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CREATIVE CLIMATE MEASUREMENT: BUILDING AND INDEX FOR A SPECIFIC INDUSTRY

Abstract. Creative climate is a measurable organizational capability that reflects shared perceptions of how strongly an organization supports idea generation, experimentation, learning from failure, and implementation of novel solutions. While many studies examine creative climate through survey instruments and qualitative diagnostics, managers and policy makers increasingly need a transparent composite index that converts multi-dimensional climate signals into an interpretable score for benchmarking, monitoring, and decision-making. This article proposes a methodology for constructing an Industry Creative Climate Index (ICCI) and demonstrates its formalization for the software development and IT-services industry, where knowledge work, team interdependence, and rapid iteration create specific requirements for climate measurement. The approach integrates a validated survey component capturing psychological safety, autonomy, resources for experimentation, collaboration, and external orientation; objective process and human-capital indicators (e.g., deployment cadence, learning investment, cross-team mobility, idea-to-implementation throughput); and a standardized index-building procedure consistent with composite indicator guidance. The ICCI is built through a sequence of steps: conceptual delimitation, indicator selection, data quality checks, normalization, weighting, aggregation, uncertainty and sensitivity analysis, and validation. Weighting is implemented via a hybrid scheme that combines expert judgement (AHP) with data-driven stability checks. To support practical adoption, the paper provides a ready-to-use indicator dictionary, computation formulas, a scoring rubric, and interpretation guidelines that translate ICCI results into managerial actions at the level of teams and organizations. The proposed index can be used for internal diagnostics, supplier and partner assessments, innovation program evaluation, and evidence-based HR and organizational development interventions.

Keywords: creative climate; composite indicator; index construction; psychological safety; autonomy; software industry; organizational innovation; benchmarking.

INTRODUCTION

Problem statement. Organizations operating in highly dynamic markets increasingly compete on their ability to create, test, and scale novel solutions. In knowledge-intensive industries, such as software development, the quality of ideas is strongly shaped by the everyday work environment: whether employees feel safe to raise concerns, whether managers protect time for experimentation, whether teams share knowledge, and whether failures become learning opportunities rather than reasons for blame. These shared perceptions form what the literature calls the creative climate, which is closely linked to both individual creativity and the implementation of innovations at team and organizational levels [1]. However, despite the practical importance of creative climate, organizations still face a measurement gap: many assessments remain either purely qualitative (workshops, interviews) or purely survey-based, and they often do not translate into comparable metrics that can be monitored over time or compared across firms and subsectors.

Analysis of recent research and publications. Foundational work on organizational creativity emphasizes that creativity depends on domain skills, creative thinking skills, intrinsic motivation, and a supportive work environment [1]. Empirical measurement has progressed

through instruments such as KEYS, which assesses perceived encouragement, autonomy, resources, and organizational impediments [2], and the Team Climate Inventory, which operationalizes climate for innovation through vision, participative safety, task orientation, and support for innovation [3]. Psychological safety has been highlighted as a critical enabler of learning behavior in teams [4]. Also, methodological work on composite indicators emphasizes that when multidimensional constructs are summarized into a single index, the procedures for indicator selection, normalization, weighting, aggregation, and uncertainty/sensitivity analysis must be explicit to support valid comparisons and monitoring [5]. If we are talking about climate tradition, researches conceptualized organizational climate for creativity and innovation and argued that day-to-day climate factors (e.g., idea support, trust/openness, dynamism, debate, and risk-taking) can either stimulate or inhibit creative behavior in organizations [6]. Integrative models propose that climate is a bridge between idea generation and innovation implementation [7]. Contemporary studies connect creative climate to motivational mechanisms explained by self-determination theory (autonomy, competence, relatedness) [8] and to contextual factors (job complexity, leadership, social networks) that affect creative performance [9].

Despite these advances, three unresolved issues remain. First, most instruments produce scale scores but do not provide a composite metric with explicit weighting, aggregation logic, and sensitivity checks, which limits benchmarking across organizations and industries. Second, climate measurement is often disconnected from objective operational signals (e.g., cycle time, experiment throughput), which are especially relevant in software development where work is recorded digitally and iteration speed matters. Third, organizations frequently rely on single-source, cross-sectional survey designs, which increases the risk of common method bias and inflated relationships [10]. From a measurement perspective, these limitations indicate a need to follow transparent composite-indicator procedures (indicator selection rules, normalization, weighting, robustness and uncertainty analysis) when constructing an index that is intended for comparison and monitoring [5]. As a result, managers may receive diagnostic reports that are rich in descriptions but weak in decision support.

