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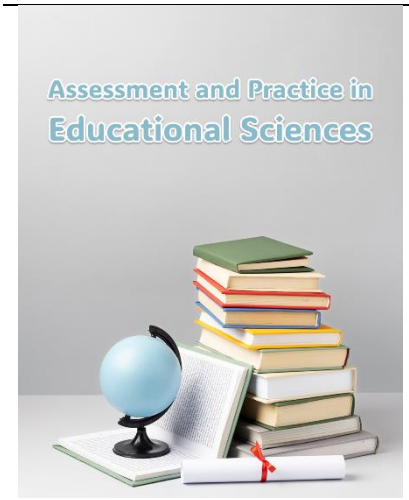

Validation of an Information Justice Model in Iran's Public Education System

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ABSTRACT

This study aimed to develop and validate a comprehensive model of information justice for Iran's public education system using a mixed-methods exploratory–confirmatory approach. This research employed a sequential mixed-methods design consisting of a grounded theory phase followed by a quantitative validation phase. In the qualitative stage, in-depth semi-structured interviews were conducted with 35 experts, principals, educational administrators, and university faculty using purposive and theoretical sampling until theoretical saturation was achieved. Data were analyzed using open, axial, and selective coding based on the Strauss and Corbin systematic approach, resulting in the identification of causal, contextual, intervening, strategic, and outcome conditions within a paradigm model. In the quantitative stage, a researcher-made questionnaire derived from qualitative findings was administered to a multi-stage probability sample of 390 principals and educational experts across five provinces, yielding 381 usable responses. Content validity was assessed using the CVR method, and reliability was evaluated through internal consistency indices. Confirmatory factor analysis and structural equation modeling were applied to assess the factorial structure and test the overall model fit. Confirmatory factor analysis demonstrated that all primary constructs of the information justice model achieved acceptable or strong standardized factor loadings. Model fit indices for all dimensions—including IFI, CFI, TLI, NFI, RMSEA, and χ^2/df—fell within acceptable thresholds, indicating robust factorial validity. Structural relationships among causal conditions, contextual factors, intervening conditions, strategies, and outcomes were statistically significant, confirming the internal coherence of the theoretical model. The final model showed strong predictive power for key organizational outcomes such as reduced polarization, enhanced self-efficacy, and increased strategic alignment. The validated model offers a theoretically grounded and empirically supported framework for analyzing and promoting information justice within Iran's public education system, demonstrating that organizational structures, cultural conditions, and ethical strategies collectively shape equitable information governance.

Keywords: Information justice; educational justice; grounded theory; structural equation modeling; public education governance; transparency; digital equity

Introduction

The rapid expansion of data-driven governance, digital infrastructures, and information-intensive decision-making across education systems worldwide has brought renewed attention to the question of justice in the distribution, access, use, and governance of information. As educational institutions increasingly rely on digital tools and data flows for administration, pedagogy, assessment, and policy-making, concerns have emerged about whether these transformations reinforce or mitigate structural inequities. Central to this debate is the concept of *information justice*, a principle that argues that fairness in

information access, representation, and participation is essential for social and educational equity (1). The relevance of information justice for education is heightened as schools and ministries adopt digital management systems, learning analytics, standardized databases, and algorithmic decision-support tools that shape the opportunities, constraints, and rights of various stakeholders.

The development of information justice as an analytical framework can be traced to debates within information ethics, data politics, and social justice studies. Griffin's early call for a doctrine of information justice framed the concept as a normative response to growing asymmetries in information power, urging institutions to address the inequities embedded in emerging technologies and data practices (1). Mathiesen later expanded this conceptualization by articulating informational justice as a form of social justice within library and information services, emphasizing equitable access, participatory inclusion, and fair representation in informational environments (2). These scholarly contributions reflect a broader awareness that information is not neutral: its visibility, availability, accuracy, and distribution reflect and reproduce societal structures.

The emergence of what Dencik and colleagues describe as *data politics* has further complicated questions of justice, as the shift to datafied infrastructures risks entrenching new forms of surveillance, categorization, and exclusion (3). Increasingly, educational institutions are becoming sites where data is not merely stored or used but governs processes and relations. This demands a reconsideration of how justice principles can guide the operationalization of data in schooling. Johnson advances this discussion by examining how technologies and data governance shape power relations within higher education administration, advocating for policy frameworks grounded in transparency, fairness, and democratic oversight (4). Collectively, these perspectives reveal that information justice is not only a theoretical construct but also a practical necessity as education systems integrate digital infrastructures.

Digital transformations have not occurred uniformly across societies. The digital divide—once conceptualized primarily as a matter of physical access—has evolved into what Hargittai calls the *second digital divide*, referring to differences in skills, literacy, and meaningful participation in online environments (5). These divides profoundly influence who benefits from digital transitions in education. In many developing countries, structural inequalities continue to limit equitable participation in digital learning and administrative processes. Assefa and colleagues argue that digital inequities in higher education must be reframed through a social justice lens to account for disparities in connectivity, technological skills, institutional readiness, and socio-economic conditions (6). Their analysis underscores that without deliberate policies and systemic interventions, digitalization may exacerbate existing inequities in information access and educational opportunity.

Such concerns have direct relevance for public education systems, where teachers, principals, students, and administrative staff depend on timely and accurate information for pedagogy, governance, and decision-making. Inequal access to timely data, lack of transparency in administrative processes, and concentration of informational resources among elite actors can create conditions of systemic injustice. Kalantari's work on validating an ICT-based model of educational justice highlights how blended learning and digital platforms can either democratize or restrict educational opportunities depending on design and governance (7). Similarly, Rah Najat and Negarestani's legal-policy examination of educational justice in Iran points out that governance structures, including those related to the regulation of private and special schools, influence how educational resources and opportunities are distributed (8). These insights highlight that information justice intersects with broader conceptualizations of educational justice and governance.

Educational justice itself remains a contested and evolving concept. Psychological, structural, legal, and socio-cultural frameworks each contribute different interpretations of what constitutes equitable access to quality education. Beigzadeh and colleagues, through their qualitative study involving students, faculty, and administrators, reveal that perceptions of educational justice extend beyond material distribution to include procedural fairness, transparency, and participatory involvement in

decision-making (9). Meanwhile, Valizadeh and Mahmoudi critique the rise of special and non-governmental schools in Iran, arguing that the stratification they produce undermines educational justice by channeling opportunities along socio-economic lines (10). These perspectives demonstrate that justice within education systems cannot be fully understood without accounting for the informational structures that shape access, participation, and authority.

Contemporary educational challenges further highlight the centrality of justice in information environments. Gao and colleagues' longitudinal study demonstrates that classroom justice—encompassing fairness, respect, and transparent teacher–student interactions—directly affects students' academic engagement and emotional well-being (11). Their findings suggest that justice-oriented practices in information sharing, feedback delivery, and classroom governance significantly influence students' sense of belonging and motivation. Hosseini et al.'s review of social justice-oriented teacher education also underscores the need for educators to navigate tensions between ideals of fairness and the structural constraints imposed by institutions, especially in contexts shaped by unequal access to information (12). Likewise, Geron's research on ethical professional development shows that teachers' values and ethical commitments are strengthened when institutions provide structures that promote justice-oriented reasoning and practice (13). These studies collectively reaffirm that information justice—whether in classroom interactions, institutional policies, or systemic structures—is a foundational dimension of educational practice.

Globally, educational justice movements are increasingly intertwined with labor organizing and teacher agency. Tarlau and colleagues highlight how teacher unions mobilize to resist privatization, advocate for equitable policies, and demand transparency in educational governance (14). Their analysis demonstrates that justice within education systems is not only conceptual but also political, shaped by collective action and institutional negotiation. This adds to a broader understanding of justice as a dynamic construct shaped by socio-political forces, institutional power structures, and cultural values.

In addition, legal perspectives contribute important insights into how information justice may be conceptualized and institutionalized. Alifah's examination of restorative justice in legal frameworks highlights how procedural fairness, equal access to information, and empowerment of marginalized groups form the bedrock of just systems (15). Although her focus is on legal responses to sexual violence, the broader principle that fair information processes are essential to equitable outcomes resonates strongly with educational governance. Similarly, societal norms and cultural expectations influence perceptions of what counts as fair, transparent, or legitimate information distribution.

