Scenario Development and Identification of Drivers for Implementing and Evaluating the Quality of Integrated Reporting, with an Emphasis on Sustainability Dimensions in Small and Medium-Sized Enterprises



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Abstract: This study aimed to identify and analyze the drivers and barriers affecting the implementation and quality of integrated reporting, with an emphasis on sustainability dimensions and climate-related disclosure in Iranian small and medium-sized enterprises (SMEs). The study employed a mixed-methods approach with an exploratory–explanatory design. In the qualitative phase, data were collected through semi-structured interviews with 19 experts and analyzed using open, axial, and selective coding, as well as a three-round Delphi process. Four future scenarios were developed through a scenario-planning workshop. In the quantitative phase, 434 valid questionnaires containing 121 items were collected, and the structural model for each scenario was analyzed separately using PLS-SEM in SmartPLS. The qualitative findings identified 13 final drivers, including seven internal and six external drivers, as well as five principal barriers. Kendall's coefficient of concordance reached 0.82 in the third Delphi round. Four scenarios were developed: "Digital Transformation Leadership," "Gradual Development," "Mandatory Transparency," and "Institutional Stagnation." In the quantitative phase, causal conditions had a positive and significant effect on the central phenomenon ($\beta = 0.624–0.723$, $p < 0.01$). Contextual and intervening conditions significantly affected strategies ($\beta = 0.518–0.634$, $p < 0.01$). Strategies were the only variable with a strong direct effect on outcomes ($\beta = 0.639–0.741$, $p < 0.01$) and played a key mediating role. Scenarios characterized by high management commitment (3.8 and 3.5) were evaluated considerably more positively than those characterized by low management commitment (2.9 and 2.7). Model fit indices (SRMR = 0.061–0.066 and NFI = 0.917–0.936) indicated satisfactory model fit. Internal organizational capacity—including the quality of information systems, management commitment, an accountability-oriented culture, and workforce skills—was the most important factor influencing the success of integrated reporting. External drivers do not lead to sustainable value creation without a strong internal foundation. The "Gradual Development" scenario appears to represent the most realistic pathway for Iranian SMEs. The findings can inform the development of a national sustainability reporting roadmap, the design of locally tailored climate disclosure guidelines, and policymaking by regulatory bodies.

Keywords: integrated reporting; small and medium-sized enterprises; scenario planning; reporting quality; organizational drivers; sustainability; climate-related disclosure.

1. Introduction

The increasing complexity of contemporary business environments has intensified demands for corporate reporting systems capable of communicating not only financial performance but also the broader environmental, social, governance, and strategic dimensions of organizational value creation. Conventional financial reporting,

although indispensable for assessing historical financial position and performance, has become progressively less capable of explaining how organizations create, preserve, or erode value over time. This limitation is particularly evident in the context of sustainability, where stakeholders increasingly expect organizations to disclose information concerning environmental impacts, social responsibilities, governance mechanisms, climate-related risks, resource efficiency, stakeholder relationships, and long-term resilience. Consequently, sustainability reporting and integrated reporting have emerged as important mechanisms for broadening organizational accountability and improving the informational basis available to investors, regulators, managers, customers, employees, and society at large [1-3].

Integrated reporting represents a particularly important development within this transformation because it seeks to connect financial and non-financial information within a coherent explanation of how an organization creates value over the short, medium, and long term. Rather than treating sustainability disclosure as a separate or supplementary reporting exercise, integrated reporting encourages organizations to connect strategy, governance, performance, risk, resource allocation, and multiple forms of capital within a unified reporting logic. The literature increasingly views this approach as a means of strengthening transparency, enhancing strategic thinking, improving stakeholder communication, and reducing fragmentation between financial and sustainability information [1, 2]. At the same time, recent research demonstrates that the effectiveness of integrated reporting depends not merely on adopting a reporting format but on whether organizations develop the internal capabilities, governance arrangements, information systems, and managerial commitment needed to produce connected and decision-useful information [4, 5].

The growing emphasis on environmental, social, and governance considerations has further reinforced the importance of integrated and sustainability-oriented reporting. ESG practices are increasingly associated with organizational sustainability, legitimacy, stakeholder confidence, and the capacity to manage long-term risk [6, 7]. Sustainable value creation requires firms to understand how economic performance interacts with environmental stewardship, social relationships, governance quality, and intangible resources [8]. At the same time, ESG-related risks are becoming progressively embedded in organizational business models, financial assessments, investment decisions, and strategic planning processes [9]. These developments have widened the scope of reporting from a predominantly accounting-oriented activity toward a strategic information system concerned with resilience, accountability, and future value creation.

This transformation is especially consequential for small and medium-sized enterprises (SMEs). SMEs constitute a substantial part of national economies and supply chains, yet their reporting systems, governance structures, resource bases, and technological capabilities often differ considerably from those of large corporations. Sustainability research concerning SMEs has expanded rapidly, reflecting recognition that smaller firms are increasingly expected to respond to environmental and social pressures despite operating under significant financial, managerial, technological, and informational constraints [10, 11]. Research on family businesses and other SME-dominated organizational settings also demonstrates growing scholarly attention to sustainability, corporate responsibility, and long-term value creation in firms whose structures and governance arrangements may be relatively informal or concentrated [12, 13].

SMEs frequently face a paradox in the adoption of sustainability and integrated reporting. On the one hand, improved disclosure can enhance legitimacy, strengthen relationships with stakeholders, support access to finance, and improve strategic decision-making. On the other hand, reporting requirements may impose substantial costs in terms of data collection, employee training, technology, assurance, and managerial time. The literature has

repeatedly highlighted the importance of balancing the benefits of sustainability reporting against the financial and organizational burdens associated with implementation [14]. Limited resources, shortages of sustainability expertise, weak awareness, insufficient institutional support, and uncertainty regarding implementation procedures are among the principal difficulties faced by SMEs attempting to introduce sustainability-oriented practices [15-17]. These limitations suggest that frameworks developed primarily for large enterprises cannot necessarily be transferred directly to SMEs without adaptation.