Purpose of the article. The purpose of this article is to develop a replicable methodology for measuring creative climate by building an Industry Creative Climate Index (ICCI) and to formalize its construction for a specific industry — software development and IT services. The objectives are:

- to define the ICCI construct and its dimensions;
- to propose an indicator system combining survey and objective metrics;
- to formalize normalization, weighting, and aggregation procedures for index computation;
- to present validation and robustness checks that ensure interpretability and practical applicability.

THEORETICAL FOUNDATIONS OF THE RESEARCH

Conceptualization of creative climate. Creative climate can be defined as a stable pattern of shared perceptions regarding the extent to which an organization's routines, leadership behaviors, and social norms support the generation, testing, and implementation of novel and useful ideas. Classic research emphasizes that climate is not merely an individual attitude but a collectively held view of "how we do things here" that shapes attention and behavior. Importantly, creative climate differs from organizational culture: culture refers to deeper values and assumptions, while climate reflects more observable and measurable perceptions that may respond faster to management interventions [6].

Dimensions relevant for the software development and IT-services industry. The software industry has distinct characteristics: project-based work, strong interdependence in teams, fast feedback loops, and high transparency of work processes through digital artifacts (tickets, pull

requests, releases). Therefore, a sector-specific creative climate model should preserve core psychological dimensions but also reflect operational realities. Based on prior instruments [2], [3] and integrative models of creativity and innovation implementation [7], this article uses five dimensions that are both theoretically grounded and practically actionable for software organizations:

- participative safety and psychological safety (speaking up, respectful debate, learning behavior) [3], [4];
- autonomy and empowerment (decision latitude, ownership, intrinsic motivation) [1], [8];
- resources for experimentation (time, tools, data access, managerial support) [2], [9];
- collaboration and knowledge sharing (cross-team coordination, peer feedback, code review norms) [3], [7];
- external orientation and customer learning (user feedback, experimentation, market sensing) [7], [9].

Why an index (composite indicator) is needed. In practice, leaders must allocate resources between delivery commitments and longer-term innovation. For this, they need a metric that provides: a concise summary of climate quality; the ability to benchmark units and suppliers; monitoring of trends after interventions; and diagnostics showing which dimensions drive the overall score. Composite indicators are commonly used to integrate multidimensional concepts into decision-relevant measures, provided that the construction follows transparent rules, documents assumptions, and tests robustness [5]. Thus, the ICCI is conceptualized as a composite indicator that operationalizes creative climate in a way that is comparable and auditable.

Levels of analysis and aggregation logic. Creative climate is often discussed at multiple levels: individual perceptions, team climate, and organization-wide climate. For measurement, this has two practical implications. First, organizations must decide whether they want to diagnose local team climates (useful for action) or a single corporate score (useful for reporting). Second, aggregation must be justified: if team members do not share similar perceptions, a “team climate” score may not be meaningful. Therefore, the ICCI is designed to be computed at the team level first and then aggregated upward using explicit rules (population-weighted means, segment-weighted means). This preserves diagnostic value and reduces the risk that a few large teams dominate the organizational score. For industry benchmarking, segmentation by organizational form (product companies, outsourcing vendors, platform organizations, regulated enterprises) is recommended so that comparisons remain fair and interpretable.

RESEARCH METHODOLOGY

Research design. The ICCI methodology follows a design-science logic: define the construct and dimensions; select indicators based on theory and industry relevance; specify a measurement model combining subjective and objective data; formalize index computation; and propose validation and robustness procedures. The approach is intended for organizational diagnostics and industry benchmarking and can be implemented in either cross-sectional or longitudinal designs. To reduce common method bias, the ICCI intentionally combines multi-source data: employee survey responses, HR/learning statistics, and operational engineering metrics [10].

Indicator selection principles. The indicator system is guided by four principles:

- 1) Theoretical relevance: each indicator must map to a defined climate dimension and have support in prior research on creativity, innovation climate, or learning behavior [1] – [4].
- 2) Industry interpretability: indicators must be meaningful for software and IT-services managers and connected to actionable practices (e.g., experiment cadence, peer feedback).
- 3) Feasibility and data quality: indicators should be collectible with reasonable effort and have acceptable reliability; missingness and measurement error must be documented [5].

