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Designing and Validating an Indigenous Productivity Model for Nongovernmental Cultural Organizations Using a Mixed-Methods Approach

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ABSTRACT

This study aimed to design and validate an indigenous productivity model for nongovernmental cultural organizations by identifying its principal dimensions, indicators, causal relationships, and structural validity. The study was applied in purpose and used an exploratory sequential mixed-methods design. In the qualitative phase, semi-structured interviews were conducted with experts in cultural management, nongovernmental organizations, human-resource management, cultural sociology, and public policymaking, selected through purposive and snowball sampling until theoretical saturation. The interview data were analyzed through inductive thematic analysis using MAXQDA. The extracted indicators were then screened and refined through three rounds of fuzzy Delphi analysis. In the quantitative phase, a researcher-developed questionnaire was administered to managers and employees of cultural organizations in Khuzestan Province using proportionate stratified random sampling, with sample size determined through Cochran's formula. Fuzzy DEMATEL, FCMapper scenario analysis, confirmatory factor analysis, structural equation modeling, bootstrapping, and WarpPLS moderation analysis were used to validate the model and examine relationships among its dimensions. The final model consisted of four significant dimensions: managerial, human, structural, and environmental factors. Managerial factors showed the highest network centrality, followed by human, structural, and environmental factors. All measurement models demonstrated acceptable fit, with χ^2/df values ranging from 1.79 to 2.96, RMSEA values from 0.049 to 0.093, and NFI, GFI, CFI, and IFI values from 0.98 to 1.00. All standardized factor loadings were significant. Structural path coefficients ranged from 0.438 to 0.919, and all bootstrapped t-values exceeded 1.96, confirming the hypothesized relationships. The moderation model also showed strong overall fit, with GoF = 0.498, APC = 0.149 ($p = 0.011$), ARS = 0.344 ($p < 0.001$), and AVIF = 2.291. Productivity in nongovernmental cultural organizations is a multidimensional and interdependent phenomenon that requires simultaneous improvement in managerial coherence, human capabilities, structural support, and environmental responsiveness.

Keywords: Organizational Productivity; Nongovernmental Cultural Organizations; Indigenous Model; Mixed Methods; Fuzzy Delphi; Fuzzy DEMATEL; Structural Equation Modeling

Introduction

Productivity is one of the central criteria by which the effectiveness, sustainability, and social value of organizations are assessed. Although the concept was initially associated mainly with economic output and the efficient use of material resources, contemporary organizational research treats productivity as a multidimensional construct shaped by managerial, structural, human, technological, cultural, and environmental conditions. In this broader understanding, productivity refers not merely to the volume of outputs produced from available inputs, but also to the quality of organizational performance, the capacity to respond to stakeholder needs, the ability to learn and innovate, the sustainability of results, and the degree

to which organizational objectives are achieved through the optimal use of financial, human, informational, and social resources. This expanded interpretation is particularly important for organizations whose outputs are not exclusively financial or readily quantifiable, including educational, public, cultural, and nongovernmental institutions. In such settings, productivity must be evaluated through a combination of efficiency, effectiveness, adaptability, accountability, stakeholder participation, knowledge utilization, and social impact [1, 2].

Nongovernmental cultural organizations occupy a distinctive position within contemporary societies. These organizations contribute to cultural development, identity formation, public participation, social cohesion, community education, artistic production, preservation of cultural heritage, and the transmission of social values. Unlike commercial enterprises, however, their performance cannot be adequately evaluated solely on the basis of profitability, production volume, or financial return. Their missions are often normative and social, their resources are frequently unstable, their stakeholders are diverse, and their outcomes may emerge gradually and indirectly. Consequently, productivity in nongovernmental cultural organizations is a complex and context-sensitive phenomenon. It depends on the ability of these organizations to transform limited resources into meaningful cultural outcomes while maintaining legitimacy, responsiveness, organizational continuity, and public trust. A productivity model for such organizations must therefore include both internal organizational capacities and the external cultural, political, economic, and social conditions that shape their operations.

The complexity of productivity in cultural organizations becomes more evident when the interaction among human, managerial, structural, and environmental factors is considered. Recent research has shown that human-resource productivity is influenced not by a single organizational variable but by the combined effects of individual characteristics, organizational arrangements, cultural conditions, and environmental pressures. Employees' knowledge, skills, motivation, creativity, commitment, and adaptability interact with organizational policies, leadership practices, structural arrangements, and broader contextual factors to determine the level of productivity achieved. This systemic perspective indicates that productivity improvement requires a coordinated model rather than isolated administrative interventions [3]. For nongovernmental cultural organizations, where professional activity is highly dependent on creativity, communication, voluntary participation, cultural sensitivity, and social interaction, the integration of these factors is particularly critical.

Leadership is among the most important determinants of organizational productivity because it shapes priorities, allocates resources, influences employee behavior, and determines the extent to which organizational members participate in decision-making and innovation. Transformational leadership can improve productivity by communicating a shared vision, creating commitment, encouraging learning, and empowering employees, whereas transactional leadership can strengthen performance through clear expectations, performance monitoring, and reward mechanisms. The relative value of these approaches depends on organizational context, but evidence indicates that leadership style directly affects workplace culture and productivity [4]. Human-resource leadership also influences productivity indirectly by shaping organizational culture, collaboration, innovation, and employee engagement. When leaders create an environment characterized by trust, knowledge sharing, professional support, and participation, employees are more likely to contribute their competencies and creative capacities to organizational goals [5].

The role of leadership is especially important under conditions of uncertainty and change. Cultural organizations operate in environments affected by rapid transformations in audience preferences, communication technologies, public policy, cultural consumption, and patterns of social participation. Organizations that rely on rigid administrative practices may be

unable to respond effectively to such changes. Transformational leadership can enhance organizational resilience by promoting adaptive cultures, supporting learning, and enabling organizations to modify their structures and processes in response to environmental pressures [6]. This capacity is essential for nongovernmental cultural organizations because their survival often depends on their ability to respond quickly to changes in public needs, sources of financial support, regulatory conditions, and stakeholder expectations.

Organizational culture also plays a fundamental role in shaping productivity. Culture establishes the values, assumptions, norms, and behavioral expectations through which employees interpret organizational goals and coordinate their actions. A supportive culture can encourage collaboration, responsibility, innovation, and commitment, whereas a fragmented or excessively bureaucratic culture can weaken motivation and obstruct effective performance. Empirical and review-based studies have consistently identified organizational culture as an important predictor of employee productivity, particularly when it is combined with effective leadership and a supportive work environment [7, 8]. In cultural organizations, this relationship is even more pronounced because employees and volunteers frequently rely on shared meanings, professional identity, intrinsic motivation, and commitment to cultural values rather than on material incentives alone.

However, organizational culture may contain contradictory tendencies. Cultural organizations often need stability in order to preserve their mission and identity, yet they must simultaneously remain flexible enough to innovate and respond to change. An ambivalent culture may contain both entrepreneurial and conservative elements. The ability to manage such contradictions through organizational ambidexterity enables organizations to exploit existing competencies while exploring new opportunities [9]. For nongovernmental cultural organizations, ambidexterity may involve maintaining cultural authenticity while adopting new technologies, preserving institutional experience while encouraging experimentation, and sustaining established stakeholder relationships while developing new audiences and partnerships. Therefore, productivity depends not on eliminating organizational tensions but on managing them constructively.

Organizational learning and knowledge management constitute another central dimension of productivity. Cultural organizations generate and use substantial forms of tacit and explicit knowledge, including knowledge of audiences, cultural practices, artistic production, social networks, local communities, public policy, and program implementation. When this knowledge remains individualized or undocumented, organizations become vulnerable to employee turnover, fragmented decision-making, and repeated operational errors. By contrast, knowledge creation, storage, exchange, and application can improve coordination, innovation, and organizational continuity. The maturity of knowledge-management systems is therefore an important indicator of organizational readiness and productivity [2]. Similarly, electronic human-resource management can support knowledge creation by integrating employee information, training, performance assessment, communication, and organizational learning processes [10].

The influence of knowledge on productivity is not automatic; it depends on dynamic organizational capabilities and the cultural context in which knowledge workers operate. Knowledge-based dynamic capabilities allow organizations to identify relevant knowledge, integrate it into decision-making, and reconfigure resources in response to change. The productivity of knowledge workers increases when these capabilities are supported by an organizational culture that values learning, experimentation, collaboration, and professional autonomy [11]. This relationship has direct relevance to nongovernmental cultural organizations because many of their employees are knowledge workers whose performance depends on intellectual, creative, communicative, and interpretive competencies rather than repetitive operational tasks.

