E-ISSN: 3108-4176

APSSHS

Academic Publications of Social Sciences and Humanities Studies
2025, Volume 6, Page No: 195-205
Available online at: https://apsshs.com/

Annals of Organizational Culture, Leadership and External Engagement Journal

Aligning Organizational Culture with Innovation Outcomes: Development and Validation of an Innovative Culture Enhancement Framework

Grace Y. Tan[1], Wei Ming Lim[2], Hui Xin Ong[1]*, Farah N. Ismail[3], Rachel S. Coleman[4]

1. Department of Strategy and Policy, Business School, National University of Singapore, Singapore.
2. Department of Leadership and Change, Lee Kong Chian School of Business, Singapore Management University, Singapore.
3. Department of Organisational Behaviour, Faculty of Business and Economics, University of Malaya, Kuala Lumpur, Malaysia.
4. Department of Management, Business School, University of Sydney, Sydney, Australia.

Abstract

Innovation is widely recognized as a critical determinant of an organization's sustained competitiveness and long-term performance. Prior research consistently emphasizes that the presence of an organizational culture conducive to innovation is a fundamental prerequisite for achieving innovative outcomes. This study introduces and empirically validates a structured approach—referred to as the Innovative Culture Enhancement Framework (ICEF)—designed to systematically strengthen innovation capabilities by aligning them with organizational culture. The framework begins by applying the Organizational Culture Assessment Instrument (OCAI) to identify the prevailing levels of dominant culture types within an organization. Subsequently, the Community Innovation Survey (CIS) is employed to assess the organization's performance across different categories of innovation. In the third phase, multiple linear regression analyses are conducted to examine the influence of each cultural dimension on various innovation types. The fourth phase involves benchmarking the organization's current innovation profile against targeted innovation levels defined by senior management. Finally, ICEF prescribes targeted adjustments to the existing cultural configuration to foster the desired innovation outcomes. The applicability and robustness of the framework were tested through its implementation in three medium-sized enterprises, where it demonstrated operational feasibility and produced statistically significant results. Further validation was achieved through structured interviews with industry experts to assess the relevance and coherence of ICEF's dimensions. Statistical evaluation of the interview data revealed strong item-to-total correlations and a high Cronbach's alpha coefficient, confirming the framework's reliability and internal consistency. The findings support the effectiveness of ICEF as a practical tool for leveraging organizational culture to enhance innovation. Future research is encouraged to further investigate the strategic role of organizational culture as a catalyst for innovation across diverse organizational contexts.

Keywords: Organizational culture, Innovation management, Analytical framework, Organizational competitiveness

How to cite this article: Tan GY, Lim WM, Xin Ong H, Ismail FN, Coleman RS. Aligning organizational culture with innovation outcomes: Development and validation of an innovative culture enhancement framework. Ann Organ Cult Leadersh Extern Engagem J. 2025;6:195-205. https://doi.org/10.51847/oxRmXoFHZS

Received: 16 August 2025; **Revised:** 08 November 2025; **Accepted:** 16 November 2025
Corresponding author: Hui Xin Ong
E-mail ✉ hui.ong@outlook.com

Introduction

In today's rapidly changing business environment, organizations must respond swiftly and innovatively to external pressures in order to remain viable and avoid obsolescence. Innovation—commonly understood as the transition from existing knowledge, practices, products, or principles to new or significantly improved alternatives—enables organizations to maintain a competitive advantage. It encompasses novel approaches to technological development, marketing practices, and evolving

consumer behaviors. Innovation may originate internally within organizations or be acquired from external sources and can manifest in either radical or incremental forms. While radical innovation typically involves higher levels of uncertainty and implementation risk, it may be more conducive to long-term growth. In contrast, incremental innovation is generally easier to implement and supports continuous, gradual improvement [1-9].

Research on organizational innovation capability, initially advanced by Burns and Stalker [10], spans multiple disciplines but has not converged on a unified framework explaining how organizations can consistently enhance their innovativeness [11]. Managing innovation remains a complex endeavor due to the involvement of multiple interdependent functional activities. Consequently, reliance on conventional approaches—such as substantial investment in research and development—does not always guarantee successful innovation outcomes [12]. Moreover, prior studies have highlighted the importance of identifying and evaluating contextual factors, such as organizational culture, that influence innovation, as well as understanding the relationships among these factors [13, 14].

Over recent decades, organizational culture has received increasing scholarly and managerial attention because of its potential to shape organizational performance and future success [15-18]. Watson [19] noted that the concept of culture originated from the metaphor of organizations as entities that are "cultivated." More broadly, culture is commonly defined as a shared system of values, beliefs, attitudes, and behaviors transmitted among members of a group over time [20]. Contemporary research emphasizes the role of these intangible elements in guiding decision-making processes and organizational development. In this context, organizational culture is often described as the set of norms, practices, and social dynamics that shape how individuals interact and contribute to organizational growth [18].

Scholars also recognize two primary patterns of cultural configuration within organizations. In some cases, a single, coherent culture may dominate across the entire organization [21, 22]. In other instances—particularly within large or diversified organizations—multiple subcultures may coexist across departments or units. As a result, cultural variation is likely to emerge, prompting management either to address culture at the organizational level or to examine subcultural differences to identify shared values and practices [22, 23].

