioritize, train, demonstrate, transfer, and reassess.

Aim of the paper. This article reports the convergent validation of PICE against ALQ and provides evidence regarding internal consistency by factor, convergent validity by factor in leader self-ratings and follower ratings, and the applied value of PICE for turning assessment results into targeted development.

Materials and Methods:-

Overall design (three phases)

The study followed a mixed-method program with quantitative emphasis in assessment and validation, organized into three sequential phases:

Phase 1 (exploratory): literature review and model selection

A focused literature review was conducted to identify a leadership model with consistent empirical support regarding organizational outcomes and with a validated assessment instrument. This phase justified the selection of Authentic Leadership as the reference framework and highlighted a practical limitation of broad factor-level assessment: limited traceability for individualized training interventions.

Phase 2 (quantitative): large-scale ALQ field study

The ALQ was administered using dual sources—leader self-assessment and follower ratings—to describe Authentic Leadership levels in real organizational contexts and to provide empirical grounding for the development of a competency-level diagnostic framework.

Phase 3 (exploratory and quantitative validation): PICE development and convergent validation against ALQ

PICE was developed as a competency-based assessment system aligned with Authentic Leadership, operationalizing the four factors into 50 competencies and values. In the first part, an extensive review of the literature on authentic leadership is carried out to determine the competencies included in each of its four areas of evaluation. Once determined, a new literature review is carried out to determine validated evaluation instruments for all of them. From there, the model is built, and finally, in phase 3 tested internal consistency and convergent validity between PICE and ALQ using correlations and simple linear regressions at the factor level, separately for self and follower ratings.

Participants

Phase 2 (ALQ, large sample):

Phase 2 included 139 companies (77 with international presence and 62 national), totalling 875 participants: 139 leaders and 736 followers. Demographic and professional descriptors (e.g., age, gender, role, tenure, and leadership experience) were collected for sample characterization and descriptive triangulation.

Phase 3 (PICE validation, smaller sample):

Phase 3 included 22 companies (12 international and 10 national) and 133 participants: 22 leaders and 111 followers. The same dual-source approach (self and follower ratings) was maintained, ensuring confidentiality and anonymity in data collection.

Sampling strategy:

Participants were recruited using a non-probabilistic convenience sampling approach, consistent with applied organizational research where access depends on voluntary company participation. For Phase 2, a quota-based approach was used to ensure representation of both nationally operating and internationally active companies. In Phase 3, a purposive sub-sample of organizations was selected to conduct the applied validation and the convergent comparison between PICE and ALQ. The participating organizations in phase 2 represented diverse macro-sectors, including industry/manufacturing, services, and knowledge-intensive activities (technology and professional services), which supports the model's applicability across heterogeneous organizational contexts. In Phase 3, a purposive subsample of organizations was selected to conduct the applied validation and enable a clearer comparison between PICE and ALQ. Organizations were selected to ensure feasibility and comparability of implementation conditions.

Measures:

Authentic Leadership Questionnaire (ALQ). The ALQ was used as the factor-level benchmark measure in Phase 2 and as the convergent criterion in Phase 3. Its continued use is supported by recent validation work across contexts (Grobler, 2024; Justiniano et al., 2022), designed by Walumbwa et al., (2008). The ALQ measures Authentic Leadership across four related dimensions. A Likert-type response format is used, and factor-level scores are computed for self and follower assessments.

PICE assessment system (Personal, Interpersonal, Cognitive, Ethical). PICE is a competency-based assessment system aligned with the four Authentic Leadership domains (structured into four operational factors: Personal, Interpersonal, Cognitive, and Ethical) and disaggregated into 50 assessable elements (10 personal competencies, 14 interpersonal competencies, 14 cognitive competencies, and 12 ethical values). The system is designed to provide profiles at global, factor, competency and value levels, and to connect results to individualized competency-based training plans. The full competency and value map and instrument traceability are provided in **Appendix A**. It uses the ESCI (Boyatzis, Goleman, & Rhee, 2000) and CIM (Boyatzis, 2008) instruments for the assessment of competencies, and the CVA instrument (Barrett, 2014) for the assessment of values.

Procedure:

In Phase 2, the ALQ was administered to leaders (self-ratings) and followers (leader ratings) across participating companies. In Phase 3, both ALQ and PICE assessments were administered within the same organizational contexts, maintaining the dual-source approach. Data collection followed confidentiality and anonymity criteria, and feedback was returned in aggregated format; when applicable, individual feedback was provided with a developmental orientation. The multi-source design functions as a procedural safeguard against single-source bias and aligns with evidence-informed recommendations in leadership development research (Day, 2021). It also supports interpretive use of self–other gaps as a practical indicator of self-awareness and perceived behavioural consistency.