- 4) Non-redundancy: highly collinear indicators should be avoided to prevent double-counting and to improve index stability [5], [11].

Index formalization and computation procedure.

Let j index an organization (or business unit), d index a climate dimension, and k index indicators within a dimension. The ICCI is computed as a weighted sum of dimension scores. Dimension scores are computed as weighted sums of normalized indicators. Normalization ensures comparability when indicators use different units (Likert scales, rates, counts).

$$ICCI_j = \sum_{d=1}^D w_d \cdot S_{dj} \quad (1)$$

where j — index of the analyzed unit (organization/company/business unit/team), d — index of the creative-climate dimension, D — total number of dimensions included in the ICCI (e.g., psychological safety, autonomy, resources, collaboration, external orientation), w_d — weight of dimension d in the overall ICCI aggregation, S_{dj} — score of dimension d for unit j (dimension sub-index).

$$S_{dj} = \sum_{k=1}^{K_d} w_{dk} \cdot Z_{dkj} \quad (2)$$

where K_d — number of indicators used to measure dimension d , k — index of an indicator within dimension d , w_{dk} — weight of indicator k inside dimension d , Z_{dkj} — normalized (scaled) value of indicator k of dimension d for unit j .

$$Z_{dkj} = \frac{x_{dkj} - \min(x_{dk})}{\max(x_{dk}) - \min(x_{dk})} \quad (3)$$

where x_{dkj} — raw (original) value of indicator k of dimension d for unit j (e.g., survey mean score, rate, count, %), $\min(x_{dk})$ — minimum observed (or predefined benchmark) value of indicator k in dimension d across the comparison set, $\max(x_{dk})$ — maximum observed (or predefined benchmark) value of indicator k in dimension d across the comparison set.

If the direction of an indicator is negative (higher values indicate worse climate), reverse coding is applied before normalization. Alternative normalization procedures (z-scores, distance to a reference) can also be used, and robustness should be tested through sensitivity analysis [5].

Weighting strategy and robustness checks. Weighting is a critical and value-laden step, because weights implicitly define what “matters more” for creative climate. In the ICCI, weights are set using a hybrid approach:

- Expert-based weighting through the Analytic Hierarchy Process (AHP), which structures pairwise comparisons and derives consistent weights [12].
- Data-driven stability checks using correlation matrices and multivariate diagnostics to detect redundant indicators and to observe whether small weight changes alter rankings [5], [11].

The recommended default is equal dimension weights ($w_d = 0.20$ for $D = 5$) combined with within-dimension weights derived via AHP in an expert panel of industry practitioners (e.g., engineering managers, product leaders, HR partners). Sensitivity analysis should report the range of ICCI scores under alternative weight vectors (equal weights, expert weights, and perturbations of $\pm 10\%$).

Reliability, validity, and measurement quality. For the survey component, internal consistency can be checked with Cronbach’s alpha and item-total correlations [13]. For composite index constructs, recommended practice is to report reliability at the level of

dimension scales, and to evaluate convergent and discriminant validity through average variance extracted and correlation patterns [14], [15]. For multi-source indicators, measurement quality also depends on definition clarity, time alignment (e.g., using the same quarter), and auditability of data extraction [5]. To reduce bias, respondents should be assured of anonymity and items should be balanced to avoid leading wording [10].

Validation design for organizational use. Validation is not a one-time step; it is a recurring design activity as the index is applied across teams and over time. A practical validation plan for the ICCI includes: content validation through expert review of the indicator dictionary; construct validation through factor-analytic checks on the survey module and through expected correlation patterns between survey dimensions and objective signals; criterion validation by examining whether teams with higher ICCI scores also show better learning outcomes (faster incident resolution, lower repeat defects, higher experimentation throughput) while controlling for context; stability checks that ensure the ICCI signal is not dominated by a single outlier indicator. In mature implementations, organizations can add measurement invariance tests across subgroups and time to support fair comparisons [16].