The literature nevertheless indicates that SMEs can derive substantial strategic value from sustainability-oriented reporting when implementation is aligned with organizational capacities. Integrated reporting can help smaller firms identify connections among resources, stakeholder relationships, risks, and future performance, thereby transforming reporting from a compliance activity into a value-creation mechanism [4]. Innovation and sustainability practices can also contribute to improved project management, efficiency, resilience, and organizational competitiveness in the SME context [18]. Similarly, sustainability-oriented innovation and open innovation can create important complementarities by allowing organizations to combine internal capabilities with external knowledge and stakeholder collaboration [19]. Consequently, the strategic relevance of sustainability reporting for SMEs depends on whether reporting is embedded within broader organizational learning, innovation, and decision-making processes.

Internal organizational factors are therefore central to understanding differences in the quality and implementation of integrated reporting. Senior management commitment, ethical leadership, employee trust, organizational commitment, workforce competence, and the quality of corporate governance can determine whether sustainability objectives become embedded in operational routines or remain symbolic aspirations. Evidence from SMEs demonstrates that ethical leadership and corporate social responsibility engagement can strengthen trust and organizational commitment, thereby supporting more sustainable organizational behavior [20]. Business ethics has similarly been associated with organizational sustainability in SMEs, emphasizing that sustainability depends not only on formal systems but also on managerial values and behavioral norms [21]. Corporate governance principles, accountability, and ethical decision-making also play important roles in shaping SME behavior and stakeholder relationships [22].

Organizational culture and stakeholder orientation are equally important. Stakeholder expectations can influence managerial attention and environmental proactivity, particularly when managers perceive particular stakeholders as strategically salient [23]. Sustainability-oriented firms are therefore required to identify and respond to the expectations of investors, customers, employees, regulators, communities, and other actors while simultaneously maintaining operational and financial viability. Social networks can further strengthen SME sustainability by enabling access to knowledge, resources, legitimacy, and interorganizational support [24]. Accordingly, implementation quality is likely to depend on the interaction between internal organizational capabilities and external relational environments rather than on isolated organizational characteristics.

External institutional pressures also play a major role in shaping sustainability and integrated reporting practices. Regulatory expectations, professional standards, investor scrutiny, competitive pressure, supply-chain demands, and public attention can all influence organizational disclosure behavior. Research on sustainability reporting has demonstrated that adoption remains uneven across countries, industries, and institutional environments, partly because traditional accounting practices and established reporting cultures may resist the incorporation of new sustainability requirements [25]. Regional evidence similarly indicates substantial variation in sustainability reporting maturity and regulatory development, suggesting that institutional context strongly

influences reporting practices [26]. The uneven development of regulatory and professional infrastructures is especially important for SMEs, which may lack the resources required to interpret fragmented or rapidly changing standards.

Voluntary ESG communication illustrates this challenge. SMEs may disclose sustainability information through annual reports, websites, or other communication channels, yet the quality and consistency of such disclosure can vary considerably depending on organizational size, governance, resources, stakeholder pressure, and strategic orientation [5]. Managers' perceptions of sustainability reporting also influence implementation because they shape how organizations assess its costs, benefits, risks, and strategic relevance [27]. Where managers perceive reporting mainly as an administrative burden, implementation may remain minimal. Where reporting is viewed as a mechanism for legitimacy, competitive advantage, risk management, and stakeholder engagement, organizations may invest more heavily in reporting quality and internal information integration.

Digital transformation further changes the conditions under which integrated reporting can be implemented. The increasing availability of enterprise systems, digital platforms, artificial intelligence, data analytics, automated accounting processes, and cloud-based information systems creates new opportunities for integrating financial and non-financial information. Digitalization can strengthen resilience and sustainability by improving information quality, coordination, responsiveness, and resource management [28]. Research on digital green innovation similarly indicates that technological capabilities can facilitate sustainability-oriented transformation and improve the coordination of environmental information within complex organizational ecosystems [29]. For SMEs, however, these benefits are conditional on affordability, employee capability, management support, and access to suitable technological infrastructure.

The financing environment provides another incentive for improving sustainability information. ESG performance is increasingly relevant to lenders and investors seeking to evaluate long-term risk, organizational resilience, and creditworthiness. Recent approaches to SME ESG assessment demonstrate that sustainability information may support credit assessment and provide a more comprehensive representation of firm performance than conventional financial metrics alone [30]. Green finance and sustainability-oriented governance can likewise contribute to sustainable performance, particularly where governance mechanisms create a supportive environment for responsible investment and resource allocation [31]. Consequently, integrated reporting may become increasingly important for SMEs seeking financing, inclusion in sustainable supply chains, or credibility with institutional stakeholders.

Climate-related disclosure represents a particularly important dimension of this reporting transformation. Climate risks can affect operating costs, supply chains, access to finance, asset values, regulatory exposure, and long-term competitiveness. As sustainability frameworks increasingly incorporate climate considerations, organizations are expected to communicate not only past environmental performance but also exposure to transition risks, physical risks, mitigation activities, governance arrangements, and strategic responses. Broader ESG integration thus requires firms to connect environmental risks with business models, governance systems, and sustainable value creation [6, 9]. In SMEs, this challenge is magnified because limited analytical resources and weak information infrastructure may constrain the ability to identify and quantify climate-related risks.

Industry context also shapes sustainability practices. Studies across sectoral ecosystems indicate that sustainability concepts are increasingly incorporated into company strategy, stakeholder communication, and operational practices, although the extent of implementation differs markedly across firms and sectors [32]. Such variation reinforces the importance of examining reporting systems within their specific institutional and

organizational environments rather than assuming a universal implementation pathway. In sectors characterized by intense market competition or strong stakeholder scrutiny, sustainability reporting may become a source of differentiation, whereas in weaker institutional environments it may remain largely reactive or compliance-oriented.

The literature therefore identifies a broad range of potential drivers of integrated reporting, including information-system quality, digital capability, leadership commitment, governance, organizational culture, employee competence, stakeholder pressure, regulatory requirements, access to resources, market competition, and professional standards. At the same time, these factors do not operate independently. Their importance may change under alternative institutional and organizational conditions. This issue is particularly significant because most studies examine existing determinants or current reporting practices rather than exploring how combinations of internal and external forces could produce different future reporting pathways. The emerging literature on SME sustainability calls for more integrated frameworks capable of connecting drivers, barriers, organizational capabilities, institutional pressures, and future strategic responses [10, 11].