Statistical analysis:

- **Internal consistency:** Cronbach's alpha by PICE factor and rating source (self vs. follower).
- **Convergent validity:** Pearson correlations between equivalent PICE and ALQ factor scores, separately for self and follower ratings.
- **Explanatory models:** simple linear regressions by factor ($ALQ = \beta_0 + \beta_1 \cdot PICE + \epsilon$), ALQ as dependent variable and PICE as predictor, reporting β coefficients and R^2 , separately for self and follower ratings.
- **Common method bias: procedural and statistical checks:** because part of the evidence relies on perceptual measures, we implemented procedural remedies and a statistical check to reduce the risk of common method bias. First, the design was multi-source (leader self-ratings and follower ratings), which reduces single-source variance. Second, confidentiality and anonymity were ensured to minimize social desirability. Third, we conducted Harman's single-factor test using an unrotated exploratory factor analysis on the self-rating dataset (PICE and ALQ factor scores). The first factor accounted for 32.45% of the total variance, below the commonly used 50% threshold, suggesting that common method bias is unlikely to be a dominant threat to the observed relationships. Additionally, the follower-rating data were provided by multiple informants, which structurally reduces method-driven spurious variance.

Results:-**Phase 2 results (ALQ, large sample)**

Phase 2 provided a broad descriptive profile of authentic leadership across organizations using dual-source ALQ ratings. Aggregate results indicated generally high levels and a relatively small mean self–follower gap, alongside meaningful variability across cases. These results supported ALQ's usefulness for global diagnosis, while reinforcing a common applied challenge: factor-level scores can be difficult to translate into specific development levers, particularly in broad domains such as the cognitive component.

Phase 3 results: PICE internal consistency

PICE showed adequate internal consistency by factor. Cronbach's alpha values (self/follower) were:

- Personal: 0.69 / 0.63
- Interpersonal: 0.74 / 0.86
- Cognitive: 0.76 / 0.87
- Ethical: 0.77 / 0.79

Higher alpha values in follower ratings for Interpersonal and Cognitive domains are consistent with the higher observability of relational and decision-related behaviours in everyday work settings.

The following table summarizes the results of the consistency and reliability analysis of the model with Cronbach's alpha.

Table 1. Internal consistency (Cronbach's alpha) for PICE by factor and rating source (Phase 3)

PICE factor	Cronbach's alpha (Self-rating)	Cronbach's alpha (Follower-rating)
Personal	0.69	0.63
Interpersonal	0.74	0.86
Cognitive	0.76	0.87
Ethical	0.77	0.79

Note. Self-rating = leader self-assessment; follower-rating = follower evaluation of the leader. Phase 3 sample: 22 leaders and 111 followers.

Convergent validity (PICE–ALQ correlations)

Factor-level correlations between PICE and ALQ indicated moderate-to-strong convergence:

Self-ratings (r): Personal 0.78; Interpersonal 0.65; Cognitive 0.53; Ethical 0.81.

Follower ratings (r): Personal 0.70; Interpersonal 0.76; Cognitive 0.60; Ethical 0.84.

Regression models (PICE predicting ALQ)

Simple linear regression models showed meaningful explanatory power (R^2), especially for the Ethical domain:

Self-ratings (R^2): Personal 0.61; Interpersonal 0.42; Cognitive 0.28; Ethical 0.65.

Follower ratings (R^2): Personal 0.49; Interpersonal 0.58; Cognitive 0.36; Ethical 0.71.

Table 2. Convergent validity between PICE and ALQ by factor: correlations (r) and explanatory power (R^2) (Phase 3)

Factor (PICE ↔ ALQ)	r (Self-rating)	R^2 (Self-rating)	r (Follower-rating)	R^2 (Follower-rating)
Personal	0.78	0.61	0.70	0.49
Interpersonal	0.65	0.42	0.76	0.58
Cognitive	0.53	0.28	0.60	0.36
Ethical	0.81	0.65	0.84	0.71

Note. r = Pearson correlation between PICE and ALQ factor scores. R^2 values come from separate simple linear regressions per factor (ALQ as dependent variable; PICE as predictor), estimated for self-ratings and follower ratings.

As an additional check, Harman's single-factor test conducted on the self-rating dataset indicated that the first factor accounted for **32.45%** of total variance, suggesting the absence of a single dominant method factor.