Within Iran's public education system, issues of transparency, access to information, administrative communication, and the distribution of decision-making authority are widely recognized challenges. Structural centralization often leads to bottlenecks in data circulation, restricting the ability of schools and educators to make informed decisions. Furthermore, informal networks, bureaucratic opacity, and variations in technological capacity create inconsistent informational environments across regions. These conditions raise concerns about equity in how information is accessed, mobilized, and controlled at various levels of the system. Despite the centrality of these concerns, empirical research on information justice within Iran's education system remains limited.

The absence of a validated, context-sensitive model of information justice creates gaps in both policy-making and institutional reform. Existing research such as Kalantari's ICT-based justice model (7) and qualitative investigations like those of Beigzadeh (9) provide a foundation, but they do not specifically address the structural, cultural, and procedural dimensions of information flows in education. Likewise, broader works on educational justice, such as those by Valizadeh (10) and Rah Najat (8), analyze governance and access inequalities but do not articulate a comprehensive framework for analyzing justice in information systems. In parallel, global scholarship on information justice provides conceptual grounding (1-4), yet it remains essential to adapt these insights to the cultural, administrative, and institutional realities of Iran's education sector.

Given the increasing digitization of Iran's education system—particularly the expansion of centralized information systems, online learning platforms, and data-driven decision-making—the development and validation of an information justice model is both timely and necessary. Such a model can support policymakers, school administrators, and educators in designing equitable information practices, reducing informational asymmetries, and strengthening transparency and accountability. Moreover, it aligns with global movements toward justice-oriented educational reform (12-14) and ongoing discussions about digital divides and information equity (5, 6). By integrating international conceptualizations with local empirical evidence, a validated model can provide actionable guidance for improving fairness in information governance at all levels of the system.

Therefore, the aim of this study is to develop and validate a comprehensive model of information justice for Iran's public education system.

Methods and Materials

This research employed a mixed-methods design in order to both gain an in-depth understanding of the phenomenon of information justice and subsequently examine the resulting model at a larger scale for purposes of generalization. Accordingly, the study was conducted in two main phases. In the first phase, a qualitative approach based on grounded theory was used to explore the underlying constructs of information justice and the relationships among them in the context of Iran's public education system. In the second phase, a quantitative survey design was adopted to develop, refine, and psychometrically validate a measurement instrument derived from the qualitative findings and to empirically test the proposed model in a broader population of educational staff.

In the qualitative phase, the methodology was grounded theory with an inductive, systematic approach following Strauss and Corbin. This approach was selected because it allows the researcher to build a context-sensitive explanatory model from the participants' perspectives through a systematic process of data collection and analysis. The participants in this phase consisted of experts and senior actors in the public education system, including heads of education departments, heads of research centers, experienced principals, and educational specialists with extensive tenure. Sampling was purposive at the outset to ensure access to information-rich cases familiar with different dimensions of information justice in education. As the analysis progressed and concepts and categories emerged, theoretical sampling was used, meaning that subsequent participants were selected based on the need to refine, deepen, or challenge emerging categories and relationships. Interviews continued until theoretical saturation was reached, that is, until no substantially new concepts or properties appeared in the data. In total, 35 participants took part in the qualitative phase, including male and female school principals, heads of district and provincial education departments, heads of research centers, university faculty in educational management, and senior educational experts from different disciplinary backgrounds such as educational management, curriculum planning, psychology, social sciences, mathematics, literature, and related fields.

In the quantitative phase, the study was applied in purpose and used a descriptive survey design. The statistical population comprised all school principals and educational experts in Iran's public education system, as the intention was to generalize the qualitative model of information justice to the national level. Based on available statistics, the total number of principals and experts was approximately 56,000 individuals. Using Krejcie and Morgan's sampling table and considering the number of observed variables and latent constructs in the model, a sample size of 390 respondents was estimated as adequate. A multi-stage procedure was used to obtain a representative sample. First, the country was divided into five geographical regions (north, south, east, west, and center), and five provinces—Isfahan, Tehran, Razavi Khorasan, Kermanshah, and Fars—were randomly selected. Second, proportional quota sampling was applied to allocate the sample size to each selected province based on the number of principals and experts in that province. Third, within each province, respondents were selected using simple random

sampling among principals and educational experts. Of the 390 distributed questionnaires, 381 fully completed questionnaires were returned and used for statistical analysis.

Two main tools were used for data collection, corresponding to the qualitative and quantitative phases of the study. In the qualitative phase, the primary technique was in-depth semi-structured interviewing. The semi-structured format made it possible to ensure coverage of core research questions while allowing flexibility to probe and follow up on issues raised by participants. The interview guide included a brief demographic section and a series of open-ended questions aligned with the study objectives and the components of the paradigm model in grounded theory. Key questions invited participants to define information justice in the context of education, to identify internal factors within the education system that influence information justice, to describe external factors and environmental conditions affecting it, to suggest strategies and policies that could promote information justice, and to discuss the consequences of observing or neglecting information justice for the education system and society. Additional questions were asked in response to the participants' own statements and to clarify or expand emerging concepts and categories. Interviews were conducted individually at participants' workplaces by prior appointment. With participants' informed consent, all interviews were audio-recorded. The duration of each interview was approximately 45–60 minutes. The verbatim transcripts of the interviews constituted the primary qualitative data used for conceptualization, categorization, and model building.

In the quantitative phase, a researcher-made questionnaire was developed as the main data collection instrument. The questionnaire was directly derived from the concepts, categories, and relationships identified in the qualitative grounded theory phase and was designed to operationalize the dimensions and components of information justice in the public education system. The initial version of the questionnaire contained 175 items rated on a five-point Likert scale (from "strongly disagree" to "strongly agree"). Items were formulated to capture the various conditions (causal, contextual, intervening), strategies, and outcomes linked to information justice, as identified in the paradigm model. To establish content validity, the draft questionnaire was reviewed by a panel of 10 experts and faculty members in educational management and related fields. Using Lawshe's content validity ratio (CVR), the necessity of each item was evaluated based on expert ratings. Items with CVR values below the critical threshold were removed or revised. In this study, 10 items were eliminated due to insufficient content validity, resulting in a refined instrument. In addition to content validity, face validity was examined by asking experts to comment on the clarity, wording, and relevance of the items for the target population. Internal consistency reliability of the questionnaire and its subscales was assessed in the quantitative phase using appropriate reliability indices such as Cronbach's alpha, although the exact coefficients are reported in the findings rather than in the methods section.

Data analysis followed the logic of the mixed-methods design, with qualitative and quantitative analyses conducted sequentially and then integrated at the interpretive level. In the qualitative phase, data analysis was carried out according to the procedures of grounded theory with the systematic approach of Strauss and Corbin. After each interview was transcribed verbatim, the text was analyzed line by line. Open coding was first performed to identify meaningful units of data and to generate initial concepts. Concepts with similar properties and dimensions were then grouped into more abstract categories. Next, axial coding was used to explore relationships among categories and to organize them within the paradigm model. In this stage, categories were related to one another along the dimensions of causal conditions, contextual conditions, intervening conditions, action–interaction strategies, and consequences, thereby forming an explanatory framework for information justice in the education system. Finally, selective coding was applied to integrate and refine the emerging theory. A central category representing the core of information justice in the public education system was identified, and other categories were systematically related to this core. Theoretical saturation was assessed continuously, and the "story line" of the model was written to articulate how conditions, processes, and consequences connect in a coherent theory.

To ensure the credibility and confirmability of the qualitative findings, several procedures were implemented. Member checking was carried out by returning coded segments and preliminary interpretations to a subset of participants so that they could confirm the accuracy and resonance of the findings with their experiences. An external audit was conducted by a colleague familiar with qualitative research, who independently reviewed a sample of transcripts, codes, and memos and compared them with the researcher's analysis. All steps of coding, categorization, and model development were documented in detail, and the research supervisors reviewed the coding process and the emergent model. Separate files and identifiers were used for each interview to facilitate traceability of data and analytic decisions.