A substantial body of empirical research has demonstrated a strong relationship between organizational culture and innovation outcomes [14, 24, 25]. For example, Tellis *et al.* [14], using survey and archival data from 759 firms across 17 countries, found that corporate culture represents the most influential determinant of radical innovation across firms and national contexts.

Similarly, Jaskyte and Kisieliene [26] and Schein [18] emphasized that the impact of organizational culture on innovation is contingent upon the specific cultural attributes present. Consequently, cultivating an innovation-oriented culture is essential to enable organizational members to actively explore new products, services, and processes [27]. Innovation, therefore, requires a supportive cultural environment and patterns of innovative behavior that foster creativity and experimentation [14, 17, 28, 29].

Based on an extensive review of the literature examining the relationship between organizational culture and innovation, scholars have identified four core cultural attributes that are particularly conducive to fostering innovation: creativity, autonomy, collaboration, and willingness to take risks [30, 31]. Prior studies also indicate that organizations often attempt to strengthen innovation-supportive cultural attributes by building on their existing cultural foundations and operational contexts. Such attributes include resource availability, customer orientation, employee involvement, interdepartmental cooperation, continuous learning, and organizational flexibility [29, 31].

Despite these insights, and to the best of the authors' knowledge, the existing literature lacks a comprehensive and systematic framework that explicitly guides organizations in enhancing specific types of innovation through deliberate and targeted modifications of organizational culture. For instance, Hartnell *et al.* [32] examined the relationship between organizational culture and overall organizational effectiveness rather than innovation per se. Although their findings broadly supported the notion that different culture types influence organizational outcomes, they did not clearly articulate the mechanisms through which culture can be strategically aligned to support particular innovation objectives—a limitation also highlighted by Hogan and Coote [6]. Addressing this gap, the present study seeks to develop a structured model, termed the Innovative Culture Enhancement Framework (ICEF), aimed at strengthening desired innovation outcomes, and to empirically validate its applicability.

Framework Development

As outlined previously, the primary objective of this research is to design a framework capable of assisting organizations in enhancing targeted forms of innovation in order to strengthen their competitive position. The initial stages of the framework involve identifying the organization's prevailing cultural configuration and assessing its current innovation profile.

To determine organizational culture types, the framework adopts the Competing Values Framework (CVF), a widely recognized and extensively applied model in organizational studies [16]. Originally developed by Quinn and Rohrbaugh [33], the CVF conceptualizes organizational effectiveness along four dimensions: human relations, open systems, rational goals,

and internal processes. Since its introduction, numerous empirical studies have employed the CVF to categorize and analyze organizational culture types [34].

The CVF evaluates organizational culture by examining competing demands along two primary dimensions: organizational focus (internal versus external orientation) and structural preference (stability versus flexibility) [35]. Building on this model, Cameron and Quinn [23] refined the framework by defining four dominant culture types: adhocracy culture (emphasizing creativity and innovation), market culture (focused on competitiveness and results), hierarchy culture (characterized by formalization and control), and clan culture (centered on collaboration and cohesion). To operationalize this model, the authors also developed the Organizational Culture Assessment Instrument (OCAI), which enables systematic assessment of culture types within organizations.

Within ICEF, the OCAI is employed to identify the existing cultural profile of an organization. The instrument consists of 24 statements grouped across multiple organizational dimensions. Respondents are asked to express the extent to which each statement reflects their organization. These statements capture perceptions related to organizational environment, leadership style, management practices, cohesion mechanisms, strategic emphasis, and definitions of success. Specifically, the statements address whether the organization is perceived as family-like and supportive, entrepreneurial and risk-oriented, performance-driven and competitive, or structured and rule-governed. They also assess leadership behaviors ranging from mentoring and innovation to control and coordination, as well as management styles emphasizing participation, individual initiative, competitiveness, or stability.

In addition, the instrument evaluates the underlying values that bind the organization together, such as trust and loyalty, commitment to innovation, achievement orientation, or reliance on formal rules and procedures. Strategic priorities—such as human development, exploration of new opportunities, market competitiveness, or operational efficiency—are also captured. Finally, the OCAI examines how organizational success is defined, whether in terms of employee development and teamwork, innovation leadership, market dominance, or efficiency and cost control.

OCAI is used in ICEF to determine existing culture types. In OCAI, respondents are asked to indicate their agreement or disagreement with the following 24 statements:

•The organization is a very personal place. It is like an extended family. People seem to share a lot of themselves.

•The organization is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks.

•The organization is very results oriented. A major concern is with getting the job done. People are very competitive and achievement oriented.

•The organization is a very controlled and structured place. Formal procedures generally govern what people do.

•The leadership in the organization is generally considered to exemplify mentoring, facilitating, or nurturing.

•The leadership in the organization is generally considered to exemplify entrepreneurship, innovation or risk taking.

•The leadership in the organization is generally considered to exemplify a no-nonsense, aggressive, results-oriented focus.

•The leadership in the organization is generally considered to exemplify coordinating, organizing, or smooth-running efficiency.

•The management style in the organization is characterized by teamwork, consensus, and participation.

•The management style in the organization is characterized by individual risk taking, innovation, freedom, and uniqueness.