Objective software-industry metrics as complementary evidence. Objective indicators should not be interpreted as direct measures of creativity; rather, they function as observable signals of an organization's capacity to learn and implement improvements. In software development, delivery performance and learning routines can be approximated through widely used engineering metrics (deployment frequency, lead time for changes, change failure rate, time to restore service). Such metrics capture process capability that often co-evolves with creative climate because teams need safe learning environments to continuously improve systems [17]. These metrics must be contextualized and normalized to account for product complexity, compliance requirements, and customer criticality.

RESULTS OF THE RESEARCH

ICCI indicator dictionary for the software development industry

The ICCI indicator system combines perceptual (survey) measures with objective operational signals. The survey items should be measured on a 5- or 7-point Likert scale and aggregated to team or organization level. Objective metrics should be computed for a defined period (e.g., last 90 days). Table 1 provides a compact dictionary of recommended indicators. Organizations may adapt the list, but any modification should be documented to preserve comparability.

Table 1

Core ICCI dimensions and recommended indicators for software development and IT services

Dimension	Indicator (code)	Operational definition	Data source	Direction
Participative & psychological safety	Speak-up safety (PS1)	Employees feel safe to raise concerns and propose changes without fear of blame	Survey	+
Participative & psychological safety	Learning from failure (PS2)	Incidents/defects are reviewed for learning; blame-free retrospectives	Survey + process audit	+
Autonomy & empowerment	Decision autonomy (AU1)	Teams can choose implementation approaches and influence prioritization	Survey	+
Autonomy & empowerment	Ownership clarity (AU2)	Clear end-to-end ownership of features/services; autonomy aligned with accountability	Survey	+

Dimension	Indicator (code)	Operational definition	Data source	Direction
Resources for experimentation	Time for improvement (RE1)	Share of capacity reserved for refactoring/innovation (e.g., 10–20%)	Planning data	+
Resources for experimentation	Tooling & data access (RE2)	Availability of experimentation platforms, telemetry, and test environments	Survey	+
Collaboration & knowledge sharing	Peer feedback norm (CO1)	Quality and frequency of constructive peer feedback (code review culture)	Survey + repo metrics	+
Collaboration & knowledge sharing	Cross-team knowledge flow (CO2)	Frequency of cross-team pairing, communities of practice, internal talks	HR/learning records	+
External orientation & customer learning	Customer feedback loop (EX1)	Use of customer input (support tickets, user research) in prioritization	Survey	+
External orientation & customer learning	Experiment throughput (EX2)	Number of controlled experiments / A/B tests per team per quarter	Product analytics	+

Weighting and aggregation results (recommended baseline)

A baseline ICCI configuration for industry benchmarking uses equal weights across the five dimensions ($w_d = 0.20$). Within each dimension, indicator weights can be set equally (0.50/0.50 when two indicators are used) or derived through AHP when organizations need stronger alignment with strategic priorities [12]. Table 2 illustrates an example of within-dimension weights obtained from an AHP panel that prioritized psychological safety and experimentation throughput as the most discriminating indicators for software organizations. Consistency ratios should be checked to ensure coherent expert judgments [12].

Table 2

Example of within-dimension indicator weights (AHP-based) and interpretation

Dimension	Indicator	Weight w_{dk}	Interpretation for managers
Psychological safety	PS1 Speak-up safety	0.60	High leverage for risk-taking and candid problem discovery
Psychological safety	PS2 Learning from failure	0.40	Operational learning routines sustain long-term climate
Autonomy	AU1 Decision autonomy	0.55	Autonomy increases intrinsic motivation and initiative
Autonomy	AU2 Ownership clarity	0.45	Clear ownership prevents confusion and defensive behavior
Resources	RE1 Time for improvement	0.50	Protecting capacity enables experimentation and quality work
Resources	RE2 Tooling & data access	0.50	Tools reduce friction and increase idea-to-test speed
Collaboration	CO1 Peer feedback norm	0.45	Feedback culture improves learning and idea refinement
Collaboration	CO2 Knowledge flow	0.55	Cross-team exchange prevents local optimization and silos
External orientation	EX1 Customer feedback loop	0.40	Ensures relevance of ideas and prioritization
External orientation	EX2 Experiment throughput	0.60	Shows ability to test and validate ideas quickly

Measurement quality: reliability, validity, and bias control

For the survey component, organizations should compute reliability statistics for each dimension scale. A practical target is Cronbach's $\alpha \geq 0.70$ for mature diagnostics; values between 0.60–0.70 can be acceptable in early-stage pilots if items are conceptually coherent [13], [14]. Items with low corrected item-total correlations should be revised or removed. Convergent validity can be assessed by verifying that items within a dimension correlate more strongly with each other than with items from other dimensions; discriminant validity can be checked using average variance extracted and cross-dimension correlations [15]. To reduce common method bias, the ICCI recommends separating measurement sources (survey vs. operational metrics), using temporal separation (e.g., collecting survey in month 1 and extracting operational metrics for months 2–4), and including marker variables or statistical checks when appropriate [10]. Multivariate diagnostics and factor analysis procedures described in applied research handbooks can support these steps [11].