In the quantitative phase, data analysis was conducted using appropriate statistical software. First, descriptive statistics, including frequencies, percentages, means, and standard deviations, were computed to describe the sample and summarize responses to each item and dimension of the questionnaire. Then, inferential analyses were employed to validate the measurement structure and examine the proposed information justice model. Given the objective of instrument validation and model testing, factor analytic procedures were applied. Exploratory factor analysis, where appropriate, was used to identify underlying dimensions and to assess the factor structure of the scales. Subsequently, confirmatory factor analysis within a structural equation modeling framework was used to test the factorial validity of the instrument, evaluate the fit of the hypothesized model of information justice, and estimate factor loadings and error terms. Model fit was assessed using standard fit indices, and items or paths with inadequate performance were reconsidered. Reliability indices for each dimension were also computed to confirm internal consistency. The combined results of qualitative coding and quantitative modeling provided the basis for validating and refining the information justice model for Iran's public education system.

Findings and Results

The qualitative findings of the study were organized using a grounded, category-based approach that clustered participants' statements into concepts, subcategories, and main categories under broader analytical dimensions. As shown in Table 1, the model encompasses causal conditions, contextual factors, intervening conditions, strategies, and outcomes, each of which reflects how informational justice and information sharing are shaped, constrained, and ultimately translated into organizational and individual consequences.

Table 1. Qualitative Results

Dimension	Main Category	Subcategory	Concepts
Causal conditions	Growing tendency toward a lean organization	Reengineering the organizational structure	Using team-based organizational structures; Expanding interdepartmental communication; Developing multidirectional information flows; Moving the organization toward structural decentralization; Aligning organizational structure
		Organizational balance	Tendency to create balance of power; Rule of law applying to all employees; Integrating activities and actions of different units; Providing access to information acquisition for all employees
	Growing tendency toward personal growth and development	Personal excellence	Desire for personal growth and development; Ability to seize job opportunities; Employees' tendency toward multiskilling; Growth of intensified interpersonal competition approaches (e.g., ranking schemes); Desire to play a role in organizational actions; Desire to develop skills and improve performance through acquiring information; Desire for excellence and creative learning; Tendency to showcase one's capabilities
	Societal value orientation	Anti-discrimination	Confronting unfair behaviors; Opposing unequal social benefits for particular groups; Revolting against unequal social mobility; Resisting exceptions and favoritism
		Social order	Desire for social rules to apply to all; Willingness to participate in all social affairs; Desire to reduce social conflict and contention; Desire for equality in public benefits
		Social equality	Enjoying equal status in civil rights; Enjoying equal status in property rights; Enjoying equal status in freedom of expression
		Economic justice	Desire for equal access to goods and services; Desire to benefit from information transparency; Right to access positions and jobs under

			conditions of fair equality of opportunity; Desire for fair distribution of incomes
Contextual factors	Organizational culture	Organizational individualism	Preference for individual interests, needs, and goals; Tendency to impose individual values and norms; Desire for individual gratification; Desire to differentiate oneself from others through greater information; Decline in group loyalty
		Power distance	Lack of equality among individuals in the organization; Concentration of power among organizational elites; Differences in social status among employees; Lack of change in roles and responsibilities (power rotation)
		Control-orientation	Organizational tendency to directly control individuals and activities; Exercising influence over individuals; Tendency to manage others through keeping them uninformed; Standards set by superiors; Real-time monitoring of employees
	Ownership-orientation	Informational monopolization	Tendency to retain information; Growth of cronyism and self-selection; Gaining privileges for specific persons through possessing information; Tendency to eliminate rivals due to holding information
		Economic–psychological possession	Making employees dependent on the organization by retaining information; Managers' unwillingness to grant employee autonomy; Lack of trust in employees; Desire to remain in position by retaining information
	Communication inefficiency	Increasing competitiveness	Desire for organizational pre-eminence; Using information as a tool of power; Organizational security at risk due to information dissemination
		Ineffectiveness of informal communication space	Lack of organizational discussion forums; Lack of close relationships between managers and employees; Absence of an organizational social network
		Hierarchical structure	Focus on top-down command; Lack of free flow of information in the organization; Desire to protect group interests; Classifying and compartmentalizing information to preserve it; Tendency to maintain confidentiality among managers and supervisors
	Expansion of information systems	Electronic data interchange system	Possibility of sharing information through office automation; Possibility of inter-organizational information sharing; Ability to communicate with oversight bodies and report
	Establishment of participative management	Sharing power with employees	Desire for advancement of all employees; Desire for emergence of organizational intellectual capital; Desire for the organization to win interorganizational competition by engaging employees; Desire to use collective wisdom
		Sharing authority with employees	Willingness to delegate authority due to complexity and breadth of work; Desire to improve services and their quality through involving employees; Desire to reduce managers' burden of responsibility; Willingness to transfer power for performing new roles; Increasingly competitive environment and need to empower employees; Desire for employees to feel responsible for improving overall organizational functioning
Intervening conditions	Infrastructural problems	Technological problems	Lack of necessary infrastructure for information sharing and informational justice; Inefficient information-sharing network; Potential threats of information sharing at all levels of society; Lack of information network security
		Socio-cultural problems	Self-interested considerations in information sharing; Decline of social capital in society; Declining honesty in society; Formation of narrow relationship networks in society (ethnic bias, nepotism, etc.); Lack of clear procedures in society regarding informational justice; Connivance and informational corruption (unwarranted secrecy, etc.); Decline of ethical conduct at various levels of society; Concealing information from public opinion; Influence exerted by centers of power
	Legal gaps	Intra-organizational regulations	Disobedience of laws; Arbitrary enforcement of laws in organizations; Constant changes in regulations
		Supervisory and evaluation regulations	Lack of laws countering informational bias; Ineffectiveness of information monitoring and evaluation systems; Monopolization of information at various societal levels; Ineffectiveness of the judicial pillar regarding informational justice; High tolerance of policymakers toward lack of informational justice
Strategies	Development of information ethics	Adherence to ethical standards	Commitment to keeping organizational secrets; Avoiding misuse of information for personal or group gain; Avoiding disclosure of confidential information
		Ethical responsibility	Emphasis on accountability and responsibility regarding information; Avoiding misconduct due to possessing organizational information; Training in self-control and trustworthiness
	Information transparency	Informational access	Fair distribution of information in the organization; Providing the possibility of information retrieval; Creating up-to-date and efficient information portals

		Informational explicitness	Avoiding information censorship; Providing analytical explanations regarding organizational information; Avoiding equivocation
		Accuracy of information	Emphasis on comprehensive information; Publishing qualitative information rather than merely quantitative data; Disseminating information needed by departments according to their job descriptions
		Up-to-dateness of information	Eliminating outdated information in the organization; Updating information systems; Multiplicity of reliable information sources in the organization; Using documented information in the organization; Using supportive tools for organizational information agents to collect and disseminate needed information
	Institutional support	Monitoring organizational information	Senior managers' assurance of timely and accurate dissemination of information among employees; Using multiple tools such as the organizational portal and SMS to distribute information; Controlling and supervising organizational information systems
		Institutional oversight	Ensuring that false information is not disseminated in the organization; Addressing organizational rumor-mongering and managing rumors; Discreet assessment of employees' behaviors regarding information
Outcomes	Reducing organizational polarization	Effective networking	Using employees' potential for organizational growth and development; Sharing in employees' power resources; Enjoying benefits of information exchange such as maintaining competitive advantage
		Organizational convergence	Creating organizational consensus; Reducing interpersonal conflicts; Reducing power distance in the organization; Feeling of integration and team membership
		Information redundancy	Correcting inaccurate information through dissemination; Growth and development of informational synergy in the organization; Completing the organizational information bank through employees' experiences
	Growth of self-efficacy	Reducing decision anxiety	Increasing employee participation through information sharing; Enhancing employees' confidence to make information-based decisions; Improving employees' capacity for organizational scenario-building by sharing information
		Perceived personal credibility	Feeling powerful and competent through acquiring information; Increased employees' social status; Feeling of shared ownership of the organization; Growth of feelings of worth and adequacy
	Psychological–organizational attachment		Desire to remain in the organization; Effort toward organizational growth and development; Sense of membership in the organization; Sense of identification with the organization; Growth of extra-role behaviors among employees
	Job–organizational fit	Alignment with organizational requirements	Accepting responsibility for informational assets; Adhering to behavioral standards regarding information; Striving to preserve, develop, and expand organizational information; Avoiding misuse of organizational information
		Alignment with colleagues	Sharing organizational information; Feeling organizational justice regarding information; Perception of reduced superiors' bias due to information sharing; Feeling organizational worth

Overall, Table 1 shows that the qualitative model of informational justice is multi-layered, beginning with causal conditions such as a growing preference for lean organizational structures, personal development, and value-driven societal orientations, which interact with contextual features of organizational culture, ownership and control patterns, communication structures, and participative management. These dynamics are further shaped by intervening infrastructural, socio-cultural, and legal constraints that can either inhibit or distort fair information practices. In response, organizations may adopt a range of strategies centered on the development of information ethics, the promotion of transparency, and the strengthening of institutional support and oversight. When these strategies are effectively implemented, they lead to a set of positive outcomes, including reduced organizational polarization, greater convergence and effective networking, richer and more synergistic information resources, enhanced self-efficacy and perceived credibility among employees, stronger psychological–organizational attachment, and improved job–organizational fit based on shared responsibility and justice in access to and use of information.