Organizational learning also strengthens human-resource productivity by increasing employees' ability to adapt, solve problems, and use organizational experience. Cultural capital, understood as the knowledge, values, competencies, and symbolic resources possessed by individuals and organizations, can reinforce this process. When organizations invest in learning and cultural capital, employees become more capable of interpreting complex environments, interacting with diverse stakeholders, and producing culturally appropriate solutions [12]. In nongovernmental cultural organizations, professional development should therefore extend beyond technical training and include cultural intelligence, communication, community engagement, creativity, and strategic awareness.

Cultural intelligence is particularly important because cultural organizations interact with heterogeneous communities and audiences. The increasing diversity of social groups, values, identities, and patterns of cultural consumption requires organizations to understand multiple cultural perspectives and adapt their communication and programming accordingly. Scenario-based research on cultural intelligence has emphasized the need to anticipate future cultural developments and prepare organizations for alternative social conditions [13]. A productivity model that ignores cultural intelligence may privilege short-term administrative efficiency while failing to assess whether organizational outputs are socially appropriate, inclusive, and responsive to emerging cultural realities.

Employee engagement and motivation are equally important. Productivity decreases when employees experience low participation, limited recognition, weak communication, occupational exhaustion, or uncertainty about organizational priorities. Conversely, employees who perceive their work as meaningful and who have opportunities to participate in decision-making are more likely to demonstrate commitment, initiative, and innovative behavior. The growing use of remote and digitally mediated work has further highlighted the importance of engagement strategies, flexible communication, and organizational support in maintaining innovation and productivity [14]. Although many nongovernmental cultural organizations depend on face-to-face activities, they increasingly use digital platforms for project coordination, public communication, fundraising, training, and cultural dissemination. Their productivity models must therefore account for both physical and virtual forms of employee participation.

Performance appraisal represents another mechanism through which productivity can be strengthened. Traditional appraisal systems often focus on compliance and individual output while neglecting learning, innovation, collaboration, and organizational culture. Innovative performance-appraisal systems can improve productivity when they provide meaningful feedback, align individual activities with organizational objectives, and encourage professional development [15]. Coaching, organizational culture, and appraisal have also been identified as interconnected determinants of employee productivity, suggesting that evaluation systems are most effective when integrated with developmental and cultural practices rather than implemented as isolated control mechanisms [16]. For cultural organizations, performance appraisal should therefore include qualitative dimensions such as stakeholder engagement, creativity, cultural relevance, teamwork, adaptability, and contribution to collective learning.

The structural characteristics of organizations can either support or restrict productivity. Excessive centralization, inflexible regulations, complicated administrative procedures, weak communication networks, inadequate resources, and unclear responsibilities reduce organizational responsiveness and create inefficiencies. In contrast, transparent processes, flexible structures, stable resources, effective communication, and interorganizational collaboration facilitate coordinated action. The design of governance models has shown that complex organizational phenomena require the integration of multiple

dimensions and the identification of relationships among institutional actors, processes, technologies, and accountability mechanisms [17]. This systems-oriented approach is applicable to nongovernmental cultural organizations because their productivity depends not only on internal operations but also on their interactions with governmental institutions, local communities, donors, artists, educational organizations, and other cultural bodies.

The need for multidimensional modeling has also been demonstrated in studies that use interpretive structural modeling and other systemic methods to identify relationships among complex organizational factors. Such approaches help distinguish foundational drivers from dependent outcomes and clarify how different components reinforce or constrain one another [18]. In productivity research, this distinction is essential because some factors, such as leadership and policy coherence, may exert broad causal effects, whereas others, such as employee satisfaction or organizational outcomes, may be more strongly influenced by the system. Identifying these relationships allows managers to prioritize interventions and allocate resources more effectively.

Digital transformation adds another layer of complexity. Cultural organizations increasingly depend on digital communication, electronic service delivery, social media, data management, and online stakeholder engagement. Digital marketing models developed for knowledge-based organizations emphasize the interaction of technological infrastructure, organizational capability, audience analysis, and strategic communication [19]. Although digitalization can increase reach and reduce some operational costs, it can also create new demands for employee competencies, cybersecurity, content management, and organizational coordination. Productivity models must therefore consider digital readiness and the ability to integrate technology with cultural goals.

Research on productivity-oriented organizational transformation has further shown that cultural change must be managed systematically. Attempts to improve productivity may fail when new structures or procedures conflict with existing values, habits, and informal relationships. A grounded model of organizational-culture transformation in the education system demonstrated that productivity improvement requires changes in leadership, organizational values, employee participation, communication, learning, and structural support [20]. This finding is relevant to nongovernmental cultural organizations, in which institutional identity and informal cultural norms may be especially powerful. Productivity initiatives should therefore be designed in a manner that respects organizational identity while enabling gradual and participatory transformation.

Despite the growing body of research on leadership, culture, human resources, knowledge management, performance appraisal, resilience, and organizational productivity, several gaps remain. First, much of the existing literature examines productivity in commercial, public, educational, technological, or professional-service settings. The distinctive conditions of nongovernmental cultural organizations have received comparatively limited attention. Second, previous studies often focus on a restricted set of factors and do not integrate managerial, human, structural, and environmental dimensions within a single explanatory framework. Third, models developed in other national or organizational contexts may not adequately reflect the regulatory, cultural, economic, and institutional characteristics of Iranian nongovernmental cultural organizations. Fourth, many studies use predetermined quantitative instruments, which may overlook context-specific dimensions that emerge from the lived experiences of cultural managers and experts. Finally, few studies combine qualitative exploration, expert consensus, causal analysis, and quantitative validation in the development of an indigenous productivity model.

An indigenous model is necessary because productivity is shaped by the institutional environment in which an organization operates. The meaning of effective leadership, appropriate participation, regulatory flexibility, stakeholder engagement, and

cultural relevance varies across societies and organizational sectors. Models imported without contextual adaptation may emphasize dimensions that are less important locally while neglecting factors that are central to organizational practice. The development of a context-sensitive framework should therefore begin with the experiences and judgments of local experts and organizational actors. It should then subject the identified dimensions to systematic screening, causal prioritization, and empirical validation. A sequential mixed-methods design is particularly suitable for this purpose because qualitative inquiry can identify context-specific components, fuzzy expert methods can reduce uncertainty and establish consensus, and quantitative modeling can test the structure and relationships of the resulting framework.

Accordingly, the present study aimed to design and validate an indigenous productivity model for nongovernmental cultural organizations through an exploratory sequential mixed-methods approach.

Methodology

This study was applied in purpose and employed an exploratory sequential mixed-methods design. The applied orientation of the research reflected its objective of developing practical knowledge that could be used to improve productivity in nongovernmental cultural organizations. Because organizational productivity in cultural institutions is a multidimensional and context-dependent phenomenon, the study began with a qualitative phase to explore the experiences, interpretations, and professional judgments of individuals who possessed extensive knowledge of cultural organizations and their operational environment. The qualitative phase was followed by a quantitative phase intended to screen, validate, weight, prioritize, and examine the relationships among the dimensions, components, and indicators identified during the initial exploration. Accordingly, the qualitative strand received priority because it provided the empirical foundation for developing the preliminary indigenous model, while the quantitative strand was used to refine and validate the model and determine the relative importance and causal position of its components. The two phases were connected through instrument development, meaning that the qualitative findings were transformed into measurable indicators and subsequently incorporated into expert questionnaires and the final productivity assessment instrument.

The qualitative study population consisted of university faculty members, senior managers, cultural policy specialists, executives of nongovernmental cultural organizations, and professionals with substantial academic or practical experience in organizational productivity, cultural management, performance evaluation, and the administration of civil-society organizations. Participants were selected through a combination of purposive judgmental sampling and snowball sampling. Initially, information-rich individuals were identified according to predetermined expertise criteria, including relevant academic qualifications, managerial or professional experience in the cultural sector, familiarity with nongovernmental organizations, and direct knowledge of productivity and performance-management processes. At the end of each interview, participants were invited to recommend other qualified specialists who could contribute additional or contrasting perspectives. Sampling and data collection continued concurrently until theoretical saturation was reached, defined as the point at which subsequent interviews produced no substantively new codes, concepts, categories, or relationships. Because the required qualitative sample size could not be determined in advance, adequacy was judged according to the richness, diversity, and saturation of the data rather than a fixed numerical criterion.

The quantitative population comprised managers and employees of nongovernmental cultural organizations operating in Ahvaz and, where applicable, other relevant areas of Khuzestan Province. Participants in this phase were selected through

proportionate stratified random sampling so that the main organizational and occupational strata were adequately represented. The strata were formed according to characteristics such as organizational unit, managerial level, occupational category, or type of cultural activity, depending on the formal structure of the participating organizations. The quantitative sample size was estimated using Cochran's formula on the basis of the known population size, the accepted confidence level, and the permissible sampling error. Eligibility required current employment or managerial involvement in a nongovernmental cultural organization, sufficient familiarity with its activities and internal processes, and willingness to participate voluntarily. Incomplete questionnaires and responses showing substantial missing data or patterned answering were excluded before statistical analysis. Ethical principles were observed throughout both phases. Participants were informed about the purpose of the research, the voluntary nature of participation, the confidentiality of their information, and their right to withdraw without consequence. Interview files and questionnaire data were anonymized through participant codes, and no personally identifying information was reported.