Another limitation concerns the quality rather than the mere presence of reporting. The availability of a sustainability report does not necessarily indicate that disclosures are comprehensive, connected, reliable, strategically relevant, or useful for decision-making. Sustainable auditing and assurance research underscores the importance of credibility and verification in strengthening the reliability of non-financial information [33]. Similarly, the movement toward social and environmental accounting requires greater integration of sustainability information with conventional accounting systems if disclosure is to influence organizational decisions rather than remain peripheral to them [3]. Assessing integrated reporting therefore requires attention to such characteristics as transparency, coherence, connectivity, comprehensiveness, reliability, and the quality of underlying information systems.

These gaps are especially relevant in emerging and institutionally evolving settings, where international sustainability standards coexist with local regulatory conditions, resource constraints, and varying levels of organizational readiness. Existing research demonstrates that sustainability practices among SMEs are strongly influenced by awareness, networks, institutional support, managerial attitudes, and resource availability [16, 24]. Yet limited attention has been given to how these factors interact dynamically to shape alternative futures of integrated reporting. A scenario-based approach can address this limitation by moving beyond static lists of drivers and barriers toward an examination of how critical uncertainties may combine to generate distinct implementation pathways. Such an approach is particularly appropriate when technological change, regulatory development, stakeholder expectations, climate-related disclosure requirements, and organizational readiness are simultaneously evolving.

The Iranian SME context provides a meaningful setting for such analysis because firms must navigate resource limitations, technological differences, changing stakeholder expectations, and evolving sustainability and reporting requirements. Although international research provides substantial insight into ESG practices, sustainability reporting, governance, digitalization, and SME resilience, the transferability of these findings depends on local institutional and organizational conditions. Consequently, there is a need for an empirically grounded framework that simultaneously identifies the internal and external drivers of integrated reporting, assesses barriers to implementation, evaluates reporting quality and sustainability dimensions, and considers how alternative combinations of managerial commitment and institutional support may shape plausible future trajectories. Such a

framework can provide both theoretical insight and practical guidance for SMEs, regulators, professional bodies, and policymakers seeking to develop realistic and context-sensitive reporting strategies.

Accordingly, the aim of this study was to identify and evaluate the internal and external drivers and barriers influencing the implementation and quality of integrated reporting, with an emphasis on sustainability and climate-related disclosure, and to develop and quantitatively assess plausible future scenarios for integrated reporting in Iranian small and medium-sized enterprises.

2. Methods and Materials

This study aimed to identify the internal and external drivers influencing the adoption and quality of integrated reporting, with an emphasis on sustainability and climate-related disclosure in Iranian small and medium-sized enterprises (SMEs), and to examine plausible futures in this field. To address this aim, an exploratory sequential mixed-methods design was employed. Qualitative data were first used to identify relevant factors and develop a conceptual framework; quantitative data were then collected to evaluate and test the relationships among the constructs. Integration of the two phases at the interpretation stage enabled the simultaneous examination of expert perspectives and patterns observed in the questionnaire data.

The study was guided by a pragmatic research paradigm, as addressing the research problem required the complementary use of interpretive data and quantitative measurement. The qualitative phase was primarily inductive, with concepts and drivers derived from participants' experiences. In the quantitative phase, relationships among the constructs identified in the qualitative phase were examined within a conceptual model; accordingly, this phase followed a deductive logic. Overall, the study adopted an exploratory mixed-methods design, with the instruments and analytical procedures selected to suit the research questions at each phase.

In terms of purpose, the study was applied; methodologically, it was descriptive–analytical. Data were collected at a single point in time; therefore, the study was cross-sectional. In the qualitative phase, semi-structured interviews and a scenario-planning workshop were used to explore the drivers, barriers, opportunities, and uncertainties affecting the phenomenon. The outputs of this phase informed the conceptual framework and the initial questionnaire items. In the quantitative phase, a structured questionnaire was used to measure the drivers, reporting quality, and sustainability dimensions. Reporting quality was represented in the model through components such as comprehensiveness, connectivity, transparency, and coherence, while sustainability encompassed its economic, social, and environmental dimensions.

The qualitative population comprised experts familiar with integrated reporting, accounting, financial management, sustainability, and climate-related disclosure. Participants were purposively selected based on their academic expertise, professional experience, and familiarity with the subject. Eleven individuals participated in the interviews: four faculty members, four financial managers or accountants, and three professional experts. A three-round Delphi process involving 19 experts was conducted to prioritize the identified factors. In the first round, 21 indicators were assessed using a five-point scale. Indicators with a mean score below 3.5 were excluded. Following feedback and reassessment, 13 final indicators were approved. Kendall's coefficient of concordance in the third round was 0.82.

The quantitative population consisted of financial managers, accountants, and specialists working in Iranian SMEs. A non-probability convenience sampling method was used. Of the 1,020 questionnaires distributed, 434 valid responses were obtained. Although the required sample size had been estimated at 384 using the Krejcie and Morgan table, the final number of valid responses exceeded this figure. The use of convenience sampling should

be considered when interpreting the findings, as it limits the statistical generalizability of the results to the entire population of SMEs.

Qualitative data were collected through semi-structured interviews containing open-ended questions and through a scenario-planning workshop. The interview guide covered topics including causal factors, contextual and intervening conditions, organizational strategies, and the outcomes of integrated reporting. The scenario-planning workshop brought together stakeholders to identify key drivers and future uncertainties. The scenarios examined were "Digital Transformation Leadership," "Gradual Development," "Mandatory Transparency," and "Institutional Stagnation." In the quantitative phase, a five-point Likert-scale questionnaire was developed based on the qualitative findings. Documents, secondary data, and company case studies were also used, where available, to supplement and compare the evidence.

To strengthen the credibility of the qualitative phase, the interview guide and workshop materials were reviewed by academics and experts. Following the initial analysis, summaries of the interpretations were shared with some participants to verify their accuracy. In addition, comparing evidence from interviews, workshops, and available documents served as a form of data triangulation. In the quantitative phase, the questionnaire's content validity was assessed through expert review. The construct measurement model was evaluated using convergent validity and composite reliability indices. Internal consistency was also examined using Cronbach's alpha, with values above 0.70 considered acceptable. Factor loadings and average variance extracted (AVE) were also assessed to evaluate the quality of construct measurement.