•The management style in the organization is characterized by hard-driving competitiveness, high demands, and achievement.

•The management style in the organization is characterized by security of employment, conformity, predictability, and stability in relationships.

•The glue that holds the organization together is loyalty and mutual trust. Commitment to this organization runs high.

•The glue that holds the organization together is commitment to innovation and development. There is an emphasis on being on the cutting edge.

•The glue that holds the organization together is the emphasis on achievement and goal accomplishment.

•The glue that holds the organization together is formal rules and policies. Maintain a smooth-running organization is important.

•The organization emphasizes human development. High trust, openness, and participation persist.

•The organization emphasizes acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued.

•The organization emphasizes competitive actions and achievement. Hitting stretch targets and winning in the marketplace are dominant.

•The organization emphasizes permanence and stability. Efficiency, control, and smooth operations are important.

•The organization defines success on the basis of the development of human resources, teamwork, employee commitment, and concern for people.

•The organization defines success on the basis of having the most unique or newest products. It is a product leader and innovator.

•The organization defines success on the basis of winning in the marketplace and outpacing the competition. Competitive market leadership is key.

•The organization defines success on the basis of efficiency. Dependable delivery, smooth scheduling, and low-cost production are critical.

In the second phase of the Innovative Culture Enhancement Framework (ICEF), the English version of the Community Innovation Survey (CIS) is employed. Originally developed by the European Union and administered in the United Kingdom by the Department for Business, Innovation and Skills [36], the CIS is a well-established instrument for assessing innovation activities within organizations. The survey consists of 28 items organized into 12 thematic sections and is designed to identify prevailing innovation types across organizations. Specifically, the CIS categorizes innovation into four main dimensions: product innovation, which focuses on the development of new or improved products or services; process innovation, which targets improvements in operational procedures; marketing innovation, which seeks to enhance competitive positioning in the marketplace; and organizational innovation, which aims to improve business practices and organizational structures [3, 8, 37, 38].

During the application of the CIS, two key limitations were identified, prompting modifications to the original instrument. First, a significant proportion of the CIS items were formulated as binary (yes/no) questions. Such response formats may limit respondents' ability to express nuanced perceptions. To address this issue, a 10-point Likert scale was adopted for selected items, allowing for a more precise measurement of respondents' views, consistent with recommendations in scale development literature [39]. Second, the original survey was relatively lengthy and included several questions that were overly broad, repetitive, or only indirectly related to innovation. As a result, certain items were removed or reworded to streamline the questionnaire and enhance its clarity and practicality.

The revised CIS instrument, adapted from the DBIS [36] version and excluding definitional content, required participants to evaluate 12 key innovation-related statements. Responses were provided using a 10-point Likert scale, where a score of 1 indicated a very weak presence of the innovation attribute and a score of 10 indicated a very strong presence. The complete modified questionnaire is presented in Appendix A.

The third stage of ICEF focuses on analyzing the relationship between organizational culture and innovation by examining the extent to which each cultural dimension contributes to different types of innovation. This relationship is explored through multiple regression analysis. The fourth stage involves benchmarking the organization's current innovation levels against the target levels defined by senior management. In the final stage, the framework proposes strategic adjustments to existing cultural characteristics to facilitate the achievement of the desired innovation outcomes.

Methodology

The research methodology adopted in this study can be summarized in three main phases:

1. **Development of a conceptual framework** comprising the following sequential steps to enhance targeted innovation outcomes within organizations:
2. Identification of existing organizational culture types using the Organizational Culture Assessment Instrument (OCAI).
3. Assessment of current innovation types using the Community Innovation Survey (CIS).
4. Examination of the relationships between culture types and innovation types through multiple regression analysis and correlation analysis.
5. Comparison of current innovation levels with desired levels as defined by organizational leadership.
6. Formulation of recommendations to modify specific cultural dimensions in order to achieve the targeted innovation profile.
7. **Implementation and empirical validation** of the proposed framework across three organizations.
8. **Expert-based validation**, involving the collection and analysis of feedback from industry specialists to assess the framework's relevance, coherence, and applicability.

The overall structure of the proposed framework is depicted in **Figure 1** and is discussed in greater detail in the subsequent validation section.

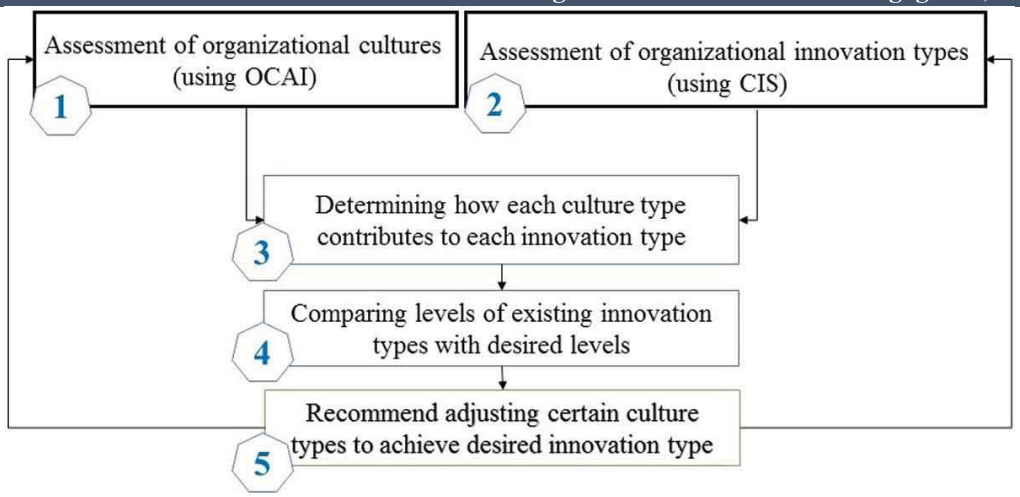

Figure 1. Illustrates the structure of the developed Innovative Culture Enhancement Framework (ICEF)