Table 2. Descriptive statistics for the five main components

Main Component	Mean	Standard Deviation	Minimum	Maximum
Causal factors	4.126	0.636	1.60	4.93
Contextual conditions	3.732	0.546	2.21	5.00
Strategies	4.087	0.697	1.84	5.00
Outcomes	4.151	0.647	2.43	5.00

Intervening factors	4.041	0.764		1.21	5.00

Overall, the descriptive results in Table 2 show that all five main components are scored relatively high, with means above 4 for causal factors (M = 4.126), strategies (M = 4.087), outcomes (M = 4.151), and intervening factors (M = 4.041), and only slightly lower for contextual conditions (M = 3.732). The standard deviations, ranging from 0.546 to 0.764, indicate a moderate level of dispersion around the means, suggesting some variability in respondents' perceptions while still clustering toward the upper end of the scale. The minimum values (from 1.21 to 2.43) show that a minority of respondents reported relatively low perceptions in some components, whereas the maximum value of 5.00 for most constructs confirms that at least some participants fully endorsed the highest possible level on the measurement scale. Collectively, these patterns imply generally favorable evaluations of causal, contextual, strategic, outcome-related, and intervening dimensions within the studied system.

Table 3. Goodness-of-fit indices for the CFA models of main components and higher-order constructs

Component / Construct	χ^2/df	IFI	NFI	TLI	CFI	RMSEA
Increasing tendency toward a lean organization	2.835	0.914	0.898	0.902	0.914	0.079
Increasing tendency toward personal growth and development	3.113	0.939	0.925	0.909	0.938	0.083
Societal value orientation	4.496	0.957	0.939	0.931	0.956	0.081
Expansion of information systems	1.221	0.999	0.998	0.999	0.999	0.001
Establishment of participative management	3.579	0.954	0.945	0.938	0.954	0.071
Organizational culture	4.735	0.955	0.930	0.924	0.955	0.079
Ownership-orientation	3.510	0.907	0.896	0.963	0.907	0.082
Communication inefficiency	3.246	0.919	0.901	0.981	0.918	0.088
Growth and development of information ethics	3.841	0.933	0.925	0.873	0.932	0.069
Information transparency	3.344	0.898	0.980	0.874	0.897	0.077
Institutional support	3.167	0.925	0.916	0.889	0.925	0.079
Reducing organizational polarization	2.196	0.975	0.963	0.929	0.874	0.082
Growth of self-efficacy	3.542	0.986	0.971	0.858	0.986	0.081
Job–organizational fit	3.589	0.968	0.962	0.936	0.968	0.080
Infrastructural problems	4.118	0.949	0.934	0.931	0.949	0.093
Legal gaps	3.970	0.970	0.964	0.951	0.969	0.091
Causal factors (latent construct)	3.323	0.962	0.956	0.941	0.962	0.071
Contextual conditions (latent construct)	3.591	0.891	0.980	0.938	0.990	0.076
Strategies (latent construct)	3.400	0.981	0.974	0.970	0.981	0.081
Outcomes (latent construct)	3.869	0.911	0.905	0.869	0.911	0.080
Intervening factors (latent construct)	1.132	0.999	0.998	0.999	0.991	0.061

Recommended thresholds: $\chi^2/df < 5.00$; IFI, NFI, TLI, CFI ≥ 0.90; RMSEA ≤ 0.10.

In general, Table 3 shows that all first-order components and higher-order constructs of the model meet the conventional goodness-of-fit criteria for confirmatory factor analysis. Across the different dimensions, the χ^2/df ratios are all below 5, indicating acceptable relative fit, while incremental indices such as IFI, NFI, TLI and CFI mostly exceed or are very close to the 0.90 benchmark, pointing to satisfactory comparative and non-normed fit. The RMSEA values for all constructs remain below 0.10, with particularly strong fit observed for the expansion of information systems and the intervening factors construct, which exhibit very low RMSEA and near-perfect incremental indices. Even in those cases where one of the indices is slightly below the ideal cut-off, the overall profile of indices still supports the adequacy of each measurement model. Taken together, these results confirm that the measurement structure for the main components (e.g., lean organization, personal development, societal values, organizational culture, ownership-orientation, communication inefficiency), the strategic dimensions (information ethics, transparency, institutional support), the outcome constructs (reducing polarization, self-efficacy growth, job–organizational fit), and the broader causal, contextual, intervening and strategic latent constructs all display an acceptable to very good level of model fit.

Table 4. Standardized factor loadings of items and subcategories on their respective constructs

Main construct	Subcategory	Item (Question)	Factor loading	Critical ratio
Increasing tendency toward a lean organization	Organizing organizational structure	Subcategory indicator	0.961	–
Increasing tendency toward a lean organization	Organizing organizational structure	Q1	0.736	–
Increasing tendency toward a lean organization	Organizing organizational structure	Q2	0.797	14.190
Increasing tendency toward a lean organization	Organizing organizational structure	Q3	0.741	13.258
Increasing tendency toward a lean organization	Organizing organizational structure	Q4	0.486	8.689
Increasing tendency toward a lean organization	Organizing organizational structure	Q5	0.647	11.584
Increasing tendency toward a lean organization	Organizational balance	Subcategory indicator	0.862	–
Increasing tendency toward a lean organization	Organizational balance	Q6	0.623	–
Increasing tendency toward a lean organization	Organizational balance	Q7	0.795	14.226
Increasing tendency toward a lean organization	Organizational balance	Q8	0.738	15.427
Increasing tendency toward a lean organization	Organizational balance	Q9	0.795	11.771
Increasing tendency toward personal growth and development	Personal excellence	Q10	0.741	–
Increasing tendency toward personal growth and development	Personal excellence	Q11	0.703	13.250
Increasing tendency toward personal growth and development	Personal excellence	Q12	0.612	11.374
Increasing tendency toward personal growth and development	Personal excellence	Q13	0.481	8.974
Increasing tendency toward personal growth and development	Personal excellence	Q14	0.689	12.844
Increasing tendency toward personal growth and development	Personal excellence	Q15	0.790	11.565
Increasing tendency toward personal growth and development	Personal excellence	Q16	0.849	12.652
Increasing tendency toward personal growth and development	Personal excellence	Q17	0.628	12.011
Societal value orientation	Anti-discrimination	Subcategory indicator	0.922	–
Societal value orientation	Anti-discrimination	Q18	0.739	–
Societal value orientation	Anti-discrimination	Q19	0.769	17.956
Societal value orientation	Anti-discrimination	Q20	0.741	16.924
Societal value orientation	Anti-discrimination	Q21	0.843	21.094
Societal value orientation	Social order	Subcategory indicator	0.974	–
Societal value orientation	Social order	Q22	0.791	–
Societal value orientation	Social order	Q23	0.492	9.959
Societal value orientation	Social order	Q24	0.790	19.719
Societal value orientation	Social order	Q25	0.874	24.306
Societal value orientation	Social equality	Subcategory indicator	0.931	–
Societal value orientation	Social equality	Q26	0.806	–
Societal value orientation	Social equality	Q27	0.746	17.302
Societal value orientation	Social equality	Q28	0.813	20.091
Societal value orientation	Economic justice	Subcategory indicator	0.931	–
Societal value orientation	Economic justice	Q29	0.815	19.991
Societal value orientation	Economic justice	Q30	0.824	20.386
Societal value orientation	Economic justice	Q31	0.847	21.493
Societal value orientation	Economic justice	Q32	0.713	–
Expansion of information systems	Electronic data interchange system	Q66	0.742	–
Expansion of information systems	Electronic data interchange system	Q67	0.922	12.645