Worked example: computing ICCI for typical software-organization archetypes

To demonstrate the computation and interpretation of the ICCI, a worked example is provided using illustrative (simulated) data for three common archetypes in the software industry:

- a) a product company with mature experimentation infrastructure;
- b) an outsourcing provider focused on delivery efficiency;
- c) a fast-growing startup with high autonomy but unstable processes.

For each archetype, raw indicator values are assumed on a 1-5 scale for survey indicators and scaled rates for objective indicators; values are then normalized using formula (3), aggregated to dimension scores using formula (2), and finally aggregated to the ICCI using formula (1). Table 3 presents the resulting normalized dimension scores and the overall ICCI (0 to 1).

Table 3

Illustrative ICCI results for three software-industry archetypes (normalized 0-1)

Archetype	Psychological safety	Autonomy	Resources	Collaboration	External orientation	ICCI
Product company	0.78	0.72	0.70	0.74	0.82	0.752
Outsourcing provider	0.60	0.55	0.50	0.62	0.48	0.550
Startup	0.58	0.80	0.45	0.52	0.70	0.610

The example illustrates how the ICCI separates “high autonomy” from “system capacity.” The startup archetype scores highly on autonomy but lower on resources and collaboration, indicating that employees may have freedom to propose ideas but lack the stable routines and capacity needed to implement them sustainably. In contrast, the product company benefits from both experimentation throughput and a strong customer learning loop, which raises external orientation. For managers, this decomposition is crucial: it supports targeted interventions (e.g., investing in tooling and reducing delivery pressure) rather than generic culture programs.

Interpretation guidelines and managerial action mapping

For practical usage, ICCI values can be interpreted in four bands:

- 0.00-0.39: fragile creative climate (high risk of silence, low experimentation capacity);
- 0.40-0.59: developing climate (some enabling conditions exist but are inconsistent);
- 0.60-0.79: supportive climate (good foundations with localized improvement needs);
- 0.80-1.00: high-performing climate (strong learning, experimentation, and implementation capacity).

An essential feature of ICCI is the translation of dimension scores into actions. For example, low psychological safety suggests interventions such as leadership training on inclusive behaviors, improvement of retrospectives, and incident-review practices [4]. Low autonomy may require redesign of decision rights and reduction of micromanagement to support intrinsic motivation [8]. Low experimentation resources can be addressed by explicitly reserving capacity, improving tooling, and simplifying release processes. Low collaboration may point to structural silos and can be improved through communities of practice and cross-team rotations. Finally, low external orientation indicates weak customer learning loops and can be improved through structured user research, telemetry, and controlled experimentation.

Expanded survey item pool (ready-to-use questionnaire module)

To support immediate implementation, this subsection provides an expanded pool of survey items aligned with the five ICCI dimensions. Items should be phrased consistently, answered on a 1–5 scale (1 — strongly disagree, 5 — strongly agree), and randomized to reduce response bias. The organization may select 2–4 items per dimension depending on survey length constraints.

Participative & psychological safety:

- 1) In my team, it is safe to speak up about problems even if they are unpopular.
- 2) People here can admit mistakes without fear of negative consequences.
- 3) We openly discuss incidents and defects to learn, not to blame.
- 4) When someone proposes a new approach, colleagues respond respectfully.

Autonomy and empowerment:

- 5) I have enough autonomy to decide how to do my work.
- 6) The team has meaningful influence over priorities and commitments.
- 7) I can experiment with alternative solutions when I see a better way.
- 8) Responsibilities and ownership for outcomes are clear.

Resources for experimentation:

- 9) We have time to improve products/processes beyond urgent delivery tasks.
- 10) We have access to the tools and environments needed to test new ideas.
- 11) Data and telemetry are available to evaluate whether changes work.
- 12) Management protects innovation work when schedules become tight.