The principal data-collection instrument in the qualitative phase was an in-depth semi-structured interview protocol. The protocol was developed after reviewing the theoretical foundations and previous studies concerning organizational productivity, performance evaluation, cultural management, civil-society organizations, and the institutional characteristics of nongovernmental cultural organizations. The interview questions were open-ended and addressed the meaning and manifestations of productivity in cultural organizations, the organizational and environmental conditions influencing productivity, the human, managerial, structural, financial, cultural, technological, and social factors associated with productive performance, the expected outcomes of an effective productivity model, the barriers faced by nongovernmental cultural organizations, and the mechanisms through which productivity could be strengthened and sustained. The semi-structured format ensured that the main topics were consistently covered across interviews while allowing the interviewer to ask probing questions, clarify ambiguous statements, explore newly emerging ideas, and encourage participants to explain their experiences freely. With participants' permission, the interviews were audio-recorded and subsequently transcribed verbatim. Field notes and analytical memos were also prepared to document contextual observations, preliminary interpretations, emerging patterns, and methodological decisions.

The rigor of the qualitative data was evaluated through credibility, dependability, confirmability, and transferability procedures. Credibility was strengthened by selecting knowledgeable participants, conducting prolonged and focused interviews, comparing data across participants with different professional backgrounds, and returning summaries or interpretations to selected participants for member checking. Peer review and expert examination were used to assess whether the extracted codes and themes accurately represented the interview material. Dependability was enhanced by applying a consistent interview protocol, documenting the stages of data collection and analysis, maintaining an audit trail, and using a second coder to independently analyze a subset of the interviews. Intercoder reliability was assessed through the percentage agreement formula based on the number of coding agreements relative to the total number of codes assigned by the two coders. Five interviews were independently coded by the researcher and a doctoral-level specialist familiar with qualitative content analysis, and the resulting agreement coefficient was approximately 90%, indicating acceptable coding reliability. Confirmability was supported by preserving interview transcripts, coding records, memos, category-development documents, and records of revisions made during model development. Transferability was facilitated by describing the participants, organizational setting, sampling procedure, and analytical process in sufficient detail.

The quantitative instruments were developed directly from the qualitative findings. Following the completion of thematic analysis, the identified themes, subthemes, concepts, and indicators were converted into questionnaire items. The initial expert questionnaire was designed to evaluate the relevance, clarity, necessity, and adequacy of the proposed productivity indicators. It also included demographic and professional questions concerning variables such as gender, age, educational attainment, occupational position, years of experience, and organizational affiliation. The specialized section was constructed using a five-point Likert response format ranging from strongly disagree to strongly agree. The wording of the items was reviewed to ensure conceptual correspondence with the qualitative findings, clarity for respondents, avoidance of double-barreled statements, and suitability for the organizational and cultural context.

The content validity of the questionnaire was assessed by a panel of university professors, cultural-management specialists, senior organizational managers, and experts in productivity and research methodology. The panel examined whether the items adequately covered the conceptual domain of productivity in nongovernmental cultural organizations and whether each item was relevant to its intended component. Recommended revisions concerning wording, redundancy, conceptual overlap, and indicator placement were incorporated before the instrument was administered. Construct validity was subsequently examined through exploratory and confirmatory factor analyses. Exploratory factor analysis was used to investigate the underlying dimensional structure of the newly developed instrument, while confirmatory factor analysis was applied to test the adequacy of the measurement model and the correspondence between the observed indicators and their latent constructs. Model adequacy was evaluated through commonly accepted goodness-of-fit indices, factor loadings, convergent validity, and discriminant validity. Internal consistency reliability was assessed using Cronbach's alpha for the overall instrument and each identified dimension. Coefficients of 0.70 or higher were considered evidence of acceptable reliability.

Separate expert questionnaires were also prepared for the fuzzy Delphi and fuzzy DEMATEL procedures. In the fuzzy Delphi questionnaire, experts evaluated the importance and appropriateness of each indicator using linguistic judgments that were converted into fuzzy numbers. Repeated rounds of expert consultation were conducted, and anonymized summaries of the group responses were returned to participants so that they could reconsider and, where necessary, revise their judgments. The rounds continued until an acceptable level of consensus was reached and the difference between successive rounds did not exceed the predetermined threshold. In the fuzzy DEMATEL questionnaire, experts assessed the degree to which each productivity factor directly influenced the other factors. Linguistic evaluations ranging from no influence to very high influence were transformed into fuzzy numerical values. These judgments formed the basis for constructing the direct-relation matrix and identifying the causal structure of the model.

Qualitative data analysis was conducted concurrently with data collection using qualitative content analysis with an inductive thematic-analysis orientation. The recorded interviews were transcribed verbatim, checked against the audio files, anonymized, and imported into MAXQDA software. MAXQDA was selected because of its compatibility with Persian-language texts and its capacity to support document organization, coding, memo writing, retrieval, categorization, and comparison across interviews. The analytical process began with repeated reading of the transcripts and listening to the audio recordings to achieve immersion in the data. Meaningful sentences, phrases, and paragraphs related to organizational productivity were then identified as units of analysis. Initial codes were assigned as closely as possible to participants' explicit statements so

that the analysis remained grounded in the manifest content of the interviews and did not depend excessively on speculative interpretation.

The initial codes were continuously compared across interviews and grouped according to conceptual similarity and difference. Redundant codes were merged, ambiguous codes were revised, and conceptually distinct codes were separated. Through iterative comparison, related codes were organized into subcategories, broader categories, and overarching themes representing the dimensions of the indigenous productivity model. The researcher repeatedly moved between the original transcripts, codes, categories, and emerging themes to verify that the developing structure adequately represented the data. Attention was given to the frequency of an idea, its perceived importance to participants, its conceptual relevance to the research question, and its explanatory value within the emerging model. Analytical memos were used to record relationships among categories, alternative interpretations, contextual conditions, barriers, enabling mechanisms, and expected outcomes. The qualitative phase culminated in a preliminary conceptual framework containing the principal dimensions, components, and indicators of productivity in nongovernmental cultural organizations.

The indicators derived from the qualitative phase were screened through the fuzzy Delphi method. Expert judgments expressed through linguistic variables were converted into triangular or trapezoidal fuzzy numbers, depending on the scale used in the questionnaire. For each indicator, the fuzzy mean of the experts' judgments was calculated. After each round, the group mean and the degree of deviation of each expert's judgment from the group response were determined and communicated anonymously to the panel. Experts were then given an opportunity to revise their assessments in light of the collective feedback. The iterative process continued until the difference between successive rounds reached the predetermined consensus criterion, with a maximum acceptable difference of 0.20. The final fuzzy values were defuzzified to produce crisp scores, and indicators failing to meet the established acceptance threshold were eliminated or revised. This procedure reduced ambiguity in expert judgment, controlled the influence of extreme opinions, and ensured that the retained indicators reflected collective professional agreement.

After indicator screening, the relationships among the validated productivity factors were analyzed using the fuzzy DEMATEL technique. Expert assessments of the direct influence of each factor on every other factor were converted from linguistic judgments into fuzzy values and aggregated to construct the initial direct-relation matrix. The matrix was normalized, and the total-relation matrix was calculated to represent both direct and indirect influences among the factors. The sum of each row represented the total influence exerted by a factor on the other components, whereas the sum of each column represented the total influence received by that factor. For each component, the prominence index was calculated by adding the row and column sums, thereby indicating the overall importance and degree of involvement of the component within the system. The causal index was obtained by subtracting the column sum from the row sum. Positive causal-index values identified influential or cause-group factors, whereas negative values identified dependent or effect-group factors. The resulting coordinates were used to construct a cause-and-effect diagram and to clarify the structural position, relative priority, and interdependence of the components included in the productivity model.

The questionnaire data were analyzed using descriptive and inferential statistical methods. Descriptive statistics, including frequency, percentage, mean, standard deviation, skewness, and kurtosis, were used to summarize participant characteristics and the distribution of item and construct scores. Before factor analysis and model testing, the data were screened for missing values, outliers, normality, multicollinearity, and response-quality problems. Exploratory factor analysis was performed to

identify the empirical factor structure of the instrument. Sampling adequacy and the suitability of the correlation matrix were examined through the Kaiser–Meyer–Olkin index and Bartlett's test of sphericity. Factors were retained according to eigenvalues, scree-plot inspection, theoretical interpretability, and the magnitude of factor loadings. Items with weak loadings, substantial cross-loadings, or inadequate conceptual correspondence were considered for removal.