Discussion:-

This paper reports evidence supporting PICE as a competency-based extension of Authentic Leadership that preserves conceptual alignment with the ALQ while improving developmental utility. Across Phase 3 analyses, PICE demonstrated adequate internal consistency and meaningful convergent validity with ALQ at the factor level in both self-ratings and follower ratings. Phase 2 results, in turn, provide a practical rationale for moving from broad factor-level diagnosis to competency-level traceability, particularly when the aim is to translate assessment into individualized training plans.

TABLE 3. COMPARISON BETWEEN ALQ AND PICE (DIAGNOSTIC GRANULARITY AND DEVELOPMENTAL TRACEABILITY)

Aspect	ALQ	PICE
Unit of assessment	4 factors (aggregate diagnosis)	4 factors + 50 competencies/values (actionable diagnosis)
Primary output	Factor-level profile	Global, factor-level, and competency/value-level profile
Development traceability	General guidance	Prioritized gaps and competency-based micro-learning pathways
Evidence of progress	Global re-assessment	Competency evidence + cycle-based re-assessment
Core purpose	Measurement of the construct	Measurement + intervention + traceability
Typical organizational use	Benchmarking and diagnosis	Audit + development + accreditation (standard-based)

Note. PICE preserves the four-domain structure of authentic leadership while providing a competency-based operationalization designed to support targeted development.

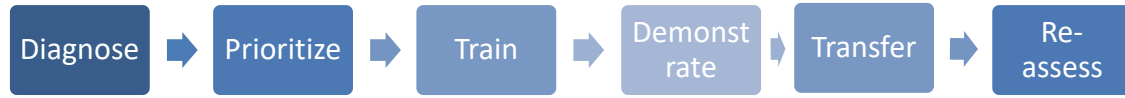
Three findings are particularly relevant

First, the internal consistency results are appropriate for applied organizational assessment. Reliability was strongest for Interpersonal and Cognitive factors in follower ratings, which is consistent with the nature of these domains: many interpersonal and decision-related behaviours are publicly observable in meetings, coordination routines, and day-to-day leadership interactions. In contrast, the Personal factor—often tied to self-awareness and internal regulation—showed comparatively lower alphas, especially in follower ratings. This pattern is not unexpected: internal states and reflective processes are less directly observable by others and may be inferred through behavioural proxies. From an applied standpoint, the implication is that Personal competencies may benefit from combining multi-source ratings with reflective evidence (e.g., structured self-observation, guided debriefs), rather than relying exclusively on external observation.

The comparatively lower convergence in the Cognitive domain is consistent with a difference in measurement depth and observability. ALQ captures balanced processing through a compact set of general items, whereas PICE operationalizes cognition through a broader set of specific competencies. Under these conditions, lower linear convergence may reflect increased specificity rather than conceptual mismatch. Moreover, recent empirical work suggests that authentic leadership effects on performance often operate through intermediate psychological mechanisms and contextual conditions; Duarte et al. (2021) report performance links via engagement and creativity-related pathways. From an applied perspective, the advantage of PICE is precisely to identify which cognitive competencies should be prioritized for development within a given role and context.

Third, regression results indicate that PICE explains a meaningful portion of variance in ALQ scores, especially in Ethical and Personal factors. The Ethical factor showed the highest explanatory power in follower ratings ($R^2 = 0.71$), reinforcing the centrality of values and moral consistency in how Authentic Leadership is perceived. This aligns with prior evidence reported in the author's published work linking higher ALQ profiles—combined with lower leader–follower perception gaps—to sustainable profitability. Together, these results suggest a coherent applied hypothesis: when ethical consistency and authentic leadership behaviours are not only measured but also converted into targeted development interventions, the organization may be better positioned to sustain trust, climate, and long-term performance. From a developmental design perspective, PICE's main contribution is the assessment-to-training traceability enabled by competency disaggregation. By producing profiles at global, factor, and competency/value levels, PICE allows leaders to identify precise strengths and development needs. Moreover, because the system is designed to link competencies to training pathways, it supports an evidence-based development cycle in 6 steps, as shown in the figure below.

Figure 2. Complete PICE model implementation cycle



This cycle becomes operational in HR routines such as coaching and annual performance reviews. This is a practical response to a common organizational problem: leaders receive assessment feedback, but the feedback does not translate into a clear and measurable improvement plan.