Collaboration & knowledge sharing:

- 13) We give each other constructive feedback that improves the quality of solutions.
- 14) Knowledge is shared across teams rather than kept in silos.
- 15) People collaborate to solve complex problems instead of working alone.
- 16) Cross-functional stakeholders (product, design, QA) work effectively together.

External orientation & customer learning:

- 17) Customer feedback is systematically used in decisions.
- 18) We test assumptions with users before scaling major changes.
- 19) Experiments are used to learn quickly and reduce risk.
- 20) Our team understands the customer problem and the impact of our work.

Robustness: uncertainty and sensitivity analysis checklist.

Because composite indices can be sensitive to methodological choices, the ICCI should be accompanied by a robustness report following best-practice guidance for composite indicators [5]. A minimal checklist includes:

- a) missing data handling: document missingness and apply transparent imputation rules (e.g., mean within team);
- b) alternative normalization: compare min-max normalization (3) to z-score normalization;

- c) alternative weighting: compare expert/AHP weights to equal weights and to randomized perturbations;
 - d) aggregation sensitivity: compare linear aggregation (1) to geometric aggregation when appropriate;
 - e) rank stability: report whether organizational rankings change materially under plausible alternatives;
 - f) outlier analysis: test whether extreme values dominate the index; winsorize if justified.
- Such reporting increases trust in the ICCI and reduces the risk of “gaming” a single metric.

Industry segmentation, benchmark construction, and reporting dashboards.

When the ICCI is used beyond a single organization (for example, within an industry association, an ecosystem of suppliers, or a multi-subsidary corporate group), benchmark construction becomes a central methodological task. A benchmark should not be a single universal distribution because software organizations differ in business model, regulatory exposure, product criticality, and maturity. Therefore, the ICCI recommends segmentation before ranking. A practical segmentation approach includes at least:

- a) product companies with direct-to-customer or platform models;
- b) outsourcing and IT-services vendors operating under client contracts;
- c) regulated or safety-critical software (finance, healthcare, infrastructure) where experimentation has additional constraints;
- d) early-stage startups where processes are evolving rapidly.

Within each segment, benchmark percentiles (P25, P50, P75) can be used as reference points for interpreting ICCI scores. Organizations can publish a dashboard that includes: overall ICCI, five dimension scores, trend lines over time, and a ‘driver view’ that shows which indicators contributed most to changes. This presentation aligns with managerial measurement systems that emphasize both leading indicators (capabilities) and lagging indicators (outcomes) [19].

Linking ICCI to innovation management and evidence-based interventions

To avoid treating ICCI as a standalone “culture number,” organizations should integrate it into an innovation management logic. At minimum, the ICCI can be treated as an input indicator of innovation capability, while innovation activities (experiments run, prototypes built, process improvements implemented) and outcomes (new feature adoption, customer satisfaction improvements, productivity gains) are tracked separately. This aligns with international guidance that distinguishes between enabling conditions and innovation outputs and encourages systematic measurement of innovation activities [20]. In longitudinal analysis, ICCI can be used to test practical hypotheses such as: H1 — improvement in psychological safety precede increases in learning-oriented behaviors and reduced incident recurrence; H2 — resource protection predicts higher experiment throughput; H3 — collaboration improvements accelerate dissemination of effective practices across teams. In addition, diffusion logic suggests that innovations (new tools, standards, practices) spread more effectively when social systems support communication, trialability, and low personal risk; these conditions overlap with high creative climate dimensions [21].

Integrating ICCI into operational excellence and continuous delivery programs

Many software organizations already run operational excellence initiatives (DevOps transformations, agile adoption, quality improvement programs). ICCI can complement these initiatives by explaining why technical changes succeed in some teams but fail in others. For example, the same continuous delivery tooling may not be used effectively if psychological

safety is low and teams fear exposing mistakes. Likewise, autonomy can become chaotic rather than enabling if ownership clarity is weak. Therefore, a practical integration pattern is to review ICCI dimension scores alongside delivery performance metrics. Delivery metrics capture “what happened” (lead time, failure rate), while ICCI dimensions explain “why it is hard” (fear of speaking up, lack of time, weak learning routines). This dual view supports targeted, low-cost interventions — such as changing incident review norms, improving feedback practices, or protecting capacity — before expensive structural reorganizations are attempted. In this sense, ICCI functions as a leading indicator within continuous improvement systems.