Confirmatory factor analysis was subsequently used to validate the measurement structure obtained from the qualitative and exploratory quantitative stages. Standardized factor loadings, error variances, composite reliability, average variance extracted, and correlations among latent variables were examined to determine convergent and discriminant validity. The structural model was then assessed to examine the relationships among the major productivity dimensions and to determine whether the proposed indigenous framework adequately represented the empirical data. The acceptability of the model was judged through multiple fit indices rather than reliance on a single statistic. Finally, the results of the thematic analysis, fuzzy Delphi screening, fuzzy DEMATEL causal analysis, factor analyses, and structural model assessment were integrated to produce the final indigenous model of productivity for nongovernmental cultural organizations. The final model specified the validated dimensions and indicators, their relative weights and priorities, their causal or dependent roles, and the principal pathways through which productivity could be developed and sustained in the organizational context under study.

Findings and Results

The findings were obtained through the sequential integration of qualitative thematic analysis, fuzzy Delphi screening, fuzzy DEMATEL analysis, fuzzy cognitive mapping and scenario simulation, network-resilience analysis, confirmatory factor analysis, structural equation modeling, and moderation analysis. In the qualitative phase, the interview transcripts were coded and progressively organized into empirical indicators, subthemes, and overarching themes. The analysis identified four principal domains of productivity in nongovernmental cultural organizations: managerial, structural, human, and environmental factors. Each domain contained three subthemes, producing a hierarchical framework composed of 12 subthemes and a broad set of empirically grounded indicators.

Managerial factors encompassed cultural policymaking, leadership and management style, and planning and control systems. Participants repeatedly emphasized fragmented cultural policymaking, weak coordination among programs, insufficient strategic coherence, the absence of a clearly articulated roadmap, centralized decision-making, limited horizontal interaction, weak employee participation, inadequate transparency, and the absence of systematic performance-control mechanisms. Structural factors included organizational infrastructure, laws and regulations, and communication structures. The principal deficiencies concerned unstable financial resources, limited facilities, weak administrative support, complicated procedures, restrictive regulations, inflexible formal structures, ineffective interorganizational communication, and slow information flows. Human factors included specialized competencies, employee motivation and satisfaction, and cultural experience and creativity. The interviews showed shortages in professional cultural skills, limited specialized knowledge, insufficient empowerment, weak incentive systems, occupational exhaustion, limited practical experience, and inadequate support for creative ideas. Environmental factors included sociocultural conditions, stakeholder interaction, and economic and political circumstances. Rapid cultural change, emerging social needs, audience diversity, weak cooperation with cultural institutions and local communities, economic constraints, macro-level policies, and instability in supportive resources were among the most frequently identified issues.

Table 1

Themes, Subthemes, and Empirical Indicators Extracted from the Qualitative Analysis

Main theme	Subtheme	Extracted empirical indicators
Managerial factors	Cultural policymaking	Absence of integrated policymaking; weak program coordination; lack of strategic coherence; absence of a clear cultural roadmap
Managerial factors	Leadership and management style	Managerial centralization; weak horizontal interaction; insufficient employee participation; lack of transparency in decision-making
Managerial factors	Planning and control system	Absence of an evaluative monitoring system; weak process control; lack of explicit performance criteria
Structural factors	Organizational infrastructure	Insufficient financial resources; limited physical space and facilities; ineffective administrative support
Structural factors	Laws and regulations	Complicated administrative procedures; restrictive cultural regulations; inflexibility of the formal structure
Structural factors	Communication structure	Weak communication networks; lack of effective interorganizational communication; slow information flow
Human factors	Specialized competencies	Shortage of cultural skills; insufficient specialized employee knowledge; need for professional empowerment
Human factors	Employee motivation and satisfaction	Low motivation to participate; absence of an appropriate reward system; occupational burnout
Human factors	Cultural experience and creativity	Weak innovation; limited practical experience; insufficient support for creative ideas
Environmental factors	Sociocultural conditions	Rapid cultural changes; emerging societal needs; diversity of audiences
Environmental factors	Stakeholder interaction	Insufficient cooperation with cultural institutions; weak participation with the local community
Environmental factors	Economic and political conditions	Effects of economic constraints; influence of macro-level policies; fluctuations in supportive resources

The qualitative hierarchy presented in Table 1 constituted the preliminary metamodel of the study. This framework preserved the progression from primary codes to subthemes and then to overarching themes and served as the basis for developing the fuzzy Delphi questionnaire. The purpose of the fuzzy Delphi stage was to reduce the broad set of qualitative indicators to a coherent and consensually accepted set of model components.

The expert panel included senior cultural managers, university faculty members, specialists in cultural policymaking, experienced professionals in cultural telecommunications in Khuzestan Province, experts in cultural human-resource management, cultural sociologists, and specialists directly involved in the development or assessment of cultural-productivity models. Experts were selected purposively on the basis of at least five years of relevant managerial, research, or executive experience, familiarity with the organizational challenges of nongovernmental cultural organizations, and the capacity to evaluate the practical and conceptual relevance of the proposed indicators. The multidisciplinary composition of the panel ensured the inclusion of complementary academic, policy, and executive perspectives.

The fuzzy Delphi method was selected because the expert evaluations were inherently linguistic, subjective, and uncertain. Judgments such as “no influence,” “very low influence,” “low influence,” “high influence,” and “very high influence” could not adequately be represented by single deterministic values. The linguistic responses were therefore transformed into triangular or trapezoidal fuzzy numbers. For example, “low influence” was represented by the fuzzy value (0.25, 0.50, 0.75), whereas “high influence” was represented by (0.50, 0.75, 1.00). This transformation retained the range of uncertainty associated with each judgment rather than forcing experts to provide unrealistically precise numerical scores.

The fuzzy Delphi process was completed in three rounds. In the first round, the full set of indicators derived from the thematic analysis was presented to the expert panel. The linguistic judgments were converted into fuzzy numbers, and the fuzzy mean was calculated separately for each component of the fuzzy values. The dispersion of individual judgments around the group mean remained greater than the accepted threshold of 0.20 for several indicators; therefore, a second round was necessary. In the second round, each expert received anonymized feedback concerning the group mean, the range of responses, and the relative position of their original judgment. Experts then revised their assessments where appropriate. Although disagreement decreased, some indicators still failed to achieve the required convergence. A third round was

consequently conducted. Following the final feedback and revision process, the differences between successive group judgments fell below 0.20, indicating satisfactory consensus.

For each indicator, the fuzzy group mean represented the collective expert judgment. The distance between each expert's judgment and the group mean was calculated to identify divergent assessments. Stability was evaluated by comparing the judgments across successive rounds. Indicators were removed when disagreement remained above 0.20 across rounds, judgments showed substantial instability, the indicator was inconsistent with the conceptual purpose of the model, or its defuzzified importance was insufficient. Indicators were retained when the inter-round difference was below 0.20, the experts' evaluations were stable, the fuzzy means converged, and the final defuzzified score indicated adequate theoretical and practical importance. Defuzzification was performed by averaging the components of each trapezoidal fuzzy number, expressed as (C=(a_1+a_2+a_3+a_4)/4).

The final fuzzy Delphi framework retained the four overarching themes and their 12 subthemes while reformulating the initial deficit-oriented qualitative codes into positive and measurable productivity indicators. Managerial productivity was represented by coherent policy, participatory leadership, transparent decision-making, managerial commitment, facilitation, process control, performance evaluation, and correspondence between plans and implementation. Structural productivity was represented by stable resources, adequate facilities, efficient administrative support, procedural clarity, regulatory flexibility, reduced bureaucracy, and effective communication networks. Human productivity consisted of professional knowledge and cultural skills, continuous learning, empowerment, rewards, participation, occupational security, professional satisfaction, innovation, experience, and organizational learning. Environmental productivity reflected responsiveness to social needs and cultural change, audience diversity, social participation, institutional cooperation, external networking, supportive-resource stability, macro-policy conditions, and the economic environment.

Table 2

Final Indicators Confirmed through the Fuzzy Delphi Process

Main theme	Subtheme	Final confirmed indicators after defuzzification
Managerial factors	Cultural policymaking	Policy coherence; existence of a cultural roadmap; intersectoral coordination; clarity of objectives
Managerial factors	Leadership style	Employee participation; transparency in decision-making; managerial commitment; managerial facilitation
Managerial factors	Planning system	Process control; presence of a performance-evaluation system; alignment between planning and implementation
Structural factors	Organizational infrastructure	Stable financial resources; organizational equipment and facilities; efficient administrative support
Structural factors	Laws and regulations	Procedural transparency; regulatory flexibility; reduction of bureaucracy
Structural factors	Communication network	Interorganizational communication; effective information flow; cooperation with cultural institutions
Human factors	Specialized competencies	Cultural skills; specialized knowledge; continuous training; individual empowerment
Human factors	Motivation and satisfaction	Reward system; willingness to participate; job security; professional satisfaction
Human factors	Creativity and experience	Support for innovation; practical experience; cultural innovation; organizational learning
Environmental factors	Sociocultural conditions	Community needs; cultural changes; audience diversity
Environmental factors	Stakeholder interaction	Social participation; cooperation among cultural institutions; external networking
Environmental factors	Economic and political conditions	Stability of supportive resources; effects of macro-level policies; economic conditions

After the fuzzy Delphi stage, the confirmed indicators were transformed into questionnaire items for the quantitative phase. Item development was based on the qualitative themes, the confirmed Delphi indicators, the preliminary conceptual framework, and the relevant theoretical literature. Each indicator was represented by at least one measurable item and, where conceptually appropriate, by two items to allow assessment of internal consistency and construct validity. All

specialized items were scored on a five-point Likert scale. The wording was revised repeatedly to ensure clarity, conceptual specificity, absence of double meanings, and relevance to employees and managers in the organizational setting.