It is important to recognize that organizational culture is not static but evolves over time. Consequently, to ensure that the targeted innovation type is achieved and sustained at the desired level following the implementation of ICEF-driven interventions, organizations may repeat the framework's assessment and adjustment cycle after a defined period, typically every two to three years

ICEF Implementation and Validation

To evaluate the practicality and validity of the proposed framework, ICEF was applied in three medium-sized organizations located in Abu Dhabi, the capital of the United Arab Emirates. These organizations operated in distinct sectors: information technology, construction and design, and media. The framework was implemented consistently across all three organizations following a structured five-stage process.

First, employees were contacted and invited to participate in the study, with recruitment conducted on a departmental basis. Second, during the implementation stage, consenting participants were provided with online access to the Organizational Culture Assessment Instrument (OCAI) followed by the Community Innovation Survey (CIS). To reduce potential response bias, the two surveys were administered on separate occasions, with a minimum interval of two weeks between them. Third, a statistical analysis phase was conducted using linear regression techniques, where organizational culture types served as independent variables and innovation types were treated as dependent variables. This analysis identified the extent to which each cultural dimension contributed to specific innovation outcomes. Fourth, the comparison phase involved company management reviewing the current level of the targeted innovation type and determining whether enhancement was required. Finally, during the adjustment phase, organizations implemented targeted strategies to modify their cultural characteristics in ways that would support the achievement of the desired innovation outcomes.

To minimize redundancy, a detailed account of the framework's implementation is presented only for the first organization, while a summary of outcomes is provided for the second and third organizations. The first organization, an information technology firm employing 781 staff members, comprised several core departments: sales and marketing, finance, services, delivery, human resources, and a miscellaneous group that included drivers, maintenance personnel, security staff, and procurement employees.

For the purposes of this study, employees from the human resources and miscellaneous departments were excluded, as their roles were not directly associated with the organization's core business activities. Consequently, 489 employees from the remaining four departments—those directly involved in core operations—were invited to participate. Of these, 372 employees completed the surveys, yielding a response rate of 76.1%. The distribution of respondents across the four departments is presented in **Table 1**.

Table 1. Summarizes the allocation of participating employees among the four departments in the first organization

Department	No. of employees	No. of responses	Percentage
Sales and marketing	7	7	100
Finance	41	41	100
Services	108	96	88.9
Delivery	333	228	68.5
Total	489	372	76.07

The Organizational Culture Assessment Instrument (OCAI) consists of six core dimensions encompassing a total of 24 items. Within each dimension, respondents are required to allocate percentage scores across four organizational culture types—clan culture (CC), adhocracy culture (AC), market culture (MC), and hierarchy culture (HC)—such that the combined total equals 100%. The overall score for each culture type is then computed by averaging the percentage allocations across the six dimensions.

This procedure is subsequently repeated to capture employees' perceptions of the preferred future cultural profile of their organization. As a result, both current and desired cultural configurations are obtained. The outcomes reflecting the existing and preferred levels of the four culture types are presented in **Table 2**.

The findings reported in **Table 2** indicate that the organization's prevailing culture is characterized by a mix of 26% clan culture, 20% adhocracy culture, 25% market culture, and 29% hierarchy culture. In contrast, respondents expressed a preference for a future cultural composition consisting of 28% clan culture, 21% adhocracy culture, 24% market culture, and 27% hierarchy culture.

Table 2. OCAI questionnaire results in the first company

Dimension	Existing %	Preferred %
CC	26	28
AC	20	21
MC	25	24
HC	29	27
Total	100	100

The results of the Community Innovation Survey (CIS), which was administered more than two weeks after the completion of the Organizational Culture Assessment Instrument (OCAI), revealed that employees attributed the highest relative importance to organizational innovation, accounting for 26.98% of the total innovation profile. This was followed by marketing innovation at 25.60%, product innovation at 25.55%, and process innovation at 21.95%.

Subsequently, multiple linear regression analysis was conducted to examine the relationships between organizational culture types and innovation outcomes. In this analysis, the four culture types served as independent variables, denoted by j=1,2,3,4, while the four innovation types were treated as dependent variables, denoted by i=1,2,3,4 The relationship between these variables was modeled using the following regression equation:

$$y_i = \beta_0 + \sum \beta_j x_j + \epsilon \quad (1)$$

where β_0 represents the intercept, β_j represents the coefficient of x_j and ϵ represents regression error.

The hypotheses for each innovation type relationship with culture types are as follows:

H_o: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$ meaning that there no relation between culture types and innovation type.