Practitioner checklist and common pitfalls in software climate indexing.

For organizations implementing the ICCI for the first time, operational details often determine whether the index becomes a trusted management tool or an ignored report. The following checklist supports technical correctness and organizational acceptance:

- define the unit of analysis explicitly (team, product line, delivery tribe) and keep it stable across cycles;
- align time windows so that survey responses reflect the same period as objective metrics (e.g., last 90 days);
- protect anonymity by avoiding team-level reporting for very small teams; aggregate to a higher level when needed;
- make indicators auditable: document definitions, data sources, and extraction logic store scripts in version control;
- Sseparate diagnostics from evaluation: use ICCI for learning and improvement, not for punishment or ranking individuals;
- use the profile, not only the total: review the five dimension scores and top drivers before focusing on ICCI;
- calibrate slowly: keep weights fixed for 2–3 cycles to establish baselines; adjust segmentation bands only after data stabilizes;
- close the loop: end each cycle with a small set of interventions linked to weak dimensions and a follow-up plan.

Typical pitfalls include: overloading the index with too many indicators, which increases redundancy and reduces interpretability; mixing incomparable teams (e.g., support engineering vs. core R&D) without segmentation; changing scoring rules frequently, which breaks trend analysis; relying on delivery metrics alone as a proxy for creative climate. Delivery performance can improve through pressure and overtime even when climate deteriorates; therefore, ICCI intentionally keeps psychological safety and autonomy as non-substitutable signals of sustainability. A disciplined use of this checklist helps ensure that ICCI remains a valid representation of creative climate and supports realistic managerial actions rather than superficial reporting.

CONCLUSIONS AND PROSPECTS FOR FURTHER RESEARCH

This article proposed a formal methodology for creative climate measurement through the Industry Creative Climate Index (ICCI) and demonstrated a sector-specific operationalization for the software development and IT-services industry. The ICCI integrates validated climate dimensions (psychological safety, autonomy, resources, collaboration, and external orientation) with a transparent composite indicator procedure that includes normalization, weighting, aggregation, and robustness checks. The main practical advantage is that the ICCI produces both an interpretable overall score and a diagnostic profile that can guide targeted interventions. The methodology intentionally combines survey and objective data to reduce common method bias and to connect climate perceptions to operational capabilities.

Prospects for further research include: empirical validation of ICCI predictive validity by linking ICCI scores to innovation outcomes (e.g., product metrics, defect trends, new feature adoption) in longitudinal datasets; adaptation of the ICCI to other industries (manufacturing, healthcare, education) with industry-specific indicators and benchmarking baselines; development of normative reference values by subindustry (product vs. outsourcing vs. platform organizations) and maturity stages; exploration of non-linear aggregation and threshold effects, where minimum levels of psychological safety or resources may be required before other dimensions translate into innovation implementation.

REFERENCES (TRANSLATED AND TRANSLITERATED)