The quantitative population consisted of managers and employees of the cultural organization of the Khuzestan Province Telecommunication Company, particularly those working in Ahvaz. Proportionate stratified random sampling was used because the organization contained several units, departments, and occupational groups. Each organizational unit was treated as a stratum, and the number of participants selected from each stratum was proportionate to its share of the total population. The required sample size was estimated using Cochran's formula. Questionnaires were distributed through a combination of printed forms delivered during organizational visits and electronic forms sent to units for which direct access was limited. Participants were informed that responses were anonymous, confidential, and used exclusively for research purposes. Follow-up contacts continued until the required sample was obtained and the returned questionnaires met the quality requirements for quantitative analysis.

The causal relationships among the validated factors were first analyzed using fuzzy DEMATEL. Experts evaluated the direct influence of each factor on the remaining factors by using linguistic categories ranging from no influence to very high influence. These judgments were transformed into fuzzy numbers, aggregated across experts, and entered into an initial direct-relation matrix. The group matrix was normalized to prevent computational divergence. The total-relation matrix was then obtained through (T=N(I-N)^{-1}), allowing the simultaneous examination of direct and indirect effects.

The row sum for each factor represented the total influence exerted on the remaining system, whereas the column sum represented the total influence received from the system. The sum of these values indicated factor prominence or centrality, while their difference identified causal position. Positive differences represented cause-group factors, and negative differences represented effect-group factors. The final matrix was imported into FCMapper to calculate influence, dependence, and centrality and to evaluate alternative scenarios.

The managerial factor had the highest centrality value, followed by the human, structural, and environmental factors. Specifically, managerial factors obtained an influence score of 3.07, a dependence score of 3.07, and centrality of 6.15. Human factors obtained corresponding values of 2.77, 2.77, and 5.53. Structural factors obtained values of 2.43, 2.43, and 4.87, whereas environmental factors received values of 1.85, 1.85, and 3.69. Consequently, the managerial, human, and structural dimensions were treated as the principal factors in the scenario analyses because of their comparatively high positions in the network.

Three principal scenarios were examined in FCMapper. In the scenario system, a value of zero indicated removal or absence of the focal factor, while a value of one indicated that the factor remained present without intervention. FCMapper categorized the resulting system changes as set to zero, set to one, high positive change, medium positive change, low positive change, very low positive change, high negative change, medium negative change, low negative change, very low negative change, or no change.

In the first scenario, the managerial factor was reduced from one to zero. Its modeled value consequently decreased from 0.59 to zero. The environmental factor changed from 0.75 to 0.61, the human factor decreased from 0.55 to zero, and the structural factor changed from 0.70 to 0.74. Although the original software-generated verbal labels contained some inconsistencies with the numerical direction of change, the numerical results demonstrated that eliminating the managerial factor produced a severe deterioration in the human dimension, a decline in the environmental dimension, and a

comparatively small numerical increase in the structural dimension. The scenario therefore confirmed the central role of managerial conditions in sustaining the human and environmental aspects of organizational productivity.

In the second scenario, the structural factor was reduced from one to zero. The managerial factor increased from 0.59 to 0.67, while the environmental factor decreased from 0.75 to 0.68 and the human factor declined from 0.55 to 0.52. The positive managerial change appeared to represent a compensatory response to the removal of structural capacity; nevertheless, the simultaneous decline in the human and environmental factors indicated that managerial compensation alone could not offset the loss of organizational infrastructure, procedures, and communication structures.

In the third scenario, the managerial factor was fixed at one while the structural factor was set to zero. Under these conditions, the managerial factor increased from 0.59 to 1.00, the environmental factor decreased from 0.75 to 0.71, and the human factor decreased from 0.55 to 0.47. Thus, even when managerial capacity was maintained at its maximum simulated level, the absence of structural support produced substantial negative changes in the other dimensions. This result indicated that managerial capability and structural capacity were complementary rather than interchangeable components of productivity.

Table 3

Centrality and Scenario Results Derived from FCMapper

Analysis	Factor	Initial value or influence	Dependence or intervention	Final value or centrality	Interpreted result
Centrality	Managerial factors	3.07	3.07	6.15	Highest network centrality
Centrality	Human factors	2.77	2.77	5.53	Second-highest network centrality
Centrality	Structural factors	2.43	2.43	4.87	Third-highest network centrality
Centrality	Environmental factors	1.85	1.85	3.69	Lowest, but still integrated into the network
Scenario 1: managerial factor removed	Managerial factors	0.59	Set from 1 to 0	0.00	Focal factor removed
Scenario 1: managerial factor removed	Environmental factors	0.75	No direct intervention	0.61	Negative change
Scenario 1: managerial factor removed	Human factors	0.55	No direct intervention	0.00	Severe negative change
Scenario 1: managerial factor removed	Structural factors	0.70	No direct intervention	0.74	Positive numerical change
Scenario 2: structural factor removed	Managerial factors	0.59	No direct intervention	0.67	Positive compensatory change
Scenario 2: structural factor removed	Environmental factors	0.75	No direct intervention	0.68	Negative change
Scenario 2: structural factor removed	Human factors	0.55	No direct intervention	0.52	Negative change
Scenario 2: structural factor removed	Structural factors	0.70	Set from 1 to 0	0.00	Focal factor removed
Scenario 3: management maintained and structure removed	Managerial factors	0.59	Fixed at 1	1.00	Managerial factor maintained at maximum
Scenario 3: management maintained and structure removed	Environmental factors	0.75	No direct intervention	0.71	Negative change
Scenario 3: management maintained and structure removed	Human factors	0.55	No direct intervention	0.47	High negative change
Scenario 3: management maintained and structure removed	Structural factors	0.70	Set from 1 to 0	0.00	Structural factor removed

The network-productivity model was also simulated through 650 executions in MATLAB. The network trajectory showed that immediately after a disruptive event, the modeled system preserved only approximately 34% of its previous performance, indicating relatively low initial resistance. Across the 650 simulation runs, the mean productivity-model index was 0.541 with a standard deviation of 0.025. The chi-square distribution-comparison criterion indicated that the error distribution provided the closest fit to these productivity-index data.

The mean network-resistance index across the 650 executions was 0.357, with a standard deviation of 0.055. Based on the chi-square criterion, the Burr distribution most closely corresponded to the simulated network-resistance values. The

mean time required for the network to return to its normal state was 632.92 hours, with a standard deviation of 22.49 hours. The beta distribution showed the best correspondence with the simulated recovery-time data. Collectively, these findings showed that the modeled system had limited immediate resistance and required a relatively extended period to return to its pre-disruption state, although the relatively small standard deviations indicated that the simulation outcomes were reasonably stable across repeated executions.

The measurement model was then examined through confirmatory factor analysis and structural equation modeling. Four latent constructs were evaluated: human characteristics, managerial approaches, structural factors, and environmental factors. Model fit was assessed through chi-square, the normed chi-square, RMSEA, NFI, GFI, CFI, and IFI. All four measurement models met the specified fit criteria. The normed chi-square values ranged from 1.79 to 2.96 and therefore remained below the threshold of 3.00. RMSEA values ranged from 0.049 to 0.093 and remained below 0.10. NFI, GFI, CFI, and IFI values ranged from 0.98 to 1.00, exceeding the criterion of 0.90.

The human-characteristics construct was significantly represented by integration, flexibility, alignment, and management. Standardized loadings ranged from 0.67 to 0.86, and all t-values were substantially higher than 1.96. Alignment had the strongest loading on the construct, followed by flexibility, integration, and management. The managerial-approaches construct was represented by cost flexibility, implementation flexibility, adaptability, and recovery or improvement. Its loadings ranged from 0.49 to 0.78, with implementation flexibility and adaptability emerging as the strongest indicators. The structural-factor construct was represented by planning, continuous improvement, reciprocal communication, and human resources. Reciprocal communication had the strongest loading, followed by continuous improvement. The environmental-factor construct was represented in the supplied statistical outputs by scope, continuous improvement, reciprocal communication, and human resources, although the accompanying narrative referred to scope, planning, process integration, and shared values. Because the numerical output was the more direct statistical evidence, the values reported in Table 4 follow the labels attached to the numerical estimates while acknowledging this discrepancy in the supplied records.