H_1: at least one $\beta_j \neq 0$, meaning that at least one of the culture types is useful in predicting or explaining this innovation type.

The regression analyses conducted for all four innovation categories produced statistically significant results ($p < 0.05$), leading to the rejection of the null hypothesis (H_0) in each case. These findings indicate that at least one organizational culture type significantly contributes to explaining variation in each innovation type. Separate regression models were estimated for product, process, organizational, and marketing innovation, yielding the following equations along with their corresponding adjusted R^2 values:

- **Product innovation**
- $= 6.108 + 0.280CC + 1.627AC - 2.816MC + 1.085HC$
- (adjusted $R^2 = 0.717$)
- **Process innovation**
- $= 7.554 - 0.078CC + 1.212AC - 2.496MC + 0.988HC$
- (adjusted $R^2 = 0.827$)
- **Organizational innovation**
- $= -2.890 + 0.496CC + 2.190AC - 0.698MC + 1.458HC$
- (adjusted $R^2 = 0.695$)
- **Marketing innovation**
- $= -0.156 + 0.552CC + 2.083AC - 0.879MC + 0.776HC$
- (adjusted $R^2 = 0.532$)

Each of these regression equations includes four unknown variables corresponding to the four organizational culture types: clan culture (CC), adhocracy culture (AC), market culture (MC), and hierarchy culture (HC). By assigning specific values to the dependent variables—that is, the innovation types—based on managerial priorities, it becomes possible to derive a cultural configuration that best supports a targeted innovation outcome.

To determine these priorities, a follow-up meeting was held with the three most senior managers of the organization, during which they were informed of the framework's progress and asked to define the relative importance of each innovation type.

The management team agreed that enhancing product innovation was the organization's primary strategic objective and decided that it should receive twice the emphasis of the remaining innovation types. Accordingly, product innovation was assigned a weight of 40%, while process, organizational, and marketing innovation were each assigned weights of 20%. It is important to note that other organizations may assign different weightings depending on their strategic goals and innovation priorities.

Solving the resulting system of four equations with four unknowns yielded the following values for the culture types: CC = −8, AC = 2.24, MC = −3.40, and HC = −4.11. The absolute values of these coefficients were then converted into percentage form to represent the desired cultural composition required to support the prioritized innovation profile, as presented below.

$$CC = \frac{8}{8 + 2.24 + 3.40 + 4.11} x100 = 45\% \quad (2)$$

$$AC = \frac{2.40}{8 + 2.24 + 3.40 + 4.11} x100 = 13\% \quad (3)$$

$$MC = \frac{3.40}{8 + 2.24 + 3.40 + 4.11} x100 = 19\% \quad (4)$$

$$HC = \frac{4.11}{8 + 2.24 + 3.40 + 4.11} x100 = 23\% \quad (5)$$

The current and target levels of the four organizational culture types are presented in **Table 3**. Based on these results, it is recommended that company management implement strategic interventions aimed at achieving the proposed cultural configuration—namely, 45% clan culture (CC), 13% adhocracy culture (AC), 19% market culture (MC), and 23% hierarchy culture (HC)—in order to establish an organizational environment conducive to strengthening product innovation. In practical terms, the ICEF outcomes suggest that the organization should substantially reinforce its clan-oriented culture, increasing it from the existing level of 26% to 45%, while simultaneously reducing the prevalence of the remaining three culture types to the specified target levels to support the desired innovation outcome.

When these findings and recommendations were communicated to senior management, the same three executives involved earlier confirmed their agreement with the framework's conclusions. Following this, they reported the formation of a dedicated internal committee tasked with developing and implementing a company-wide strategy designed to strengthen clan culture while moderating the influence of adhocracy, market, and hierarchy cultures, with the ultimate objective of enhancing product innovation performance.

An additional observation arising from the implementation phase relates to the consistency between the framework's recommendations and employees' cultural preferences as measured by OCAI. As shown in **Table 2**, employees indicated a preference for a modest increase in clan culture and a corresponding slight decrease in the other cultural dimensions. Although the magnitude of change desired by employees differed from that prescribed by ICEF, the direction of change was fully aligned. This convergence provides indirect support for the validity and practical relevance of the framework's outcomes within the organization.

The application of ICEF in the remaining two organizations produced similarly meaningful results, with adjusted R^2 values ranging between 0.5 and 0.8 across all innovation models. Management teams in both organizations also expressed their intention to act upon the framework's recommendations in order to enhance their respective targeted innovation outcomes.

Validation of ICEF Through Expert Opinion

In studies of this nature, it is critical to complement empirical implementation with both face and content validation to ensure that the proposed framework is comprehensive, meaningful, and internally consistent. Content validity refers to the extent to which the elements of an instrument adequately represent the construct being measured [40], while face validity concerns whether an instrument appears, on the surface, to measure what it is intended to measure [41]. To assess these forms of validity, Netemeyer *et al.* [42] recommend consulting subject-matter experts to evaluate the representativeness and adequacy of survey instruments, including conceptual definitions, item wording, response formats, scale anchors, and instructions.