The interviews were transcribed and analyzed using a grounded theory approach. The analysis involved open coding to extract initial concepts, axial coding to organize the concepts and examine their relationships, and selective coding to formulate the main categories and conceptual model. The qualitative findings informed the development of the questionnaire items. Scenario analysis involved identifying influential factors, assessing their importance and uncertainty, and developing future narratives.

Quantitative data were analyzed using SPSS version 28 and SmartPLS version 3. Descriptive statistics were used to summarize respondent characteristics and data distributions. The measurement model was then assessed in terms of factor loadings, composite reliability, and convergent validity. The structural model was tested to examine the direction and strength of relationships among the drivers, reporting quality, and sustainability dimensions. Path coefficients, coefficients of determination, and statistical significance were used as the basis for interpreting these relationships. Given the exploratory nature of the qualitative phase, the study was guided by research questions; structural model analysis in the quantitative phase was used to evaluate the proposed relationships.

3. Findings and Results

The demographic characteristics of the experts participating in the qualitative phase indicated that the sample was predominantly male, highly educated, and professionally experienced. Of the 19 experts, 15 (79%) were men and four (21%) were women. In terms of education, 16 participants (84%) held doctoral degrees and three (16%) held master's degrees, indicating a high level of academic familiarity with integrated reporting, sustainability, accounting, and related theoretical concepts.

Regarding professional experience, three participants (16%) had fewer than 10 years of work experience, 13 (68%) had between 10 and 20 years of experience, and three (16%) had more than 20 years of experience. Thus, the expert panel incorporated both relatively recent professional perspectives and substantial long-term practical experience. Participants also represented diverse professional fields: six (32%) worked in academia and research, 10 (53%) were

affiliated with insurance and financial companies, two (11%) worked in consulting and sustainability organizations, and one (5%) was an independent accounting professional. This combination provided a balance between theoretical and practice-oriented perspectives.

Table 1. Demographic Characteristics of the Expert Participants

Characteristic	Category	n	%
Gender	Male	15	79
	Female	4	21
Education	Doctoral degree	16	84
	Master's degree	3	16
Work experience	Fewer than 10 years	3	16
	10–20 years	13	68
	More than 20 years	3	16
Field of activity	Academia and research	6	32
	Insurance and financial companies	10	53
	Consulting and sustainability organizations	2	11
	Independent accounting	1	5

The Delphi process was conducted in three rounds to screen, prioritize, and confirm the drivers affecting the implementation and quality of integrated reporting. In the first round, experts evaluated 21 identified indicators. Indicators with a mean importance score below 3.00 were eliminated, resulting in the retention of 16 indicators for the second round. Analysis of the experts' open-ended comments indicated that several indicators received relatively low scores because their definitions or implementation procedures were insufficiently clear.

In the second round, experts received feedback on the first-round results and were asked to reassess and rank the remaining indicators. Kendall's coefficient of concordance was 0.67, indicating an acceptable level of convergence among expert judgments. Using a more stringent acceptance criterion of a mean importance score of at least 3.50, three additional indicators were eliminated, leaving 13 indicators for final assessment. Expert comments also indicated that some indicators were perceived as practically important but required clearer conceptual and operational definitions.

In the third round, the 13 remaining indicators were presented for final confirmation. Kendall's coefficient of concordance increased to 0.82, demonstrating strong agreement and a high level of expert consensus. The increase from $W = 0.67$ in the second round to $W = 0.82$ in the third round showed that convergence among expert judgments strengthened as the Delphi process progressed. The final indicators were subsequently classified as internal and external drivers of integrated reporting.

The qualitative analysis resulted in 13 principal drivers, classified into seven internal and six external drivers. Internal drivers accounted for approximately 54% of the identified factors, whereas external drivers accounted for approximately 46%. This distribution indicates that the successful implementation of integrated reporting depends on the interaction between organizational capabilities and environmental or institutional pressures rather than on either category in isolation.

Table 2. Final Integrated Reporting Drivers and Their Roles in Implementation

Category	Driver	Description and role in implementation
Internal	Information systems quality	Produces accurate and reliable data and enables analysis, automation, and the integration of financial and sustainability information.
Internal	Workforce skills and training	Equips employees to analyze data, understand sustainability indicators, and improve reporting quality.

Internal	Senior management commitment	Supports strategic decision-making, provides financial and cultural backing, and facilitates structural change.
Internal	Transparent and accountable organizational culture	Promotes organizational values based on transparency, accountability, and organizational learning.
Internal	Active corporate governance structure	Establishes internal control mechanisms and independent oversight, supporting data assurance and validation.
Internal	Coordination between financial and non-financial units	Aligns financial, sustainability, and reporting activities and reduces conflicts and inconsistencies in information.
Internal	Employee motivation and awareness of sustainability	Develops understanding of sustainability values, strengthens internal engagement, and improves reporting quality.
External	Legal and regulatory requirements	Supports compliance with national laws and mandatory standards while reducing legal and regulatory risk.
External	Pressure from regulators and investors	Builds stakeholder confidence and reinforces transparency and accountability.
External	Public and media expectations	Strengthens organizational reputation and supports accountability to external stakeholders.
External	Industry competition and market requirements	Encourages alignment with industry best practices and assists firms in maintaining competitive advantage.
External	International standards and peer pressure	Promotes alignment with international standards and facilitates learning from comparable organizations.
External	Access to financial resources and supporting technology	Provides the technological infrastructure and financial resources required for implementation and reporting.

The importance rankings further demonstrated that organizational capacity occupied the most prominent position in the expert assessments. Information systems quality was ranked first, followed by senior management commitment, a transparent and accountable organizational culture, and workforce skills and training. Legal and regulatory requirements represented the highest-ranked external factor.