Table 4

Measurement-Model Fit and Standardized Indicator Loadings

Construct	Model-fit results	Observed component	Standardized loading	t-value	Result
Human characteristics	$\chi^2 = 5.92$; $\chi^2/df = 2.96$; RMSEA = 0.087; NFI = 0.99; GFI = 0.99; CFI = 0.99; IFI = 0.99	Integration	0.68	13.14	Confirmed
Human characteristics	Same model-fit indices	Flexibility	0.83	17.23	Confirmed
Human characteristics	Same model-fit indices	Alignment	0.86	18.09	Confirmed
Human characteristics	Same model-fit indices	Management	0.67	13.01	Confirmed
Managerial approaches	$\chi^2 = 5.64$; $\chi^2/df = 2.82$; RMSEA = 0.093; NFI = 0.98; GFI = 0.99; CFI = 0.99; IFI = 0.99	Cost flexibility	0.64	11.64	Confirmed
Managerial approaches	Same model-fit indices	Implementation flexibility	0.78	14.42	Confirmed
Managerial approaches	Same model-fit indices	Adaptability	0.77	14.21	Confirmed
Managerial approaches	Same model-fit indices	Recovery or improvement	0.49	8.46	Confirmed
Structural factors	$\chi^2 = 4.53$; $\chi^2/df = 2.26$; RMSEA = 0.062; NFI = 0.99; GFI = 0.99; CFI = 1.00; IFI = 1.00	Planning	0.67	12.87	Confirmed
Structural factors	Same model-fit indices	Continuous improvement	0.83	17.06	Confirmed
Structural factors	Same model-fit indices	Reciprocal communication	0.86	18.05	Confirmed
Structural factors	Same model-fit indices	Human resources	0.67	12.95	Confirmed

Environmental factors	χ^2 = 3.58; χ^2/df = 1.79; RMSEA = 0.049; NFI = 0.99; GFI = 0.99; CFI = 1.00; IFI = 1.00	Scope	0.66	12.70	Confirmed
Environmental factors	Same model-fit indices	Continuous improvement	0.83	17.20	Confirmed
Environmental factors	Same model-fit indices	Reciprocal communication	0.86	18.00	Confirmed
Environmental factors	Same model-fit indices	Human resources	0.68	13.14	Confirmed

The structural relationships were evaluated through the partial least-squares algorithm and bootstrapping. A t-value greater than 1.96 was treated as statistically significant at the 95% confidence level; values above 2.58 and 3.27 represented significance at the 99% and 99.9% levels, respectively. Standardized path coefficients above 0.60 were interpreted as strong, coefficients from 0.30 to 0.60 as moderate, and coefficients below 0.30 as weak.

The first hypothesis proposed that human characteristics significantly influenced the remaining dimensions of the productivity model. Human characteristics exerted a strong direct effect on managerial approaches, with a coefficient of 0.919 and a t-value of 68.209. The effects on structural and environmental factors were also positive and significant, with coefficients of 0.640 and 0.438 and t-values of 9.859 and 4.812, respectively. The reported indirect coefficients were 0.443 for managerial approaches, 0.114 for structural factors, and 0.155 for environmental factors. All relationships were accepted. The positive cross-validated redundancy values reported in the model assessment additionally indicated acceptable predictive quality.

The second hypothesis proposed that managerial approaches significantly influenced the other productivity dimensions. Managerial approaches had a strong positive effect on human characteristics, with a coefficient of 0.919 and a t-value of 68.209. Their effects on structural and environmental factors were also significant, with coefficients of 0.640 and 0.438 and t-values of 9.859 and 4.812. The reported indirect effects were 0.396 on human characteristics, 0.202 on structural factors, and 0.400 on environmental factors. These results supported the second hypothesis and reinforced the high centrality of the managerial dimension observed in the FCMapper analysis.

The third hypothesis concerned the effect of structural factors. Structural factors significantly influenced managerial approaches, human characteristics, and environmental factors. The direct coefficients were 0.919, 0.640, and 0.438, respectively, and the corresponding t-values were 68.209, 9.859, and 4.812. The indirect coefficients were 0.426 for managerial approaches, 0.428 for human characteristics, and 0.191 for environmental factors. All relationships were statistically significant and positive.

The fourth hypothesis proposed that environmental factors significantly affected the remaining dimensions. Environmental factors exerted positive effects on managerial approaches, structural factors, and human characteristics, with coefficients of 0.919, 0.640, and 0.438 and t-values of 68.209, 9.859, and 4.812, respectively. The indirect coefficients were 0.396 for managerial approaches, 0.202 for structural factors, and 0.229 for human characteristics. All paths were accepted at the 95% confidence level.

Table 5

Direct and Indirect Structural Relationships among the Productivity Dimensions

Hypothesis	Independent construct	Dependent construct	Direct path coefficient	t-value	Reported indirect coefficient	Result
H1	Human characteristics	Managerial approaches	0.919	68.209	0.443	Confirmed
H1	Human characteristics	Structural factors	0.640	9.859	0.114	Confirmed
H1	Human characteristics	Environmental factors	0.438	4.812	0.155	Confirmed
H2	Managerial approaches	Human characteristics	0.919	68.209	0.396	Confirmed
H2	Managerial approaches	Structural factors	0.640	9.859	0.202	Confirmed

H2	Managerial approaches	Environmental factors	0.438	4.812	0.400	Confirmed
H3	Structural factors	Managerial approaches	0.919	68.209	0.426	Confirmed
H3	Structural factors	Human characteristics	0.640	9.859	0.428	Confirmed
H3	Structural factors	Environmental factors	0.438	4.812	0.191	Confirmed
H4	Environmental factors	Managerial approaches	0.919	68.209	0.396	Confirmed
H4	Environmental factors	Structural factors	0.640	9.859	0.202	Confirmed
H4	Environmental factors	Human characteristics	0.438	4.812	0.229	Confirmed

The repeated direct coefficients in the supplied model outputs indicated a highly symmetrical structural specification among the four principal dimensions. The coefficient of 0.919 represented a very strong relationship, 0.640 represented a strong relationship, and 0.438 represented a moderate relationship. Since all bootstrapped t-values exceeded 1.96, every proposed direct relationship was statistically significant. The findings therefore supported a systemic interpretation of productivity: managerial, human, structural, and environmental factors were not isolated determinants but mutually connected dimensions whose effects were transmitted both directly and indirectly throughout the organizational system.

The final stage examined the moderation model through WarpPLS. Because the measurement reliability, validity, and basic structural-model assessment procedures in WarpPLS were consistent with those applied in SmartPLS, the analysis focused on the overall fit of the moderation model. The global goodness-of-fit index was 0.498. According to the applied benchmarks of 0.10 for a small effect, 0.25 for a medium effect, and 0.36 for a large effect, this value indicated a strong overall model fit.

Three additional WarpPLS indices supported this conclusion. The average path coefficient was 0.149 and statistically significant at $p = 0.011$. The adjusted average R-squared was 0.344 and statistically significant at $p < 0.001$. The average variance inflation factor was 2.291, which was below the maximum acceptable value of 5.00 and also below the preferred threshold of 3.30. Thus, the moderation model showed statistically meaningful average relationships, adequate explanatory capacity, and no problematic multicollinearity.