Previous studies developing comparable frameworks have relied on expert panels ranging in size from as few as one to more than nine individuals, depending on expert availability and domain specificity (e.g., Cheaitou *et al.* [43]; Li *et al.* [44]). In the present study, feedback was solicited from seven experts. These individuals were senior managers and engineers actively engaged in strategic decision-making across a range of manufacturing and service industries. Detailed demographic and professional information about the experts is provided in **Table 4**.

Each expert participated in an individual face-to-face interview during which they were asked to evaluate the conceptual structure underpinning both the Organizational Culture Assessment Instrument (OCAI) and the Community Innovation Survey (CIS). For OCAI, the experts reviewed the five core dimensions defined by Cameron and Quinn [45], namely: the relationship between employees and the workplace environment, leadership style, mechanisms that foster organizational

cohesion, organizational strategy, and criteria for success. For CIS, the experts assessed the extent to which the questionnaire effectively captures the four innovation types and accurately reflects their respective levels within organizations.

The experts were specifically asked to assess the adequacy and representativeness of the questionnaire items, response formats, and scaling approaches associated with each dimension. Their evaluations were recorded using a 10-point Likert scale, which was deemed appropriate for capturing expert judgments, attitudes, and beliefs with sufficient sensitivity [39].

Framework reliability was assessed as part of the validation process using two established measures: Cronbach's alpha coefficient [46] and item-to-total correlations. According to guidelines proposed by Nunnally and Bernstein [47] and DeVellis [39], a Cronbach's alpha value of 0.70 or higher indicates acceptable internal consistency. Given the lack of a universally accepted threshold for item-to-total correlations, correlations exceeding 0.60 were considered indicative of strong associations in this study.

The evaluations provided by the seven experts regarding the adequacy of the two questionnaires are summarized in **Table 5**. As shown, the majority of item-to-total correlations were strong, and the overall Cronbach's alpha value was calculated as 0.928. These results provide strong evidence of the framework's reliability and confirm that ICEF effectively measures the constructs it was designed to assess.

Table 3. Existing and desired levels of each culture type

Culture type	Existing level (from OCAI)	Desired level (from multiple linear regression analysis)	Dif.
CC	26%	45%	+19
AC	20%	13%	−7
MC	25%	19%	−6
HC	29%	23%	−6

Table 4. Background information of the seven experts

No.	Position	Qualification	Experience
1	CEO	BSc in Computer Science, MBA	10
2	Sales and marketing director	BSc in Marketing	12
3	Data center manager	BSc and MSc in Computer Science	10
4	Service manager	BSc in Computer Engineering, MSc in Engineering Management	8
5	Senior networking engineer	BSc in Internet Technology	15
6	Head of project management office	BSc in Computer Engineering, PMI certified	10
7	Head of R&D department	PhD in Computer Science	14

Table 5. Mean, standard deviation and item-to-total correlation of items

Questions	Item	Mean	SD	Item-to-total correlations
Does OCAI describe employee's relation with the workplace?	Demonstrates relation between employees and workplace environment	4.8571	1.34519	0.899
Does OCAI describe the employee's emotions during the work?				
Does OCAI consider workplace rules?				
Does OCAI describe leadership style within the organization?	Demonstrates relation between employees and organization leadership	5.0000	0.81650	0.626
Does OCAI consider the relation between employees and their leaders?				
Does OCAI consider the appropriateness of management styles applied in the organization?	Finds out the reason that keeps organization employees together	5.5714	1.27242	0.921
Does OCAI describe most important management styles applied in the organization?				
Does OCAI consider the organization strategy and objectives of the business?	Examines organization strategy in general	4.5714	0.97590	0.869
Does OCAI consider the criteria needed by the management to succeed?	Examines success keys of the organization	5.7143	1.11270	0.850
Does CIS cover the most important points of product innovation?	Demonstrates product innovation in the organization	4.2857	0.75593	0.671
Does CIS demonstrate the services offered by your organization?				
Does CIS consider the most important processes within the organization and how to develop them?	Demonstrates process innovation in the organization	4.4286	1.39728	0.949

Does CIS describe the most important methods and practices that will improve performance of the organization?	Demonstrates organizational innovation in the organization	5.4286	0.97590	0.271
Does CIS consider marketing strategies and concepts?	Demonstrates marketing innovation in the organization	5.0000	0.81650	0.626

Discussion

Organizational culture plays a critical role in shaping creativity and innovation within firms. A number of previous studies have examined the relationship between culture and innovation. For instance, Naranjo-Valencia *et al.* [48] analyzed organizational culture types in Spanish firms and explored their association with overall innovation performance. Similarly, Hogan and Coote [6] investigated this relationship using an alternative cultural framework. While these studies contributed valuable empirical insights, their findings largely characterized the culture–innovation relationship in broad positive or negative terms, without offering concrete, actionable guidance on how organizations might deliberately modify their cultural profiles to achieve specific innovation objectives. Moreover, these studies typically focused on a single dominant culture type, thereby overlooking the coexistence of multiple cultural dimensions within organizations, which often operate simultaneously at varying levels.

Conversely, another stream of research has focused on the influence of different innovation types on organizational performance (e.g., Hassan [49]; Karabulut [50]). However, such studies generally did not incorporate organizational culture as a mediating or enabling factor, resulting in an incomplete understanding of the mechanisms through which innovation outcomes are shaped.