Table 3. Final Integrated Reporting Drivers Ranked by Importance and Source

Importance Rank	Driver	Category	Primary Source
1	Internal information systems quality	Internal	Interviews and literature
2	Senior management commitment	Internal	Interviews and literature
3	Transparent and accountable organizational culture	Internal	Interviews
4	Workforce skills and training	Internal	Interviews and literature
5	Legal and regulatory requirements	External	Literature
6	Pressure from regulators and investors	External	Interviews
7	Active corporate governance structure	Internal	Interviews
8	Coordination between financial and non-financial units	Internal	Interviews
9	Public and media expectations	External	Literature
10	Industry competition and market requirements	External	Interviews
11	Employee motivation and awareness of sustainability	Internal	Interviews
12	Access to financial resources and supporting technology	External	Interviews and literature
13	Compliance with national laws and mandatory standards	External	Literature

The mean importance scores therefore confirmed information systems quality, senior management commitment, and an accountable organizational culture as the highest-priority determinants. The results particularly emphasized the role of internal organizational capabilities. Information systems quality provides accurate, integrated, and timely data for reliable reporting and strategic decision-making; senior management commitment facilitates resource allocation, process guidance, and organizational motivation; coordination between financial and non-financial units supports information exchange and reduces inconsistencies; workforce skills and training

enhance financial and sustainability analysis capabilities; and a responsive and transparent organizational culture facilitates the acceptance of new reporting processes and strengthens organizational decision-making.

Alongside the drivers, the Delphi process identified several practical and strategic barriers capable of limiting the implementation and quality of integrated reporting. Resource constraints were particularly important because SMEs frequently lack sufficient financial capacity and specialized personnel for collecting, processing, assuring, and reporting sustainability information. Resistance to organizational change was another important obstacle, particularly where reporting practices were strongly embedded in traditional financial reporting routines.

A further challenge concerned the absence of sufficiently developed domestic standards and locally adapted frameworks. Experts emphasized the need to adapt international sustainability and integrated reporting requirements to national, institutional, and industry-specific conditions. External pressure could also become problematic when regulatory bodies, investors, media, and other stakeholders imposed inconsistent expectations.

Table 4. Principal Barriers and Challenges to the Implementation of Integrated Reporting

Barrier	Interpretation
Limited financial and human resources	Insufficient budgets and shortages of specialists constrain the collection, processing, analysis, and reporting of sustainability data.
Cultural and organizational resistance to change	Resistance to changes in established processes and limited acceptance of innovation can delay implementation.
Lack of domestic standards and locally tailored frameworks	International standards require adaptation to national, sectoral, and SME-specific conditions.
External pressures and lack of coordination among regulatory bodies	Differences among investor, media, legal, and regulatory expectations complicate implementation and increase uncertainty.

Following identification of the principal drivers and completion of the Delphi process, a scenario-planning workshop was conducted to examine uncertainties surrounding the future of integrated reporting and to map plausible development pathways. The workshop extended the analysis beyond the identification of individual factors by examining their interactions and their implications under alternative future conditions.

The one-day participatory workshop involved approximately 12–15 stakeholders and experts, including mid-level managers from insurance and financial companies, sustainability specialists, representatives of regulatory bodies, and university faculty members. The workshop began with a review of the 13 Delphi-confirmed drivers. Participants then identified major uncertainties and classified them into internal uncertainties, such as senior management commitment and technological capacity, and external uncertainties, particularly regulatory support, regulatory pressure, and changes in the institutional environment.

A two-dimensional cross-impact matrix was subsequently used to assess the influence and interdependence of the identified drivers. Senior management commitment and support from regulatory bodies emerged as the two most influential variables and were therefore selected as the pivotal uncertainties around which the future scenarios were constructed.

The probability–impact analysis provided additional support for this selection. Access to information technology, legal requirements, and social pressure for transparency received the highest combined evaluations in terms of likelihood and potential impact. On the basis of the two pivotal uncertainties—senior management commitment and regulatory support—four plausible future scenarios were developed.

Table 5. Research Scenarios, Pivotal Conditions, and Underlying Logic

No.	Scenario	Management Commitment	Regulatory Support	Underlying Logic and Expected Pathway

1	Digital Transformation Leadership and Active Oversight	High	High	A proactive and progressive pathway characterized by advanced technologies, strong information infrastructure, active institutional oversight, accountability, and full implementation of integrated reporting.
2	Gradual Development and Voluntary Compliance	High	Low	A phased and cautious pathway in which organizational initiative, learning, and market pressure progressively improve reporting despite limited regulatory support.
3	Mandatory Transparency and Regulatory Compliance	Low	High	A reactive and compliance-oriented pathway in which regulatory bodies compel organizations to establish minimum transparency and disclosure practices without a corresponding internal cultural transformation.
4	Institutional Stagnation and Organizational Resistance	Low	Low	A survival-oriented pathway characterized by weak motivation, limited resources, organizational resistance, delayed implementation, and declining reporting quality.

The scenario analysis indicated that sustainable implementation requires the concurrent strengthening of both senior management commitment and institutional oversight. Strong regulatory support without management commitment may generate formal compliance but is unlikely to result in deep organizational transformation. Conversely, high management commitment in a weak regulatory environment may still facilitate meaningful progress, although implementation is likely to remain gradual and voluntary.

The interaction among these uncertainties is represented in the scenario matrix.