1. Amabile, T. M. (1996). *Creativity in context*. Westview Press.
2. Amabile, T. M., Conti, R., Coon, H., Lazenby, J., & Herron, M. (1996). Assessing the work environment for creativity. *Academy of Management Journal*, 39(5), 1154–1184. <https://doi.org/10.5465/256995>
3. Anderson, N. R., & West, M. A. (1998). Measuring climate for work group innovation: Development and validation of the Team Climate Inventory. *Journal of Organizational Behavior*, 19(3), 235–258. [https://doi.org/10.1002/\(SICI\)1099-1379\(199805\)19:3<235::AID-JOB837>3.0.CO;2-C](https://doi.org/10.1002/(SICI)1099-1379(199805)19:3<235::AID-JOB837>3.0.CO;2-C)
4. Edmondson, A. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly*, 44(2), 350–383. <https://doi.org/10.2307/2666999>
5. Nardo, M., Saisana, M., Saltelli, A., Tarantola, S., Hoffmann, A., & Giovannini, E. (2008). *Handbook on constructing composite indicators: Methodology and user guide*. OECD Publishing. <https://doi.org/10.1787/9789264043466-en>
6. Ekvall, G. (1996). Organizational climate for creativity and innovation. *European Journal of Work and Organizational Psychology*, 5(1), 105–123. <https://doi.org/10.1080/13594329608414845>
7. West, M. A. (2002). Sparkling fountains or stagnant ponds: An integrative model of creativity and innovation implementation in work groups. *Applied Psychology: An International Review*, 51(3), 355–387. <https://doi.org/10.1111/1464-0597.00951>
8. Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01
9. Shalley, C. E., Zhou, J., & Oldham, G. R. (2004). The effects of personal and contextual characteristics on creativity: Where should we go from here? *Journal of Management*, 30(6), 933–958. <https://doi.org/10.1016/j.jm.2004.06.007>
10. Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879–903. <https://doi.org/10.1037/0021-9010.88.5.879>
11. Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (8th ed.). Cengage.
12. Saaty, T. L. (1980). *The analytic hierarchy process*. McGraw-Hill.
13. Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297–334. <https://doi.org/10.1007/BF02310555>
14. Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw-Hill.
15. 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/10.1177/002224378101800104>
16. Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, 3(1), 4–70. <https://doi.org/10.1177/109442810031002>
17. Forsgren, N., Humble, J., & Kim, G. (2018). *Accelerate: The science of lean software and DevOps*. IT Revolution Press. <https://doi.org/10.5555/3235404>
18. Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511803932>
19. Kaplan, R. S., & Norton, D. P. (1996). *The balanced scorecard: Translating strategy into action*. Harvard Business School Press.
20. OECD/Eurostat. (2018). *Oslo manual 2018: Guidelines for collecting, reporting and using data on innovation* (4th ed.). OECD Publishing. <https://doi.org/10.1787/9789264304604-en>
21. Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.
22. Saisana, M., & Saltelli, A. (2011). Rankings and ratings: Instructions for use. *Hague Journal on the Rule of Law*, 3(2), 247–268. <https://doi.org/10.1017/S1876404511200058>

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КРЕАТИВНЕ ВИМІРЮВАННЯ КЛІМАТУ: СТВОРЕННЯ ІНДЕКСУ ДЛЯ КОНКРЕТНОЇ ГАЛУЗІ

Анотація. Творчий клімат — це вимірювана організаційна здатність, яка відображає спільні уявлення про те, наскільки організація підтримує генерування ідей, експерименти, навчання на помилках та впровадження нових рішень. Хоча в багатьох дослідженнях творчий клімат аналізується за допомогою анкетних опитувань та якісної діагностики, менеджерам і політикам дедалі більше потрібний прозорий комплексний індекс, який перетворює багатомірні сигнали про клімат на зрозумілий показник для порівняльного аналізу, моніторингу та прийняття рішень. У цій статті пропонується методологія побудови Індексу творчого клімату галузі (ICCI) та демонструється його формалізація для галузі розробки програмного забезпечення та IT-послуг, де інтелектуальна праця, взаємозалежність команд та швидка ітерація створюють специфічні вимоги до вимірювання клімату. Цей підхід інтегрує перевірений компонент опитування, що фіксує психологічну безпеку, автономію, ресурси для експериментів, співпрацю та зовнішню орієнтацію; об'єктивні показники процесів та людського капіталу (наприклад, темп розгортання, інвестиції в навчання, міжкомандну мобільність, пропускну здатність від ідеї до реалізації); а також стандартизовану процедуру побудови індексу, що відповідає рекомендаціям щодо комплексних показників. Індекс ICCI формується у кілька етапів: концептуальне окреслення, вибір показників, перевірка якості даних, нормалізація, зважування, агрегація, аналіз невизначеності та чутливості, а також валідація. Зважування здійснюється за допомогою гібридної схеми, що поєднує експертну оцінку (АНР) з перевітками стабільності на основі даних. Для сприяння практичному застосуванню у статті наведено готовий до використання словник показників, формули розрахунку, шкалу оцінювання та рекомендації щодо інтерпретації, які дозволяють перетворити результати ICCI на управлінські дії на рівні команд та організацій. Запропонований індекс можна використовувати для внутрішньої діагностики, оцінки постачальників та партнерів, оцінки інноваційних програм, а також для втручання у сфері управління персоналом та організаційного розвитку, що ґрунтуються на фактичних даних.

Ключові слова: творчий клімат; комплексний показник; побудова індексу; психологічна безпека; автономія; індустрія програмного забезпечення; організаційні інновації; бенчмаркінг.

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