The Innovative Culture Enhancement Framework (ICEF) addresses these limitations by explicitly accounting for the existing distribution of multiple culture types within an organization and by identifying the cultural configuration required to strengthen a targeted form of innovation. To the best of the authors' knowledge, ICEF represents the first empirically grounded framework in the literature that provides a systematic mechanism for enhancing specific innovation types through deliberate and data-driven adjustments to organizational culture. Furthermore, the framework's application across three organizations, combined with validation through expert evaluation, yielded positive evidence regarding its feasibility, reliability, and practical relevance.

Conclusions

The primary objective of this study was to develop a structured framework—the Innovative Culture Enhancement Framework (ICEF)—to assist organizations in strategically adjusting their cultural profiles in order to enhance specific types of innovation. The framework begins by assessing existing organizational culture using the Organizational Culture Assessment Instrument (OCAI), followed by the evaluation of innovation types and their relative prevalence through a modified version of the Community Innovation Survey (CIS). ICEF then quantifies the extent to which each culture type contributes to each innovation type, enabling organizations to identify the cultural adjustments necessary to support their innovation priorities.

The framework was empirically tested in three medium-sized organizations to assess its practicality and effectiveness. In all cases, the implementation produced positive outcomes, supporting the conclusion that ICEF is both workable and adaptable across different organizational contexts. Additional validation was achieved through expert assessment of the framework's concepts and measurement instruments. Statistical analysis of expert feedback revealed strong item-to-total correlations across all evaluated dimensions and a high Cronbach's alpha coefficient of 0.928, indicating excellent internal consistency and reliability. These results confirm that ICEF effectively fulfills its intended purpose.

Collectively, the findings suggest that systematically modifying organizational culture in line with the ICEF methodology can serve as a powerful mechanism for enhancing targeted innovation outcomes. Although cultural transformation is inherently gradual and may require sustained effort over several months or even years, fostering innovation remains a critical requirement for long-term organizational survival and competitiveness.

Nevertheless, the proposed framework and its current validation should be interpreted with caution. As ICEF represents an initial contribution in this research domain, further refinement and validation are warranted. Future studies may extend the framework by incorporating additional organizational factors or refining its analytical components. Moreover, longitudinal validation—entailing repeated cycles of implementation, adjustment, and reassessment over extended periods (e.g., three years)—is necessary to fully evaluate the framework's long-term effectiveness. While such analysis was beyond the scope of the present study, it represents a promising direction for future research.

Acknowledgments: None

Conflict of interest: None

Financial support: None

Ethics statement: None

References

1. Dewar R, Dutton J. The adoption of radical and incremental innovations: an empirical analysis. Manag Sci. 1986;32(11):1422-33.
2. Dosi G. Technological paradigms and technological trajectories: a suggested interpretation of the determinants and directions of technical change. Res Policy. 1982;11(3):147-62.
3. Giannopoulou E, Barlatier PJ, Pénin J. Same but different? Research and technology organizations, universities and the innovation activities of firms. Res Policy. 2019;48(1):223-33.
4. Hamel G. Bringing silicon valley inside. Harv Bus Rev. 1999;77(5):70-84.
5. Herkema S. A complex adaptive perspective on learning within innovation projects. Learn Organ. 2003;10(6):336-40.
6. Hogan S, Coote L. Organizational culture, innovation, and performance: a test of Schein's model. J Bus Res. 2014;67(8):1609-21.
7. OECD, Eurostat. Guidelines for collecting and interpreting innovation data - Oslo manual. 3rd ed. Paris, France: Organization for Economic Co-operation and Development and Statistical Office of the European Communities; 2005.
8. Revilla E, Rodríguez-Prado B. Building ambidexterity through creativity mechanisms: contextual drivers of innovation success. Res Policy. 2018;47(9):1611-25.
9. Tidd J, Bessant J. Managing innovation: integrating technological, market and organizational change. 4th ed. West Essex, UK: John Wiley & Sons; 2009.
10. Burns TE, Stalker GM. The management of innovation. London: Tavistock Publishing House; 1961.
11. Raisch S, Birkinshaw J, Probst G, Tushman ML. Organizational ambidexterity: balancing exploitation and exploration for sustained performance. Organ Sci. 2009;20(4):685-95.
12. Hansen MT, Birkinshaw J. The innovation value chain. Harv Bus Rev. 2007;85(6):121-30.
13. Abdel Razek RH, Alsanad DS. Auditing and comparing innovation management in organizations. Glob J Bus Res. 2014;8(3):49-17.
14. Tellis GJ, Prabhu JC, Chandy RK. Radical innovation across nations: the preeminence of corporate culture. J Mark. 2009;73:3-23.
15. Fisher EM, Wilmoth MC. Do I take the job?: assessing fit with the organization. J Prof Nurs. 2018;34(2):82-6.
16. Hutchison N, Burke P, See Tao HY, Kothari SJ, Makwana D, Luna S. The influence of organization alignment on the effectiveness of systems engineers. Procedia Comput Sci. 2019;153:80-90.
17. Jacksyte K, Dressler WW. Organizational culture and innovation in nonprofit human service organizations. Adm Soc Work. 2005;29(2):23-41.
18. Schein EO. Organizational culture and leadership. United States: Jossey-Bass; n.d.
19. Watson TJ. Organising and managing work. 2nd ed. United Kingdom: Pearson Education Limited; 2006.
20. Matsumoto D. Culture and psychology. Pacific Grove, USA: Brooks/Cole; 1996.
21. Martin J. Organizational change. Oxford: Basil Blackwell; 2004.
22. Wood JM, Zeffane RM, Fromholtz M, Wiesner R, Morrison R, Factor A, et al. Organisational behaviour: core concepts and applications. 4th Australasian ed. Brisbane: John Wiley & Sons; 2016.
23. Cameron K, Quinn RE. Diagnosing and changing organizational culture: based on the competing values framework. Boston, USA: W; 1999.
24. Chang S, Lee M. The effects of organizational culture and knowledge management mechanisms on organizational innovation: an empirical study in Taiwan. Bus Rev. 2007;7(1):295-301.
25. Obenchain A, Johnson W. Product and process innovation in service organizations: the influence of organizational culture in higher education institutions. J Appl Manag Entrep. 2004;9(3):91-113.
26. Jaskyte K, Kisieliene A. Organizational innovation: a comparison of nonprofit human-service organizations in Lithuania and the United States. Int Soc Work. 2006;49(2):76-165.
27. Skerlavaj M, Song JH, Lee Y. Organizational learning culture, innovative culture and innovations in South Korean firms. Expert Syst Appl. 2010;37(9):6390-403.
28. Büschgens T, Bausch A, Balkin DB. Organizational culture and innovation: a meta-analytic review. J Prod Innov Manag. 2013;30(4):763-81.
29. Jamrog J, Vickers M, Bear D. Building and sustaining a culture that supports innovation. Hum Resour Plan. 2006;29(3):9-19.