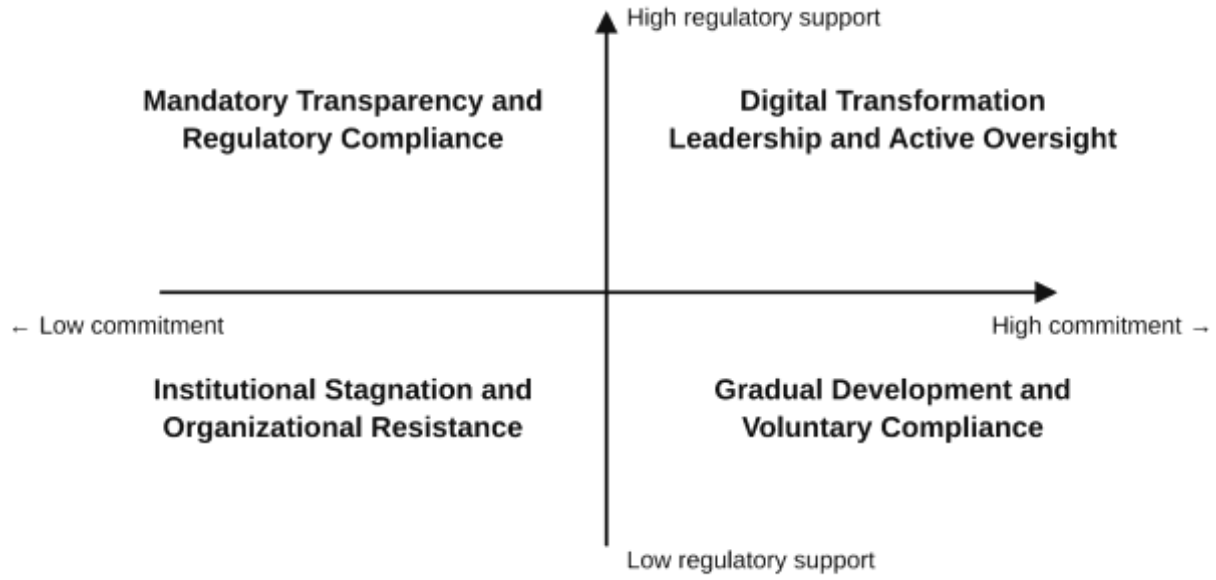


Figure 1. Scenario Matrix Based on the Two Pivotal Uncertainties: Senior Management Commitment and Support from Regulatory Bodies

The vertical axis of the scenario matrix represents the level of support from regulatory bodies, whereas the horizontal axis represents the degree of senior management commitment. The interaction of these two dimensions produces the four scenarios of Digital Transformation Leadership and Active Oversight, Gradual Development and Voluntary Compliance, Mandatory Transparency and Regulatory Compliance, and Institutional Stagnation and Organizational Resistance. The matrix therefore illustrates how different combinations of organizational leadership and regulatory support can generate substantially different pathways for the future of integrated reporting in Iranian SMEs.

The qualitative analysis followed a sequential process beginning with semi-structured interviews and continuing through open, axial, and selective coding. The preliminary concepts and drivers identified through coding were subsequently refined through the Delphi process. The scenario-planning workshop then deepened the analysis by identifying uncertainties, examining cross-impacts, constructing a probability–impact matrix, and developing the four alternative futures. The resulting driver interaction matrix, uncertainty map, and scenario narratives informed the final conceptual model and the subsequent development of the quantitative questionnaire.

Open, axial, and selective coding enabled the extraction and consolidation of the initial concepts and drivers. The Delphi process refined the indicators and established expert consensus, while the scenario-planning workshop identified pivotal uncertainties and developed plausible futures using cross-impact analysis and a probability–impact matrix. Together, these stages provided the theoretical and empirical foundations for the conceptual model, quantitative measurement instrument, and strategic recommendations.

Following the qualitative analysis and the three-stage coding process, the findings were organized according to the grounded theory paradigm framework. The resulting explanatory model represented the mechanism through which the future of integrated reporting may emerge, develop, become institutionalized, and produce organizational and macro-level consequences in SMEs.

The model was structured around causal conditions, the central phenomenon, contextual conditions, intervening conditions, strategies, and outcomes. Causal conditions represent the principal forces initiating the transition toward integrated reporting. The central phenomenon concerns the establishment and quality of integrated reporting with an emphasis on sustainability. Contextual conditions represent the internal and external infrastructures within which implementation occurs, whereas intervening conditions can strengthen or weaken the transformation process. Strategies represent the organizational actions and policies adopted to implement integrated reporting, and outcomes reflect the consequences produced by these strategies.

The model provides an integrated representation of the relationships among technological, institutional, cultural, organizational, and strategic factors involved in the transition from conventional financial reporting to sustainability-oriented integrated reporting. It also formed the conceptual foundation for the scenario-specific quantitative models.

Table 6. Dimensions and Components of the Research Conceptual Paradigm Model

Main Component	Dimension or Sub-component	Description and Examples
Causal Conditions	Technological transformations and digitalization of the reporting system	Analytical technologies, ERP systems, artificial intelligence, accounting automation, big data analytics, and management dashboards strengthen firms' ability to collect, process, analyze, and integrate financial and non-financial information and support forward-looking, multidimensional reporting.
	Social and media pressures and stakeholder expectations	Society, media, consumers, civil society institutions, and investors increasingly demand disclosure of financial, environmental, social, and ethical impacts, encouraging transparency, accountability, responsibility, and long-term value creation.
	Legal and regulatory requirements and professional frameworks	Domestic and international regulatory requirements and frameworks such as ESG, GRI, and IFRS create institutional and compliance pressures that can accelerate integrated reporting adoption.
	Business environment complexity and the need for multidimensional decision-making	Competition, globalization, economic uncertainty, technological change, and environmental risk require simultaneous consideration of financial, intellectual, human, social, and natural capital.
Central Phenomenon	Transition to sustainability-based integrated reporting	Represents a structural, procedural, and cognitive transition from traditional financial reporting toward an integrated system emphasizing multilevel