Practical implications

In practice, PICE can be embedded in executive coaching and performance management by translating factor-level scores into a small set of priority competencies (e.g., 3–5 per cycle) and defining observable targets. Coaches and managers can use the self–follower gap to frame developmental hypotheses (self-awareness vs. behavioural consistency) and to select interventions. Progress can be monitored through cycle-based re-assessment and workplace evidence (behaviour checklists, brief 180/360 pulse items), enabling a structured diagnose, prioritize, develop and reassess routine rather than one-off feedback. At an organizational level, aggregated PICE profiles can inform cohort-based programs, talent reviews, and leadership standards for internal certification.

Limitations:-

Several limitations should be acknowledged. The validation results are based on a smaller sample (Phase 3) than the large ALQ field study (Phase 2), and sectoral variability may influence factor expression and rating dynamics. Additionally, multi-source ratings can be affected by contextual variables (team climate, relationship quality, organizational culture), which can be a feature (reflecting real leadership impact) but also a potential source of noise. Future work should therefore include segmentation analyses (industry, company size, ownership type) and measurement invariance testing across demographic and organizational groups. Finally, longitudinal designs are needed to evaluate whether competency-based training grounded in PICE produces sustained improvements in both leadership scores and external criteria (e.g., engagement, turnover, performance indicators).

Appendix A. Pice Competency And Values Map :

Appendix A provides the full PICE map (50 elements) and its traceability. Each competency/value is assigned to one of the four PICE domains (Personal, Interpersonal, Cognitive, Ethical), linked to the corresponding reference instrument used for measurement (ESCI, CIM, or CVA), and accompanied by a brief behavioural indicator to support applied interpretation and development planning.

PICE domain	Competency / Value	Source instrument	Instrument authors (year)	One-line behavioural indicator
Personal	Self-confidence	ESCI	Boyatzis, Goleman, & Rhee (2000)	Acts with calm assurance when leading under pressure
	Emotional self-awareness	ESCI / CIM	Boyatzis, Goleman, & Rhee (2000) / Boyatzis (2008)	Identifies emotions and their impact before acting or speaking
	Healthy self-esteem	ESCI	Boyatzis, Goleman, & Rhee (2000)	Accepts feedback without defensiveness and adjusts constructively
	Adaptability	ESCI	Boyatzis, Goleman, & Rhee (2000)	Adjusts priorities and behaviour quickly when conditions change
	Emotional self-control	CIM	Boyatzis (2008)	Regulates impulses and stays composed in conflict or uncertainty

	Emotional self-management	ESCI	Boyatzis, Goleman, & Rhee (2000)	Sustains effective performance by managing stress and energy
	Initiative	ESCI	Boyatzis, Goleman, & Rhee (2000)	Takes proactive action without waiting for instructions
	Achievement orientation	ESCI	Boyatzis, Goleman, & Rhee (2000)	Sets challenging goals and follows through to meet standards
	Optimism / Resilience	ESCI	Boyatzis, Goleman, & Rhee (2000)	Recovers from setbacks and maintains a solution-focused mindset
	Transparency / Trustworthiness	CVA	Barrett (2014)	Communicates openly and behaves consistently with values and commitments
Interpersonal	Organizational awareness	CIM / ESCI	Boyatzis (2008) / Boyatzis, Goleman, & Rhee (2000)	Reads organizational dynamics and navigates stakeholder relationships
	Empathy	CIM	Boyatzis (2008)	Understands others' perspectives and adapts communication accordingly
	Service orientation	CIM / ESCI	Boyatzis (2008) / Boyatzis, Goleman, & Rhee (2000)	Anticipates needs and provides support while maintaining standards
	Collaboration	CIM	Boyatzis (2008)	Works cooperatively across functions to deliver shared outcomes
	Developing others	CIM / ESCI	Boyatzis (2008) / Boyatzis, Goleman, & Rhee (2000)	Coaches and gives feedback that improves capability over time
	Leadership / Coordination	CIM	Boyatzis (2008)	Sets direction, clarifies roles, and coordinates resources effectively
	Building bonds	CIM / ESCI	Boyatzis (2008) / Boyatzis, Goleman, & Rhee (2000)	Builds trust-based relationships that sustain collaboration
	Conflict management	CIM	Boyatzis (2008)	Addresses tensions early and reaches clear, sustainable agreements
	Change management	CIM	Boyatzis (2008)	Guides people through change with clarity, support, and alignment
	Influence	ESCI	Boyatzis, Goleman, & Rhee (2000)	Gains commitment through credible arguments and stakeholder alignment
	Inspiration	CIM	Boyatzis (2008)	Communicates an attractive vision and mobilizes effort
	Negotiation	CIM / ESCI	Boyatzis (2008) / Boyatzis, Goleman, & Rhee (2000)	Reaches balanced agreements while preserving relationships
	Persuasion and influence	CIM / ESCI	Boyatzis (2008) / Boyatzis, Goleman, & Rhee (2000)	Tailors' messages and evidence to secure buy-in from diverse audiences
	Teamwork	CIM	Boyatzis (2008)	Builds cohesion and shared accountability in the team
Cognitive	Learning capability	CIM	Boyatzis (2008)	Learns from experience and applies lessons to new decisions
	Reading comprehension	CIM	Boyatzis (2008)	Extracts key information from complex documents reliably