30. Crossan M, Apaydin M. A multidimensional framework of organizational innovation: a systematic review of the literature. J Manag Stud. 2010;47(6):91-154.
31. McLean L. Organizational culture's influence on creativity and innovation: a review of the literature and implications for human resource development. Adv Dev Hum Resour. 2005;7(2):46-226.
32. Hartnell CA, Ou AY, Kinicki A. Organizational culture and organizational effectiveness: a meta-analytic investigation of the competing values framework's theoretical suppositions. J Appl Psychol. 2011;96(4):677-94.
33. Quinn RE, Rohrbaugh J. A spatial model of effectiveness criteria: towards a competing values approach to organizational analysis. Manag Sci. 1983;29(3):363-77.
34. Stock G, McFadden K, Gowen C. Organizational culture, critical success factors, and the reduction of hospital errors. Int J Prod Econ. 2007;106:92-368.
35. Bradley L, Parker R. Organizational culture in the public sector. Australia: Institute of Public Administration Australia (IPAA), IPAA National; 2001.
36. Department for Business Innovation and Skills. The community innovation survey. DBIS – United Kingdom; 2012. Available from: https://webarchive.nationalarchives.gov.uk/20121204170456/http://www.bis.gov.uk/policies/science/science-innovation-analysis/cis
37. Bianchini S, Llerena P, Martino R. The impact of R&D subsidies under different institutional frameworks. Struct Change Econ Dyn. 2019;50:65-78.
38. Bou JC, Satorra A. Multivariate exploratory data analysis for large databases: an application to modelling firms' innovation using CIS data. BRQ Bus Res Q. 2018;1-19.
39. DeVellis RF. Scale development: theory and applications. 2nd ed. Thousand Oaks, CA: Sage; 2003.
40. Haynes S, Richard DC, Kubany ES. Content validity in psychological assessment: a functional approach to concepts and methods. Psychol Assess. 1995;7(3):238-47.
41. Nevo B. Face validity revisited. J Educ Meas. 1995;22(4):287-93.
42. Netemeyer RG, Bearden WO, Sharma S. Scaling procedures: issues and applications. Thousand Oaks, CA: Sage; 2003.
43. Cheaitou A, Larbi R, Al Housani B. Decision making framework for tender evaluation and contractor selection in public organizations with risk considerations. Socioecon Plan Sci. 2018;1-12.
44. Li Z, Shen W, Xu J, Lev B. Bilevel and multi-objective dynamic construction site layout and security planning. Autom Constr. 2015;57:1-16.
45. Cameron K, Quinn RE. Diagnosing and changing organizational culture: based on the competing values framework. San Francisco, USA: Josey-Bass; 2011.
46. Cronbach LJ. Caatisot P. 31:93-6.
47. Nunnally JC, Bernstein IH. Psychometric theory. 3rd ed. New York, NY: McGraw-Hill; 1994.
48. Naranjo-Valencia JC, Jiménez-Jimén D, Sanz-Valle R. Studying the links between organizational culture, innovation, and performance in Spanish companies. Rev Lat Am Psicol. 2016;48(1):30-41.
49. Hassan M. Effects of innovation types on firm performance: an empirical study on Pakistan's manufacturing sector. Pakistan J Commer Soc Sci. 2013;7(2):243-62.
50. Karabulut AT. Effects of innovation types on performance of manufacturing firms in Turkey. Procedia Soc Behav Sci. 2015;195:1355-64.