Expansion of information systems	Electronic data interchange system	Q68	0.661	12.120
Establishment of participative management	Sharing power with employees	Subcategory indicator	0.917	–
Establishment of participative management	Sharing power with employees	Q69	0.867	–
Establishment of participative management	Sharing power with employees	Q70	0.887	23.270
Establishment of participative management	Sharing power with employees	Q71	0.810	19.721
Establishment of participative management	Sharing power with employees	Q72	0.847	21.401
Establishment of participative management	Sharing authority with employees	Subcategory indicator	0.752	–
Establishment of participative management	Sharing authority with employees	Q73	0.838	–
Establishment of participative management	Sharing authority with employees	Q74	0.857	20.741
Establishment of participative management	Sharing authority with employees	Q75	0.703	15.319
Establishment of participative management	Sharing authority with employees	Q76	0.813	18.973
Establishment of participative management	Sharing authority with employees	Q77	0.811	18.927
Establishment of participative management	Sharing authority with employees	Q78	0.888	21.995
Organizational culture	Organizational individualism	Subcategory indicator	0.936	–
Organizational culture	Organizational individualism	Q33	0.594	–
Organizational culture	Organizational individualism	Q34	0.702	13.629
Organizational culture	Organizational individualism	Q35	0.628	11.953
Organizational culture	Organizational individualism	Q36	0.558	10.457
Organizational culture	Organizational individualism	Q37	0.659	12.654
Organizational culture	Power distance	Subcategory indicator	0.973	–
Organizational culture	Power distance	Q38	0.670	–
Organizational culture	Power distance	Q39	0.833	17.295
Organizational culture	Power distance	Q40	0.772	15.884
Organizational culture	Power distance	Q41	0.658	12.714
Organizational culture	Control-orientation	Subcategory indicator	0.846	–
Organizational culture	Control-orientation	Q42	0.732	–
Organizational culture	Control-orientation	Q43	0.852	18.166
Organizational culture	Control-orientation	Q44	0.730	14.861
Organizational culture	Control-orientation	Q45	0.583	11.310
Organizational culture	Control-orientation	Q46	0.639	12.606
Ownership-orientation	Informational monopolization	Subcategory indicator	0.574	–
Ownership-orientation	Informational monopolization	Q47	0.497	–
Ownership-orientation	Informational monopolization	Q48	0.657	8.531
Ownership-orientation	Informational monopolization	Q49	0.707	8.855
Ownership-orientation	Informational monopolization	Q50	0.890	9.646
Ownership-orientation	Economic–psychological possession	Subcategory indicator	0.699	–
Ownership-orientation	Economic–psychological possession	Q51	0.833	–
Ownership-orientation	Economic–psychological possession	Q52	0.702	14.488
Ownership-orientation	Economic–psychological possession	Q53	0.783	16.748
Ownership-orientation	Economic–psychological possession	Q54	0.805	17.393
Communication inefficiency	Increasing competitiveness	Subcategory indicator	0.990	–
Communication inefficiency	Increasing competitiveness	Q55	0.664	–
Communication inefficiency	Increasing competitiveness	Q56	0.743	15.513
Communication inefficiency	Increasing competitiveness	Q57	0.546	11.791
Communication inefficiency	Inefficiency of informal communication	Subcategory indicator	0.978	–

Communication inefficiency	Inefficiency of informal communication	Q58	0.739	–
Communication inefficiency	Inefficiency of informal communication	Q59	0.677	13.618
Communication inefficiency	Inefficiency of informal communication	Q60	0.581	11.206
Communication inefficiency	Hierarchical structure	Subcategory indicator	0.949	–
Communication inefficiency	Hierarchical structure	Q61	0.715	–
Communication inefficiency	Hierarchical structure	Q62	0.821	17.949
Communication inefficiency	Hierarchical structure	Q63	0.609	12.094
Communication inefficiency	Hierarchical structure	Q64	0.702	14.444
Communication inefficiency	Hierarchical structure	Q65	0.600	11.817
Growth and development of information ethics	Adherence to ethical standards	Subcategory indicator	0.692	–
Growth and development of information ethics	Adherence to ethical standards	Q100	0.798	–
Growth and development of information ethics	Adherence to ethical standards	Q101	0.749	13.495
Growth and development of information ethics	Adherence to ethical standards	Q102	0.784	13.925
Growth and development of information ethics	Ethical responsibility	Subcategory indicator	0.914	–
Growth and development of information ethics	Ethical responsibility	Q103	0.761	–
Growth and development of information ethics	Ethical responsibility	Q104	0.704	12.372
Growth and development of information ethics	Ethical responsibility	Q105	0.833	13.650
Information transparency	Informational access	Subcategory indicator	0.692	–
Information transparency	Informational access	Q106	0.648	–
Information transparency	Informational access	Q107	0.767	19.622
Information transparency	Informational access	Q108	0.815	21.992
Information transparency	Informational explicitness	Subcategory indicator	0.914	–
Information transparency	Informational explicitness	Q109	0.785	–
Information transparency	Informational explicitness	Q110	0.755	17.221
Information transparency	Informational explicitness	Q111	0.822	19.856
Information transparency	Accuracy of information	Subcategory indicator	0.914	–
Information transparency	Accuracy of information	Q112	0.774	–
Information transparency	Accuracy of information	Q113	0.763	17.136
Information transparency	Accuracy of information	Q114	0.846	20.245
Information transparency	Up-to-dateness of information	Subcategory indicator	0.914	–
Information transparency	Up-to-dateness of information	Q115	0.621	–
Information transparency	Up-to-dateness of information	Q116	0.749	16.923
Information transparency	Up-to-dateness of information	Q117	0.884	22.467
Information transparency	Up-to-dateness of information	Q118	0.801	18.796
Institutional support	Organizational rewards and sanctions	Subcategory indicator	0.923	–
Institutional support	Organizational rewards and sanctions	Q119	0.757	–
Institutional support	Organizational rewards and sanctions	Q120	0.844	20.018
Institutional support	Monitoring organizational information	Subcategory indicator	0.771	–
Institutional support	Monitoring organizational information	Q121	0.786	–
Institutional support	Monitoring organizational information	Q122	0.795	19.065
Institutional support	Monitoring organizational information	Q123	0.783	18.578
Institutional support	Institutional oversight	Subcategory indicator	0.867	–
Institutional support	Institutional oversight	Q124	0.848	–
Institutional support	Institutional oversight	Q125	0.863	21.456
Institutional support	Institutional oversight	Q126	0.641	13.591
Reducing organizational polarization	Effective networking	Subcategory indicator	0.977	–
Reducing organizational polarization	Effective networking	Q127	0.737	–