Table 6

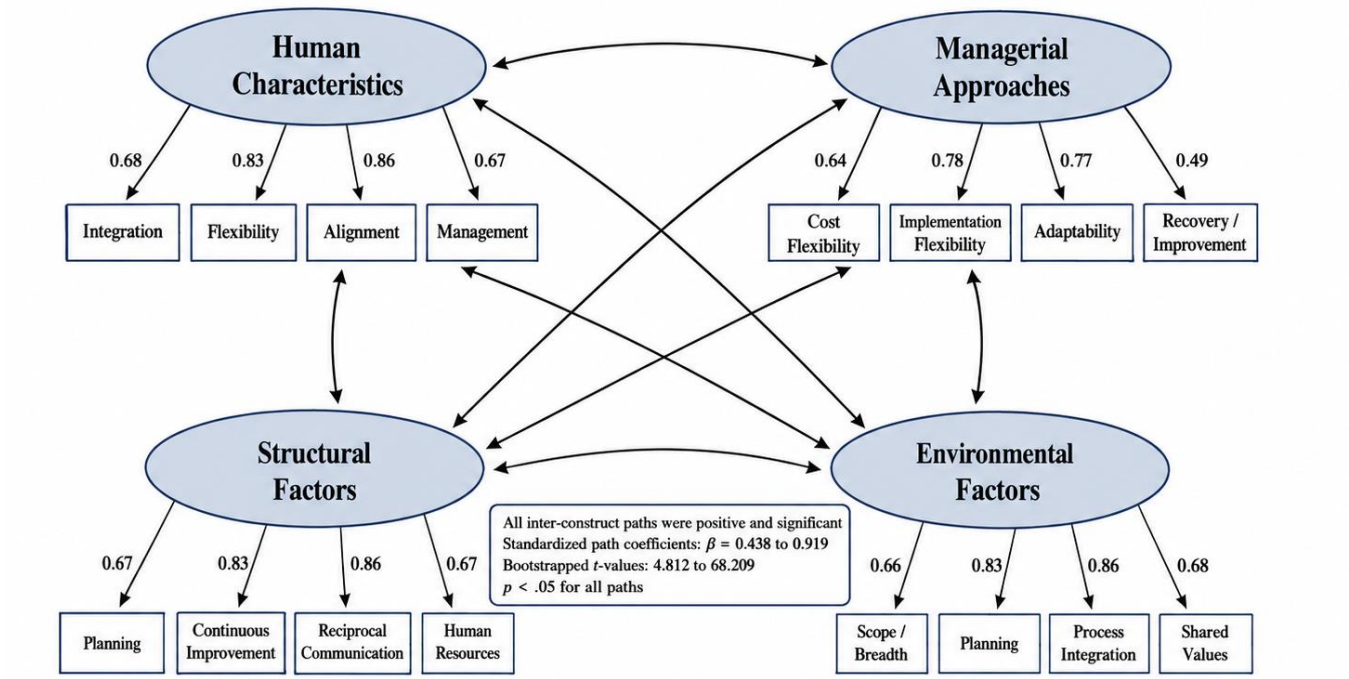
Fit Indices for the Moderation Model

Fit index	Obtained value	Acceptance criterion	Interpretation
Global goodness of fit	0.498	Small ≥ 0.10; medium ≥ 0.25; large ≥ 0.36	Strong overall model fit
Average path coefficient	0.149, p = 0.011	Acceptable when p < 0.05	Statistically significant average path coefficient
Adjusted average R-squared	0.344, p < 0.001	Acceptable when p < 0.05	Statistically significant explanatory power
Average variance inflation factor	2.291	Acceptable when < 5.00; ideally ≤ 3.30	No problematic multicollinearity

Overall, the findings produced an indigenous productivity model consisting of four mutually reinforcing domains. The qualitative analysis established the contextual content of the model, the fuzzy Delphi procedure confirmed and refined its indicators, fuzzy DEMATEL and FCMapper identified the centrality and systemic role of the main dimensions, and the simulation analysis demonstrated the sensitivity and recovery behavior of the organizational network. The factor-analytic findings confirmed the adequacy of the measurement structures, and the structural model supported all proposed direct and indirect relationships. Managerial factors had the highest network centrality, but scenario analysis showed that management could not independently compensate for the removal of structural capacity. Human factors occupied the second-highest central position and were particularly vulnerable to the absence of effective management. Structural factors formed the enabling organizational platform, while environmental factors connected internal productivity with societal needs, cultural changes, stakeholders, economic conditions, and macro-level policies. The final evidence therefore supported a multidimensional, interactive, and context-sensitive model of productivity for nongovernmental cultural organizations.

Figure 1

Final Model of the Study



Discussion and Conclusion

The present study was conducted to design and validate an indigenous productivity model for nongovernmental cultural organizations through an exploratory sequential mixed-methods approach. The findings demonstrated that organizational productivity in this context is a multidimensional, interconnected, and context-dependent phenomenon composed of four principal domains: managerial, structural, human, and environmental factors. The qualitative phase initially identified 12 subthemes and a broad set of empirical indicators, which were subsequently refined through three rounds of fuzzy Delphi analysis. The final framework retained cultural policymaking, leadership style, planning and control, organizational infrastructure, laws and regulations, communication networks, specialized competencies, motivation and satisfaction, creativity and experience, sociocultural conditions, stakeholder interaction, and economic-political circumstances. The fuzzy DEMATEL and FCMapper analyses further showed that managerial factors had the highest network centrality, followed by human, structural, and environmental factors. The measurement models demonstrated acceptable fit, all factor loadings were significant, and all hypothesized relationships among the four major constructs were confirmed. These results collectively indicate that productivity in nongovernmental cultural organizations cannot be improved through isolated interventions; rather, it emerges from the coordinated functioning of leadership, human capability, organizational structure, and environmental responsiveness.

One of the most important findings was the central role of managerial factors. Managerial factors obtained the highest centrality score in the network analysis, and their elimination in the first simulation scenario produced considerable deterioration in the human and environmental dimensions. This result indicates that management is not merely one component among several parallel components but functions as an organizing mechanism through which other productivity resources are activated, coordinated, and directed. Cultural policy coherence, the existence of a clear roadmap, intersectoral

coordination, transparent decision-making, employee participation, process control, and alignment between planning and implementation were identified as the principal managerial requirements. In practical terms, even when an organization possesses skilled employees or adequate structural resources, productivity may remain limited if management cannot integrate these resources around clear cultural objectives.

This finding is consistent with research emphasizing the decisive influence of leadership on workplace culture, employee behavior, and productivity. Transformational leadership can raise productivity through shared vision, empowerment, intellectual stimulation, and commitment, while transactional leadership can strengthen clarity and accountability through explicit expectations and reward systems [4]. Similarly, human-resource leadership has been shown to influence productivity by shaping collaboration, innovation, workforce culture, and the quality of employee relationships [5]. The present findings extend these arguments to nongovernmental cultural organizations by showing that managerial effectiveness also depends on policy coherence, facilitative leadership, participatory decision-making, and the ability to connect cultural missions with operational processes. The high centrality of the managerial domain is also consistent with evidence that leadership, organizational culture, and the work environment jointly shape employee productivity rather than functioning as separate influences [7].

The significance of managerial factors can also be interpreted through the concept of organizational resilience. Nongovernmental cultural organizations frequently operate under financial instability, regulatory change, shifts in cultural demand, and uncertain public support. The scenario analysis showed that the disappearance of managerial capacity sharply weakened the human dimension and negatively affected environmental responsiveness. This suggests that management provides the interpretive and adaptive capacity required to preserve organizational functioning under uncertainty. Previous research has similarly shown that transformational leadership promotes organizational resilience through the development of adaptive cultures and the capacity to respond constructively to external disruption [6]. The present model therefore supports the view that productivity and resilience are closely related: organizations become more productive when their leaders are able to anticipate change, mobilize employees, coordinate resources, and adjust strategies without abandoning the organization's cultural mission.

Human factors constituted the second most central domain in the model. Specialized cultural competencies, professional knowledge, continuous training, empowerment, participation, occupational security, professional satisfaction, practical experience, innovation, and organizational learning were all confirmed as essential indicators. The measurement model also showed that integration, flexibility, alignment, and management significantly represented the human-characteristics construct. Among these indicators, alignment and flexibility had particularly strong factor loadings, suggesting that employee productivity depends not only on individual competence but also on the capacity to align personal activity with organizational goals and adapt to changing cultural and organizational circumstances.

This result is aligned with findings that human-resource productivity is shaped by the simultaneous influence of individual, organizational, cultural, and environmental conditions [3]. Employees do not become productive solely because they possess technical knowledge. Their competencies must be supported by motivation, learning opportunities, appropriate leadership, adequate resources, and a culture that enables initiative. Research on organizational learning and cultural capital similarly shows that productivity increases when employees are able to develop their knowledge, interpret organizational experiences, and convert cultural resources into effective performance [12]. This correspondence is particularly important in cultural

organizations because much of their work depends on tacit knowledge, creative judgment, audience understanding, and the capacity to interpret complex social meanings.

The confirmation of continuous training, knowledge, empowerment, and organizational learning also supports knowledge-management perspectives on productivity. Knowledge-management maturity improves the capacity of organizations to create, preserve, share, and apply knowledge systematically [2]. Likewise, electronic human-resource management can strengthen knowledge creation by connecting employee development, communication, information management, and performance processes [10]. In nongovernmental cultural organizations, where institutional memory may be dispersed among employees, volunteers, artists, and project managers, the absence of knowledge-management mechanisms can result in repeated errors, discontinuity, and dependence on particular individuals. The present results therefore indicate that productivity requires mechanisms through which experience is transformed into collective organizational knowledge.

The relationship between human competencies and organizational culture is also evident in the findings. Employees require an environment in which creativity, innovation, and professional participation are recognized and supported. Knowledge-based dynamic capabilities improve knowledge-worker productivity when organizational culture encourages learning, collaboration, and the reconfiguration of expertise in response to change [11]. The current findings similarly showed that support for innovation, practical experience, cultural creativity, and organizational learning were integral components of the human domain. Because nongovernmental cultural organizations often rely on intellectual and creative work, restrictive cultures may suppress precisely the capacities on which productivity depends.