	Written communication	CIM	Boyatzis (2008)	Produces clear, structured written messages and decisions
	Oral communication	CIM	Boyatzis (2008)	Communicates complex ideas clearly in meetings and discussions
	Creativity	CIM	Boyatzis (2008)	Generates alternative options and reframes problems productively
	Active listening	CIM	Boyatzis (2008)	Listens to understand, checks meaning, and avoids premature judgments
	Flexibility	CIM	Boyatzis (2008)	Revises assumptions when new evidence emerges
	Information management	CIM	Boyatzis (2008)	Organizes and prioritizes information for decision-making
	Analytical thinking	CIM	Boyatzis (2008)	Uses data and logic to diagnose causes and evaluate options
	Conceptual thinking	CIM	Boyatzis (2008)	Connects patterns and builds coherent models for complex issues
	Critical thinking	CIM	Boyatzis (2008)	Detects biases and evaluates evidence quality before concluding
	Efficiency / Time management	CIM	Boyatzis (2008)	Plans work and allocate time to high-impact priorities
	Innovation	CIM	Boyatzis (2008)	Translates ideas into feasible improvements and tested solutions
	Problem solving	CIM	Boyatzis (2008)	Defines problems, selects methods, and implements corrective actions
Ethical	Autonomy	CVA	Barrett (2014)	Makes principled decisions without undue pressure or dependency
	Coherence	CVA	Barrett (2014)	Aligns decisions and behaviour with stated values and principles
	Organizational commitment	CVA	Barrett (2014)	Demonstrates commitment to organizational purpose and long-term goals
	Trust	CVA	Barrett (2014)	Builds credibility through consistent and fair behaviour
	Delegation	CVA	Barrett (2014)	Delegates appropriately and supports accountability
	Equity / Fairness	CVA	Barrett (2014)	Applies impartial criteria and treats people consistently
	Honesty	CVA	Barrett (2014)	Communicates truthfully, even when messages are difficult
	Integrity	CVA	Barrett (2014)	Acts ethically under pressure and avoids conflicts of interest
	Organization alloyalty	CVA	Barrett (2014)	Protects the organization's interests without compromising ethics
	Respect	CVA	Barrett (2014)	Treats others with dignity, especially in disagreement
	Responsibility	CVA	Barrett (2014)	Takes ownership of consequences and corrects errors transparently
	Transparency	CVA	Barrett (2014)	Shares relevant information openly and explains decisions clearly

Conclusion:-

This article presents PICE as a competency-based extension of Authentic Leadership designed to enhance the practical usefulness of leadership assessment. Across a three-phase research program, Phase 2 ALQ evidence in a large organizational sample highlighted the practical limitation of broad factor-level diagnosis for individualized development, while Phase 3 provided psychometric support for PICE as a coherent and reliable system aligned with ALQ. PICE demonstrated adequate internal consistency across its four factors and meaningful convergent validity with ALQ, particularly in Ethical, Personal, and Interpersonal domains. The more moderate convergence in the Cognitive factor is consistent with differences in measurement depth: ALQ captures cognition in a compact manner, whereas PICE operationalizes this domain through a broader set of specific competencies. Beyond measurement, PICE's primary contribution is developmental: by disaggregating the four authentic leadership factors into 50 competencies and values, it enables actionable feedback and individualized training pathways grounded in observable behaviours and ethical alignment.

One limitation is the heterogeneity of the Phase 2 field sample, which included organizations of different sizes and sectors. Phase 3 relied on a purposive subsample designed to support the applied validation and the ALQ–PICE comparison under comparable implementation conditions. Future research should test PICE across organizational segments, comparing homogeneous sectors and company sizes, to achieve a more faithful traceability to their socio-economic reality, examine measurement invariance, and establish criterion validity using external outcomes. Longitudinal intervention studies are also required to determine whether PICE-guided competency development produces sustained improvements in leadership behaviour and organizational performance.

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