Reducing organizational polarization	Effective networking	Q128	0.673	14.183
Reducing organizational polarization	Effective networking	Q129	0.675	14.372
Reducing organizational polarization	Organizational convergence	Subcategory indicator	0.980	–
Reducing organizational polarization	Organizational convergence	Q130	0.736	–
Reducing organizational polarization	Organizational convergence	Q131	0.818	19.321
Reducing organizational polarization	Organizational convergence	Q132	0.838	20.136
Reducing organizational polarization	Organizational convergence	Q133	0.751	16.739
Reducing organizational polarization	Information redundancy	Subcategory indicator	0.877	–
Reducing organizational polarization	Information redundancy	Q134	0.831	–
Reducing organizational polarization	Information redundancy	Q135	0.837	20.427
Reducing organizational polarization	Information redundancy	Q136	0.834	20.291
Growth of self-efficacy	Reducing decision anxiety	Subcategory indicator	0.892	–
Growth of self-efficacy	Reducing decision anxiety	Q137	0.803	–
Growth of self-efficacy	Reducing decision anxiety	Q138	0.904	23.118
Growth of self-efficacy	Reducing decision anxiety	Q139	0.697	15.205
Growth of self-efficacy	Perceived personal credibility	Subcategory indicator	0.952	–
Growth of self-efficacy	Perceived personal credibility	Q140	0.694	–
Growth of self-efficacy	Perceived personal credibility	Q141	0.746	16.619
Growth of self-efficacy	Perceived personal credibility	Q142	0.826	19.454
Growth of self-efficacy	Perceived personal credibility	Q143	0.887	22.009
Growth of self-efficacy	Psychological–organizational attachment	Subcategory indicator	0.973	–
Growth of self-efficacy	Psychological–organizational attachment	Q144	0.749	–
Growth of self-efficacy	Psychological–organizational attachment	Q145	0.829	20.027
Growth of self-efficacy	Psychological–organizational attachment	Q146	0.799	18.027
Growth of self-efficacy	Psychological–organizational attachment	Q147	0.785	18.260
Growth of self-efficacy	Psychological–organizational attachment	Q148	0.542	10.975
Job–organizational fit	Alignment with organizational requirements	Subcategory indicator	0.750	–
Job–organizational fit	Alignment with organizational requirements	Q149	0.917	–
Job–organizational fit	Alignment with organizational requirements	Q150	0.785	18.894
Job–organizational fit	Alignment with organizational requirements	Q151	0.858	22.345
Job–organizational fit	Alignment with colleagues	Subcategory indicator	0.502	–
Job–organizational fit	Alignment with colleagues	Q152	0.464	–
Job–organizational fit	Alignment with colleagues	Q153	0.852	8.945
Job–organizational fit	Alignment with colleagues	Q154	0.867	8.814
Job–organizational fit	Alignment with colleagues	Q155	0.724	8.408
Job–organizational fit	Alignment with colleagues	Q156	0.798	8.756
Infrastructural problems	Technological problems	Subcategory indicator	0.831	–
Infrastructural problems	Technological problems	Q79	0.823	–
Infrastructural problems	Technological problems	Q80	0.908	20.735
Infrastructural problems	Technological problems	Q81	0.726	15.340
Infrastructural problems	Technological problems	Q82	0.696	14.591
Infrastructural problems	Socio-cultural problems	Subcategory indicator	0.780	–
Infrastructural problems	Socio-cultural problems	Q83	0.642	–
Infrastructural problems	Socio-cultural problems	Q84	0.595	11.946
Infrastructural problems	Socio-cultural problems	Q85	0.785	12.798
Infrastructural problems	Socio-cultural problems	Q86	0.759	12.459
Infrastructural problems	Socio-cultural problems	Q87	0.840	13.495
Infrastructural problems	Socio-cultural problems	Q88	0.871	13.817
Infrastructural problems	Socio-cultural problems	Q89	0.845	13.502
Infrastructural problems	Socio-cultural problems	Q90	0.676	11.339
Infrastructural problems	Socio-cultural problems	Q91	0.757	12.433
Legal gaps	Intra-organizational regulations	Subcategory indicator	0.901	–
Legal gaps	Intra-organizational regulations	Q92	0.864	–

Legal gaps	Intra-organizational regulations	Q93	0.860	20.881
Legal gaps	Intra-organizational regulations	Q94	0.819	19.294
Legal gaps	Supervisory and evaluation regulations	Subcategory indicator	0.987	–
Legal gaps	Supervisory and evaluation regulations	Q95	0.812	–
Legal gaps	Supervisory and evaluation regulations	Q96	0.917	21.493
Legal gaps	Supervisory and evaluation regulations	Q97	0.844	19.021
Legal gaps	Supervisory and evaluation regulations	Q98	0.872	19.955
Legal gaps	Supervisory and evaluation regulations	Q99	0.884	19.021
Causal factors (higher-order)	Increasing tendency toward a lean organization	Component indicator	0.940	–
Causal factors (higher-order)	Increasing tendency toward a lean organization → Organizing organizational structure	Subcomponent	0.834	–
Causal factors (higher-order)	Increasing tendency toward a lean organization → Organizational balance	Subcomponent	0.849	21.567
Causal factors (higher-order)	Increasing tendency toward personal growth and development	Component indicator	0.926	–
Causal factors (higher-order)	Increasing tendency toward personal growth and development → Personal excellence	Subcomponent	0.891	–
Causal factors (higher-order)	Societal value orientation	Component indicator	0.928	–
Causal factors (higher-order)	Societal value orientation → Anti-discrimination	Subcomponent	0.788	–
Causal factors (higher-order)	Societal value orientation → Social order	Subcomponent	0.910	25.679
Causal factors (higher-order)	Societal value orientation → Social equality	Subcomponent	0.842	24.507
Causal factors (higher-order)	Societal value orientation → Economic justice	Subcomponent	0.876	23.649
Contextual conditions (higher-order)	Expansion of information systems	Component indicator	0.517	–
Contextual conditions (higher-order)	Expansion of information systems → Electronic data interchange system	Subcomponent	0.517	18.447
Contextual conditions (higher-order)	Establishment of participative management	Component indicator	0.419	–
Contextual conditions (higher-order)	Establishment of participative management → Sharing power with employees	Subcomponent	0.970	–
Contextual conditions (higher-order)	Establishment of participative management → Sharing authority with employees	Subcomponent	0.923	15.895
Contextual conditions (higher-order)	Organizational culture	Component indicator	0.955	–
Contextual conditions (higher-order)	Organizational culture → Organizational individualism	Subcomponent	0.777	–
Contextual conditions (higher-order)	Organizational culture → Power distance	Subcomponent	0.903	24.515
Contextual conditions (higher-order)	Organizational culture → Control-orientation	Subcomponent	0.834	20.901
Contextual conditions (higher-order)	Ownership-orientation	Component indicator	0.922	–
Contextual conditions (higher-order)	Ownership-orientation → Informational monopolization	Subcomponent	0.748	–
Contextual conditions (higher-order)	Ownership-orientation → Economic–psychological possession	Subcomponent	0.813	18.646
Contextual conditions (higher-order)	Communication inefficiency	Component indicator	0.968	–
Contextual conditions (higher-order)	Communication inefficiency → Increasing competitiveness	Subcomponent	0.739	–
Contextual conditions (higher-order)	Communication inefficiency → Inefficiency of informal communication	Subcomponent	0.802	19.253
Contextual conditions (higher-order)	Communication inefficiency → Hierarchical structure	Subcomponent	0.882	23.054
Strategies (higher-order)	Growth and development of information ethics	Component indicator	0.782	–
Strategies (higher-order)	Growth and development of information ethics → Adherence to ethical standards	Subcomponent	0.700	–
Strategies (higher-order)	Growth and development of information ethics → Ethical responsibility	Subcomponent	0.785	21.008
Strategies (higher-order)	Information transparency	Component indicator	0.571	–
Strategies (higher-order)	Information transparency → Informational access	Subcomponent	0.913	–
Strategies (higher-order)	Information transparency → Informational explicitness	Subcomponent	0.845	24.525

Strategies (higher-order)	Information transparency → Accuracy of information	Subcomponent	0.836	24.266
Strategies (higher-order)	Information transparency → Up-to-dateness of information	Subcomponent	0.860	25.894
Strategies (higher-order)	Institutional support	Component indicator	0.948	–
Strategies (higher-order)	Institutional support → Organizational rewards and sanctions	Subcomponent	0.818	–
Strategies (higher-order)	Institutional support → Monitoring organizational information	Subcomponent	0.907	27.443
Strategies (higher-order)	Institutional support → Institutional oversight	Subcomponent	0.824	23.756
Outcomes (higher-order)	Reducing organizational polarization	Component indicator	0.953	–
Outcomes (higher-order)	Reducing organizational polarization → Effective networking	Subcomponent	0.820	–
Outcomes (higher-order)	Reducing organizational polarization → Organizational convergence	Subcomponent	0.882	25.590
Outcomes (higher-order)	Reducing organizational polarization → Information redundancy	Subcomponent	0.900	26.968
Outcomes (higher-order)	Growth of self-efficacy	Component indicator	0.985	–
Outcomes (higher-order)	Growth of self-efficacy → Reducing decision anxiety	Subcomponent	0.833	–
Outcomes (higher-order)	Growth of self-efficacy → Perceived personal credibility	Subcomponent	0.850	23.957
Outcomes (higher-order)	Growth of self-efficacy → Psychological–organizational attachment	Subcomponent	0.903	27.903
Outcomes (higher-order)	Job–organizational fit	Component indicator	0.948	–
Outcomes (higher-order)	Job–organizational fit → Alignment with organizational requirements	Subcomponent	0.867	–
Outcomes (higher-order)	Job–organizational fit → Alignment with colleagues	Subcomponent	0.862	24.097
Intervening factors (higher-order)	Infrastructural problems	Component indicator	0.811	–
Intervening factors (higher-order)	Infrastructural problems → Technological problems	Subcomponent	0.852	–
Intervening factors (higher-order)	Infrastructural problems → Socio-cultural problems	Subcomponent	0.920	21.445
Intervening factors (higher-order)	Legal gaps	Component indicator	0.923	–
Intervening factors (higher-order)	Legal gaps → Intra-organizational regulations	Subcomponent	0.885	–
Intervening factors (higher-order)	Legal gaps → Supervisory and evaluation regulations	Subcomponent	0.918	24.467

In summary, Table 4 indicates that all items load positively and significantly on their corresponding subcategories, and that these subcategories in turn show strong, statistically significant loadings on their higher-order constructs. Most item loadings are in the moderate-to-high range, with many exceeding 0.70, which supports good convergent validity at the indicator level. Subcategories such as social order, organizational convergence, psychological–organizational attachment, and supervisory regulations display particularly strong loadings on their parent constructs, demonstrating coherent and well-defined latent structures. At the highest level, the causal, contextual, strategic, outcome, and intervening constructs are each robustly represented by their main components, confirming that the overall measurement model captures a consistent and theoretically meaningful hierarchy from individual items up to the most abstract dimensions of the framework.