Employee motivation and satisfaction were also confirmed as central components. The qualitative findings identified weak incentives, low participation, and occupational burnout as barriers, whereas the final framework emphasized reward systems, willingness to participate, job security, and professional satisfaction. This result is consistent with research showing that engagement, particularly under flexible or remotely mediated working arrangements, is essential for sustaining innovation and productivity [14]. It also corresponds with findings that work culture affects productivity by shaping employee attitudes, commitment, and motivation [8]. In cultural organizations, where financial rewards may be limited, symbolic recognition, professional autonomy, participation, and commitment to a socially meaningful mission may become especially influential sources of motivation.

Structural factors formed the third most central domain and included stable financial resources, facilities, administrative support, procedural transparency, regulatory flexibility, reduced bureaucracy, interorganizational communication, effective information flows, and institutional cooperation. The scenario analyses provided particularly important evidence concerning this domain. When structural factors were eliminated, both human and environmental dimensions declined. Even when managerial factors were maintained at their maximum simulated level, the removal of structural capacity continued to produce negative changes in the human and environmental factors. This demonstrates that strong leadership cannot fully compensate for deficient infrastructure, restrictive procedures, unstable resources, or ineffective communication systems. Management and structure therefore operate as complementary rather than substitutable dimensions.

This finding is supported by productivity models developed in other organizational settings. Productivity management in higher education has been linked to accountability systems, appropriate structures, performance criteria, resource use, and organizational coordination [1]. Similarly, multidimensional governance models indicate that effective performance depends on the integration of institutional processes, communication networks, accountability, technology, and stakeholder relations

[17]. The present study extends these findings by demonstrating that structural productivity in nongovernmental cultural organizations must combine adequate internal infrastructure with external communication and regulatory flexibility. The organization requires not only sufficient facilities but also procedures that allow timely action and networks that facilitate cooperation with other cultural institutions.

The importance of communication networks and reciprocal relationships was further supported by the high loading of reciprocal communication in the structural measurement model. Cultural organizations rarely operate independently; they depend on interaction with governmental bodies, donors, educational institutions, local communities, artists, media organizations, and other nongovernmental institutions. Weak communication slows information flow, creates duplication, and reduces access to resources and audiences. Systems-oriented modeling has shown that complex organizational outcomes emerge from relationships among interconnected components and that interpretive structural approaches can distinguish influential drivers from dependent outcomes [18]. The current DEMATEL results similarly demonstrated that structural and managerial factors operate as central nodes that influence the wider productivity network.

The environmental domain had the lowest centrality score among the four principal dimensions, but it remained a significant and fully integrated part of the model. This domain included societal needs, cultural changes, audience diversity, social participation, cooperation with cultural institutions, external networking, resource stability, macro-level policies, and economic conditions. Its lower centrality should not be interpreted as low importance. Rather, it suggests that environmental factors are comparatively more dependent on and connected through managerial, structural, and human capacities. An organization cannot control macroeconomic or political conditions, but it can strengthen its capacity to understand, anticipate, and respond to them.

The importance of environmental responsiveness is consistent with research on cultural intelligence and scenario planning. Organizations must prepare for alternative cultural futures and develop the capacity to interpret changes in values, identities, communication patterns, and audience expectations [13]. The inclusion of audience diversity and emerging social needs in the final model indicates that productivity in cultural organizations cannot be assessed only through internal efficiency. An organization may use its resources efficiently but remain unproductive if its programs are irrelevant to changing community needs. Productivity must therefore incorporate social responsiveness and cultural appropriateness.

The environmental findings are also related to organizational ambidexterity. Nongovernmental cultural organizations must preserve their mission and identity while simultaneously adapting to technological, social, and political change. Research on ambivalent organizational culture has shown that organizational ambidexterity is essential for balancing established practices with entrepreneurial and exploratory activity [9]. The present findings reinforce this perspective by identifying cultural change, audience diversity, innovation, and adaptability as connected components. A productive cultural organization must exploit existing cultural competencies while exploring new methods, partnerships, and channels of engagement.

Digital transformation is one such area of environmental and structural adaptation. Cultural organizations increasingly communicate with audiences and stakeholders through digital platforms, electronic campaigns, online cultural content, and data-based communication. Digital marketing research in knowledge-based organizations has emphasized the need to integrate technology, organizational capability, audience understanding, and strategic communication [19]. Although digital readiness was not isolated as a separate overarching domain in the final model, it is implicitly reflected in communication networks, information flow, professional competencies, environmental responsiveness, and innovation. Future

implementation of the model should therefore interpret these indicators in ways that include both traditional and digital organizational practices.

The measurement-model findings confirmed that the four constructs possessed acceptable statistical validity. The fit indices for the human, managerial, structural, and environmental models were within acceptable ranges, and all standardized factor loadings were statistically significant. The structural analyses also confirmed all proposed relationships among the four dimensions. The direct effects ranged from moderate to strong, and all bootstrapped t-values exceeded the required threshold. These findings support a systemic interpretation in which changes in one domain are transmitted to the others. The results are consistent with literature showing that leadership, organizational culture, appraisal, coaching, learning, and work conditions jointly influence productivity [15, 16]. Innovative performance appraisal, in particular, improves productivity when it is aligned with organizational culture, development, and collaboration rather than being limited to administrative control [15].

The results also support the importance of cultural transformation. A productivity-oriented transformation model requires coordinated changes in values, leadership, structures, communication, participation, and learning [20]. The present study reached a similar conclusion through a different methodological pathway. Its qualitative, fuzzy, causal, and structural findings all indicated that productivity cannot be produced by modifying one practice in isolation. A new reward system, training program, policy document, or technological tool will have limited effect unless it is supported by coherent leadership, enabling structures, and environmental alignment.

The simulation results provide an additional interpretation of the final model. Across 650 MATLAB executions, the mean productivity index was 0.541, the mean network resistance was 0.357, and the mean recovery time was 632.92 hours. The system preserved only approximately 34% of its previous functioning immediately after disruption. These values indicate that the modeled network possessed moderate productivity but relatively weak immediate resistance and a long recovery period. This is compatible with the structural vulnerabilities identified in the qualitative findings, including unstable resources, bureaucracy, inadequate coordination, and weak support systems. The results suggest that productivity improvement should not be limited to raising routine output but should also strengthen resistance, adaptability, and recovery capacity.

Finally, the WarpPLS analysis produced a goodness-of-fit value of 0.498, significant average path and adjusted explanatory coefficients, and an acceptable variance inflation factor. These findings confirm that the final indigenous model possesses adequate overall explanatory and predictive quality. The model's principal contribution lies in combining contextual depth with empirical validation. It does not treat productivity as a universal formula but as a locally embedded organizational capability that depends on the integration of cultural mission, leadership, people, structures, and environmental relationships.

The study had several limitations that should be considered when interpreting its findings. The qualitative and quantitative data were collected from experts, managers, and employees connected to a particular organizational and geographical setting, which may limit the direct transferability of the model to all nongovernmental cultural organizations. The expert-based fuzzy Delphi and DEMATEL procedures were dependent on informed subjective judgments, and although repeated rounds and fuzzy calculations reduced uncertainty, they could not eliminate individual interpretive biases. The cross-sectional quantitative design also prevented the examination of changes in productivity over time. In addition, several constructs were measured through self-reported perceptions, which may have been affected by social desirability or organizational

expectations. Finally, some inconsistencies in the terminology of the original quantitative outputs suggest that the operational labels of selected indicators should be standardized in future applications.

Future studies should validate the model in different provinces, cultural sectors, and types of nongovernmental organizations to assess its stability across institutional contexts. Comparative research could examine whether the relative centrality of managerial, human, structural, and environmental factors differs between artistic, religious, educational, heritage, media, and community-based cultural organizations. Longitudinal designs are recommended to determine how improvements in one domain influence productivity and resilience over time. Researchers may also develop a standardized scale from the final indicators and test its measurement invariance across organizational groups. Additional studies could employ multilevel modeling to distinguish employee-level, organizational-level, and environmental effects, and could integrate objective performance indicators, stakeholder evaluations, financial sustainability measures, and cultural-impact outcomes with perceptual data.

Managers of nongovernmental cultural organizations should implement the model as an integrated productivity-development framework rather than selecting isolated indicators. Priority should be given to creating a coherent cultural roadmap, increasing transparency, involving employees in decisions, and aligning plans with implementation. Organizations should establish continuous training, knowledge-sharing, recognition, and innovation-support mechanisms while improving job security and professional satisfaction where feasible. Structural reform should include simplifying procedures, reducing unnecessary bureaucracy, stabilizing financial resources, strengthening administrative support, and developing effective interorganizational communication networks. Organizations should also establish systematic mechanisms for monitoring cultural change, audience needs, stakeholder expectations, and policy developments. Because the simulation results indicated low immediate resistance and a prolonged recovery period, continuity planning, resource diversification, succession planning, digital communication capacity, and crisis-response protocols should be incorporated into productivity-management programs.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Written consent was obtained from all participants in the study.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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