		transparency, sustainable value creation, and accountability to multiple stakeholders.
	Structural level	Reinvention of information architecture, development of data-driven infrastructure, integrated analytical systems, ERP enhancement, and data governance transform reporting from a retrospective documentary output into a decision-support and value-adding system.
	Procedural level	Redesign of the collection, refinement, standardization, storage, analysis, and reporting cycle for financial and non-financial data shifts reporting from compliance-oriented retrospection toward strategic, forward-looking, value-based, and risk-based reporting.
	Cognitive-cultural level	Transformation of managerial attitudes, professional identity, organizational acceptance, and decision-makers' perceptions facilitates movement from minimum regulatory disclosure toward sustainable value creation based on human, intellectual, social, and natural capital.
Strategies	Human capital empowerment	Development of data-driven skills, sustainability analysis capabilities, knowledge of integrated reporting standards, systems thinking, and futures-oriented competencies.
	Standardization and digitalization of information infrastructure	Establishment of integrated information systems, standardized databases, analytical dashboards, ERP systems, and business intelligence tools suited to SME resources.
	Establishing transparent and value-driven corporate governance	Creation of formal accountability mechanisms, transparency systems, multi-capital performance assessment, stakeholder engagement, and mechanisms for strengthening social legitimacy.
	Culturalization and changing managerial attitudes	Movement from minimal compliance toward multidimensional value creation, long-term responsibility, and sustainability-oriented decision-making supported by transformational leadership and organizational motivation.
	Scientific, professional, and institutional networking	Collaboration among regulators, universities, professional associations, consultants, and firms to facilitate knowledge sharing, reduce implementation costs, and manage implementation risk.
	Developing a phased and scenario-based roadmap	Gradual progression through the maturity stages of Readiness ← Development ← Systemic Integration ← Institutionalization to reduce transformation risk and strengthen control and forward-looking decision-making.
Contextual Conditions	Maturity of performance management, value creation, and risk	Requires a measurable relationship among financial performance, intangible capital, risk, and sustainable value, using simple and cost-effective performance and risk models appropriate for SMEs.
	Data capacity, automation, and digital analytics	Reflects access to ERP systems, analytical dashboards, data warehouses, and integrated platforms; cloud-based, modular, affordable technologies are particularly relevant to SME resource limitations.
	Governance and decision-making structure	Agile, short-chain governance can accelerate transformation, whereas person-centric management, insufficient documentation, and unstable managerial cycles can undermine implementation continuity.
	Multi-skilled human capital and rapid learning	Limited capacity to establish specialized ESG, sustainability, and data-analysis units increases the need for multi-skilled employees and cost-effective, project-based training.
	Competitive environment and stakeholder pressure	Green supply chains, sustainability-sensitive investors, and conscious customers can encourage adoption, whereas weak market pressure may encourage symbolic or promotional reporting.
Intervening Conditions	Cultural, structural, and identity resistance	Dependence on conventional financial reporting, concerns regarding transparency, fear of risk disclosure, and uncertainty about change can generate resistance, particularly in informal and person-centric structures.
	Ambiguity and inconsistency in policymaking and regulation	Absence of binding frameworks, domestic guidelines, quality-assessment mechanisms, and interinstitutional coordination can create uncertainty and delay implementation.
	Financial, technological, and human resource constraints	Limited financial resources, insufficient digital infrastructure, shortages of specialized personnel, and perceptions of high transformation costs may restrict or halt implementation.
	Weakness of data governance, information security, and analytical literacy	Unreliable, untimely, or fragmented data; weak assurance of non-financial information; inadequate security standards; and reliance on disconnected systems reduce reporting quality and reliability.

	Lack of acceptance by the market, regulatory bodies, and stakeholders	When investors, customers, regulators, media, and markets fail to recognize the value of sustainability reporting, organizational motivation declines and reporting may become merely symbolic.
Organizational Outcomes	Enhancement of legitimacy, trust, and social capital	Multilevel transparency, value-based accountability, and reliable disclosure can strengthen stakeholder confidence, social acceptance, and organizational trust.
	Reduction of information asymmetry and improvement of decision-making	Integration of financial, environmental, risk, and sustainability information can reduce information gaps among managers, investors, banks, and financial institutions and support analytical, forward-looking decisions.
	Resource efficiency, risk management, and sustainable value creation	Integration of financial, human, technological, social, and natural capital information facilitates comprehensive resource and sustainability-risk assessment and strengthens resilience.
	Competitive advantage and strengthening of the sustainability brand	Sustainability transparency can improve differentiation, credibility, access to finance, and positioning within supply chains.
Macro Outcomes	Enhancement of transparency and national accountability	Wider implementation can contribute to national non-financial disclosure frameworks, ESG standards, sustainable value creation, and greater alignment with international benchmarks.
	Strengthening corporate governance and social accountability	Institutionalization of integrated reporting can strengthen transparency, professional accountability, organizational ethics, and sustainable behavior at the industry level.
	Data-driven policymaking and futures studies	Availability of reliable information can support evidence-based SME policy, sustainable financial instruments, and forward-looking regulation.
	Increased comparability and capital attraction	Higher reporting quality can improve comparability, standardization, credibility, competitiveness, and attractiveness to domestic and foreign investors.

In the quantitative phase, data were obtained through a structured questionnaire containing 121 items measured on a five-point Likert scale ranging from 1, representing the lowest level of importance, to 5, representing the highest level of importance. The respondents consisted of financial managers, accountants, and senior specialists working in Iranian SMEs. Of the distributed questionnaires, 434 valid responses were available for quantitative analysis.

For the scenario-specific structural analysis, the questionnaire indicators were aggregated and classified according to the six principal components of the grounded theory paradigm model: causal conditions, the central phenomenon, contextual conditions, intervening conditions, strategies, and outcomes. In interpreting the models, causal conditions were considered the primary drivers of the central phenomenon. Following formation of the central phenomenon, contextual and intervening conditions, together with the central phenomenon itself, were expected to shape organizational strategies. Strategies, in turn, were expected to determine the resulting outcomes.

The measurement model was evaluated prior to structural model testing. Confirmatory factor analysis indicated that, of 45 initial model indicators, 34 exhibited factor loadings greater than 0.50 and were retained. The retained indicators therefore demonstrated adequate representation of their corresponding constructs.

Internal consistency was satisfactory for all constructs, with Cronbach's alpha values greater than 0.70. Composite reliability values were also above 0.70, confirming satisfactory construct reliability. Average variance extracted values exceeded 0.50 for all dimensions, supporting convergent validity. Discriminant validity was confirmed using the Fornell–Larcker criterion because the square root of the AVE for each construct exceeded its correlations with the other constructs. Collectively, these results supported the reliability and validity of the measurement model and justified proceeding to structural model evaluation.

The structural model was estimated separately for each of the four scenarios using the Partial Least Squares algorithm in SmartPLS. Path coefficients and corresponding t-values were used to evaluate the magnitude and

statistical significance of relationships among causal conditions, the central phenomenon, contextual conditions, intervening conditions, strategies, and outcomes.

Table 7. Comparative Structural Model Path Coefficients Across the Four Scenarios

Structural Path	Digital Transformation Leadership β (t)	Gradual Development β (t)	Mandatory Transparency β (t)	Institutional Stagnation β (t)
Causal Conditions → Central Phenomenon	0.624 (13.547)**	0.671 (15.834)**	0.712 (19.634)**	0.723 (19.634)**
Contextual Conditions → Strategies	0.541 (10.892)**	0.584 (11.726)**	0.561 (10.847)**	0.541 (10.847)**
Intervening Conditions → Strategies	0.518 (9.764)**	0.532 (9.847)**	0.618 (12.395)**	0.634 (12.395)**
Central Phenomenon → Strategies	0.587 (12.231)**	0.561 (10.913)**	0.524 (9.762)**	0.528 (9.762)**
Strategies → Outcomes	0.639 (14.018)**	0.648 (13.762)**	0.673 (15.218)**	0.741 (15.218)**

Scenario 1: Digital Transformation Leadership

Under the Digital Transformation Leadership scenario, SMEs were assumed to follow a proactive approach based on advanced technologies, integrated information systems, digital tools, and relatively automated sustainability and climate-related disclosure. The primary objectives were sustainable value creation, greater transparency, and stronger competitive advantage.