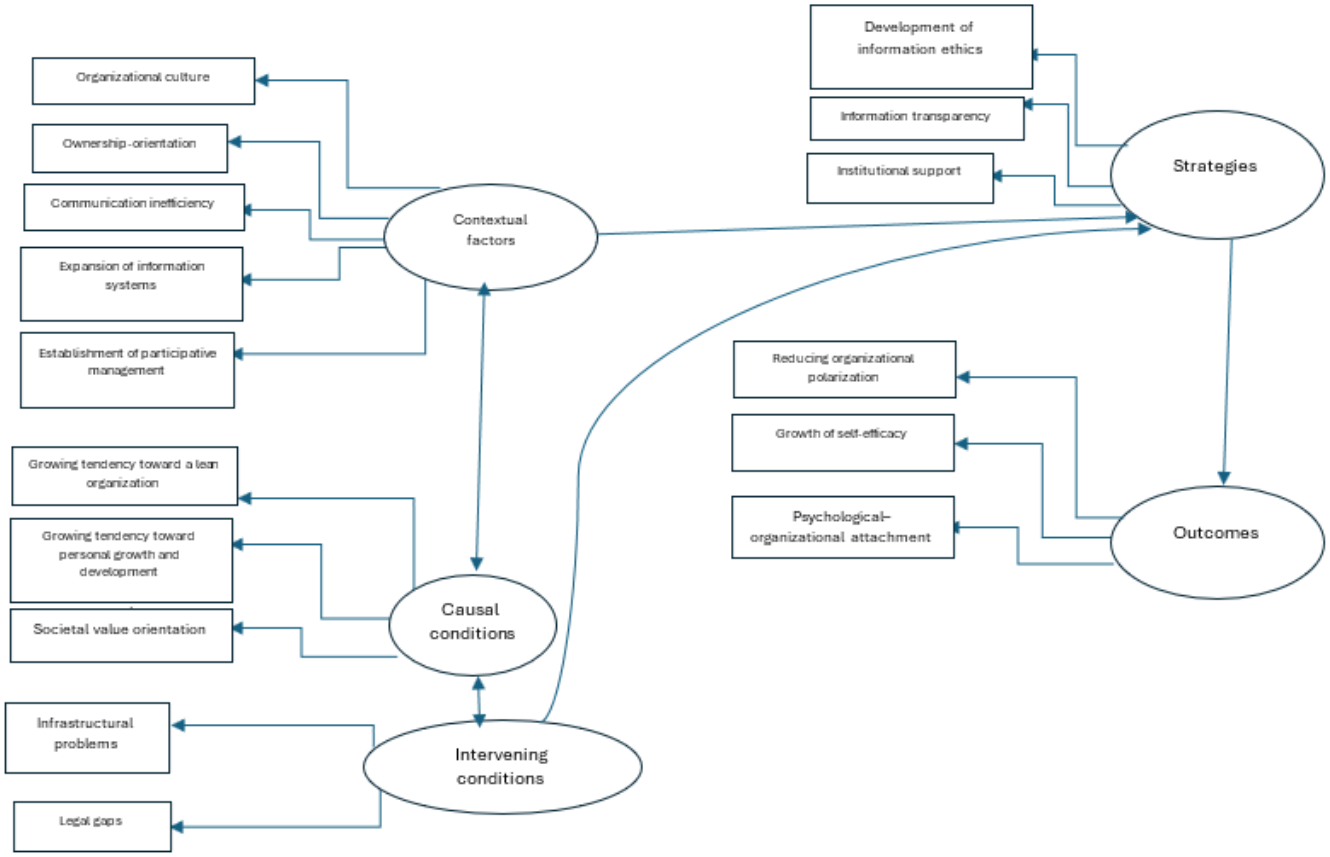

Figure 1. Final Validated Model

Discussion and Conclusion

The purpose of this study was to develop and validate a comprehensive model of information justice within Iran's public education system through a mixed-methods design integrating grounded theory and confirmatory factor analysis. The study's results provide empirical confirmation of the multidimensional structure of information justice, encompassing causal conditions, contextual conditions, intervening conditions, strategies, and outcomes. The qualitative phase identified a rich set of categories—such as organizational structure reform, individual capacity building, values of social justice, technological infrastructure, managerial participation, and institutional accountability—that together shape the dynamics of information justice across schools and administrative bodies. These categories were then operationalized into measurable indicators in the quantitative phase. Confirmatory factor analysis demonstrated that all primary components and subcomponents exhibited acceptable or strong factor loadings, supported by goodness-of-fit indices within the standard thresholds. Together, the findings demonstrate that the proposed model is both theoretically grounded and statistically robust, offering an empirically validated framework for analyzing information justice in public education.

The identification of causally influential factors such as organizational restructuring, enhanced communication flows, and fairness-driven administrative regulation indicates that information justice emerges not merely from technological improvements but from deliberate institutional design. These findings underscore that fairness in the distribution, availability, and transparency of information is tightly linked to organizational culture and governance. The model also revealed strong relationships between information justice and outcomes such as reduced organizational polarization, enhanced self-efficacy among staff, and higher levels of collaboration and role alignment. This suggests that information justice serves as a

foundational mechanism shaping broader organizational behavior, performance, and climate. The fact that participants consistently emphasized transparency, participatory decision-making, and equitable access to information highlights the centrality of procedural fairness in educational administration.

The results further indicate that contextual variables—especially culture, power distance, and control orientation—play a mediating role in how information justice is either facilitated or constrained. For example, environments characterized by hierarchical structures and restricted information flows created barriers to justice-oriented governance, while more participatory and communicative environments enabled it. Similarly, intervening conditions such as legal ambiguity, technological shortcomings, and socio-cultural dynamics were identified as potential disruptors that absorbed or redirected the influence of organizational strategies. These findings highlight that information justice cannot be understood solely through structural or policy lenses; it is shaped through ongoing interactions among cultural, technological, policy, and interpersonal systems.

The explanatory strength of the model is further supported by the identified strategies—such as ethical information practices, structured transparency, and institutional accountability—which showed strong statistical relationships with both contextual variables and key outcomes. These strategies represent the actionable dimensions of information justice and reveal how equitable information governance can be intentionally built. When implemented effectively, they appear to reduce informational asymmetry, strengthen trust among staff, and improve the overall coherence of the educational system. The final validated model provides evidence that comprehensive information justice frameworks can systematically enhance organizational functioning.

The study's results align closely with global literature on information justice and educational equity. Griffin's foundational argument for a doctrine of information justice highlights the need for explicit principles regulating the flow, distribution, and governance of information within institutional settings (1). The robust structure identified in the present study—encompassing fairness, transparency, and equitable access—reflects the dimensions Griffin conceptualized. Similarly, Johnson's exploration of technological governance and data practices illustrates how inequitable information processes can reinforce existing hierarchies in higher education (4). The present findings confirm this dynamic: hierarchical structures and centralized decision-making were shown to restrict equitable information access, thereby diminishing organizational cohesion.

The results also corroborate Mathiesen's conceptual framework for informational justice, which emphasizes distributive fairness, participatory access, and representational equity (2). Several components of the validated model—such as equitable allocation of information, inclusive communication systems, and mechanisms for accountability—directly reflect these principles. The emergent importance of social values such as anti-discrimination, equality, and economic fairness corresponds with Dencik's analyses of data politics, where systemic inequities embedded in data governance create new forms of exclusion (3). In the same way, the present study found that in the absence of institutional safeguards, information systems can reinforce inequalities in authority, resources, and opportunities.

The strong emphasis on the digital divide, technological barriers, and socio-cultural inequalities reflects ongoing discussions by Hargittai on the second digital divide, which is rooted in disparities not only in technological access but also in skills and meaningful participation (5). These findings also resonate with Assefa and colleagues' arguments that digital inequity in developing countries is deeply intertwined with structural and socio-economic constraints that require justice-oriented interventions (6). In Iran's educational context, technological disparities and inconsistent digital literacy levels were shown to be major obstacles to achieving information justice, reinforcing the necessity of system-wide digital capacity building.

The results further align with contemporary research on educational justice. Beigzadeh's qualitative investigation of justice perceptions among students, faculty, and administrators revealed that fairness is seen not only as equal access to resources but also as transparency, respect, and equitable participation in decision-making (9). These dimensions are reflected in the high

factor loadings associated with transparency, shared authority, and participatory governance in the current study. Likewise, Valizadeh's critique of privatization and stratification in Iran's education system demonstrates the harmful effects of inequitable resource allocation (10). Although the present study focuses specifically on information flows, the systemic patterns of inequity identified by Valizadeh manifest similarly in the informational domain.

Rah Najat's policy analysis of educational justice in the governance of private and special schools highlights legal ambiguities and inconsistent enforcement as sources of inequity (8). These themes appear prominently in this study's findings as well, where legal gaps and discretionary rule enforcement were deeply intertwined with informational inequality. Geron's research on supporting teachers' ethical values through professional development emphasizes the role of justice-oriented institutional structures in strengthening educators' sense of agency and fairness (13). The strategies identified in this study—such as ethical information dissemination and institutional oversight—closely mirror those ethical structures. Additionally, Hosseini and colleagues note that teacher education programs must equip educators to navigate tensions between ideals of fairness and unequal institutional realities (12), a dynamic also reflected in participants' concerns about inconsistent communication and unequal access to information.

The importance of participatory governance and collective action, highlighted in Tarlau's research on teacher unions and global educational justice movements, further supports the current findings that shared authority and collaborative information systems strengthen cohesion and reduce conflict in educational institutions (14). This study's model demonstrates empirically that when information is shared equitably and decision-making processes become more inclusive, institutional trust increases and polarization diminishes. The finding that strategies based on ethical responsibility and structured transparency have strong effects is also consistent with Alifah's argument that justice systems—legal or educational—must rely on transparent, inclusive procedures to protect marginalized stakeholders (15). Moreover, the demonstrated effect of informational fairness on academic and emotional outcomes parallels Gao's findings that classroom justice significantly influences students' engagement and development (11). Just as fair practices in classroom communication support students' well-being, equitable information processes at the institutional level enhance staff cohesion and organizational performance.

Kalantari's work on ICT-based educational justice models also provides contextual support for the current findings, affirming that technological systems must be intentionally designed to support transparency, equitable access, and accountability (7). Collectively, these aligned studies demonstrate that the validated model of information justice is grounded in and supported by global and regional scholarship, reinforcing its conceptual and empirical credibility.

This study has several limitations that should be considered when interpreting the findings. First, although the qualitative sampling strategy sought maximum variation, participants were still drawn primarily from individuals occupying leadership and expert roles within the education system, which may have shaped the perspectives represented in the grounded theory model. A broader inclusion of frontline teachers and students could have revealed additional dimensions of information justice. Second, the quantitative phase relied on self-reported data, which may be influenced by response biases, including social desirability and subjective interpretation of questionnaire items. Third, the study was conducted within the structural and cultural context of Iran's public education system, which may limit the generalizability of the model to systems with different governance structures, technological infrastructures, or socio-cultural dynamics. Finally, although confirmatory factor analysis confirmed model fit, longitudinal or experimental designs would be required to establish causal relationships.

Future studies should consider expanding the model to include the perspectives of students, parents, and community stakeholders, whose experiences with information access and institutional transparency may differ from those of administrators and experts. Additional research could also examine the role of digital literacy training and technological readiness in strengthening information justice, particularly in regions with limited infrastructure. Cross-national comparative studies would

provide deeper understanding of how cultural, legal, and governance contexts shape informational equity. Finally, employing longitudinal designs could illuminate how changes in policy, digital systems, or organizational culture influence the development of information justice over time.

Educational policymakers and administrators should consider implementing structured transparency protocols, ensuring timely and equitable dissemination of information across all levels of the education system. Training programs in ethical information handling and participatory governance can help build capacity among school leaders and staff. Additionally, investment in reliable digital infrastructures and user-friendly information systems can reduce disparities and support more consistent communication. By institutionalizing accountability mechanisms and fostering collaborative cultures, educational organizations can move toward more equitable, just, and effective information environments.

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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

All ethical principles were adhered in conducting and writing this article.

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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References

1. Griffin J. A call for a doctrine of 'information justice'. Intellectual Property Rights and Emerging Technology: Routledge; 2018. p. 141-67.
2. Mathiesen K. Informational justice: A conceptual framework for social justice in library and information services. Library Trends. 2015;64(2):198-225. doi: 10.1353/lib.2015.0044.
3. Dencik L, Hintz A, Cable J. Towards data justice: Data Politics; 2017. 167-9781315167305-9 p.
4. Johnson JA. Toward information justice: Technology, politics, and policy for data in higher education administration: Springer; 2018.
5. Hargittai E. The Second Digital Divide: How People Vote Online. Policy and Internet. 2014;4(1):1-7.

6. Assefa Y, Gebremeskel MM, Moges BT, Tilwani SA, Azmera YA. Rethinking the digital divide and associated educational in(equity) in higher education in the context of developing countries: the social justice perspective. The International Journal of Information and Learning Technology. 2025;42(1):15-32.

7. Kalantari F. Presenting and validating an educational justice model based on information and communication technology with a blended learning approach in education. Journal of Technology in Entrepreneurship and Strategic Management. 2024;4(3). doi: 10.61838/kman.jtesm.3.4.11.

8. Rah Najat M, Negarestani MH. Examining Educational Justice in Light of the Law on the Establishment and Management of Private Schools and Educational Centers. Public Policy Quarterly. 2024;10(1):143-57.

9. Beigzadeh A, Nemati N, Zarei M, Kianiservak I, Rezaei H. Exploring Educational Justice: A Qualitative Study of Perspectives from Students, Faculty members, and Administrative Managers. Journal of Kerman University of Medical Sciences. 2025;32(1):1-9.

10. Valizadeh MJ, Mahmoudi RA. Critique and Review of Educational Justice with Regard to the Formation of Special and Non-Governmental Schools. Social and Cultural Strategy. 2024;13(4):1645-71. doi: 10.22034/scs.2024.480748.1611.

11. Gao Q, Zhou Y, Zhang L, Wang C, Yang Y, Liang W, et al. Longitudinal Effects of Peer Support and Classroom Justice on Academic Engagement and Disaffection Among Chinese Adolescents: A Mediation and Multigroup Analysis. British Journal of Educational Psychology. 2025. doi: 10.1111/bjep.70021.

12. Hosseini N, Leijgraaf M, Gaikhorst L, Volman M. Navigating Challenges and Tensions in Social Justice-Oriented Teacher Education: A Review of the Literature. Review of Educational Research. 2025. doi: 10.3102/00346543251325572.

13. Geron T. “Creating Justice in My Practice”: Supporting Teachers’ Values Through Professional Development in Educational Ethics. Teachers College Record. 2025;127(3):40-66. doi: 10.1177/01614681251336676.

14. Tarlau R, Campos J, Visagie A. Teachers’ unions, educator organising, and global struggles for educational justice. Globalisation, Societies and Education. 2025;23(1):1-14.

15. Alifah N. Critical Review of the Implementation of Restorative Justice for Victims of Sexual Violence Crimes: A Legal Positivism Perspective of Hart. International Journal of Educational Research & Social Sciences. 2025;6(2):138-45. doi: 10.51601/ijersc.v6i2.964.