All five structural relationships were statistically significant at the 0.01 level. The path from causal conditions to the central phenomenon was positive and significant (β = 0.624, t = 13.547), indicating that technological, institutional, social, and environmental drivers substantially contributed to the formation of integrated reporting. Contextual conditions positively influenced strategies (β = 0.541, t = 10.892), as did intervening conditions (β = 0.518, t = 9.764). The central phenomenon also exerted a significant effect on strategies (β = 0.587, t = 12.231).

The strongest relationship was observed between strategies and outcomes (β = 0.639, t = 14.018), confirming that organizational actions played the most decisive direct role in translating the integrated reporting transition into organizational outcomes. The smallest coefficient was associated with the effect of intervening conditions on strategies (β = 0.518), although this relationship remained statistically strong. Overall, all proposed relationships were supported under the Digital Transformation Leadership scenario.

Scenario 2: Gradual Development

Under the Gradual Development scenario, integrated reporting was assumed to be introduced in a phased and progressive manner. The principal emphasis was on organizational learning, risk reduction, pilot implementation, the use of relatively simple tools, and gradual improvement in the quality of sustainability disclosure. This scenario represents a cautious pathway in which maturity develops through cumulative learning rather than immediate system-wide transformation.

All structural relationships were statistically significant at the 0.01 level. Causal conditions exerted the strongest antecedent effect on the central phenomenon (β = 0.671, t = 15.834). Contextual conditions significantly influenced strategies (β = 0.584, t = 11.726), while intervening conditions also had a positive and significant effect (β = 0.532, t = 9.847). The central phenomenon significantly influenced strategies (β = 0.561, t = 10.913), and strategies subsequently had a strong effect on outcomes (β = 0.648, t = 13.762).

The lowest path coefficient was associated with the relationship between intervening conditions and strategies (β = 0.532), although it remained significant at the 99% confidence level. The structural model further indicated that causal conditions explained 69.3% of the variance in the central phenomenon ($R^2 = 0.693$), while strategies explained 65.7% of the variance in outcomes ($R^2 = 0.657$).

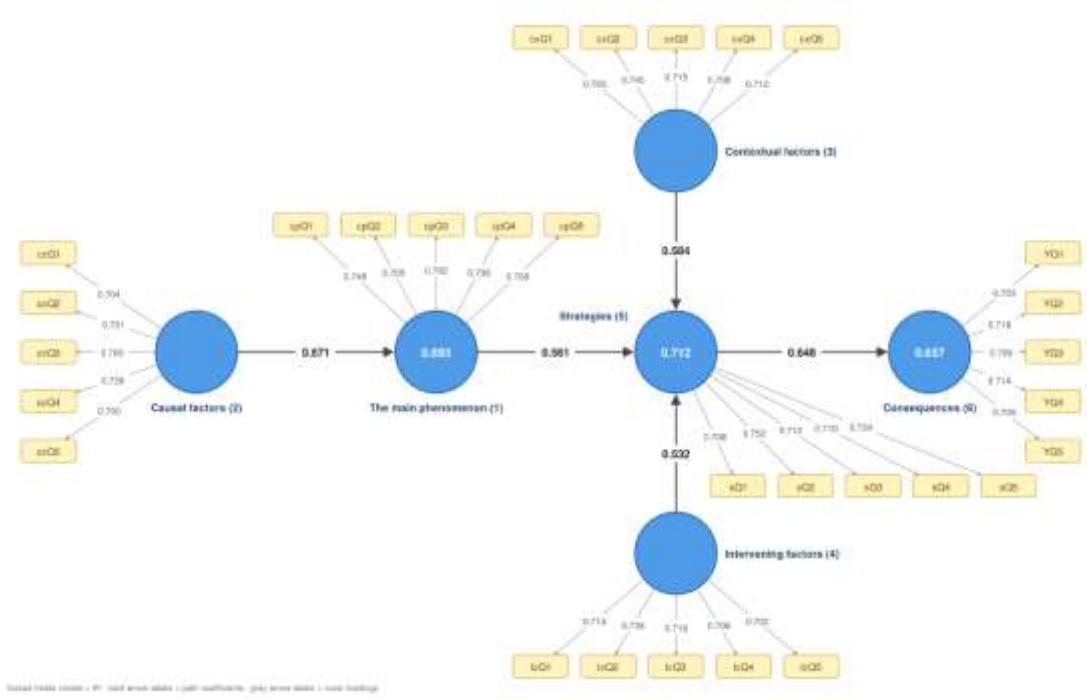


Figure 2. Structural Model of the Gradual Development Scenario with Path Coefficients (β)

The model demonstrates that the strongest relationship was the effect of causal conditions on the central phenomenon (β = 0.671), followed by the effect of strategies on outcomes (β = 0.648). The coefficients of determination further indicate substantial explanatory power for both the central phenomenon and outcomes.

Scenario 3: Mandatory Transparency

The Mandatory Transparency scenario represents a regulatory and compliance-oriented pathway in which integrated reporting is implemented primarily in response to legal and institutional requirements. The primary organizational objectives are avoidance of sanctions, mitigation of legal and regulatory risk, and achievement of a minimum acceptable level of transparency rather than internally motivated sustainable value creation.

All structural relationships were significant at the 0.01 level. Causal conditions exerted the strongest effect on the central phenomenon (β = 0.712, t = 19.634), demonstrating the particularly strong role of legal requirements, regulatory pressure, and compliance-related forces under this scenario. Contextual conditions positively influenced strategies (β = 0.561, t = 10.847), while intervening conditions also showed a substantial relationship with strategies (β = 0.618, t = 12.395).

The effect of the central phenomenon on strategies was positive and significant (β = 0.524, t = 9.762), and strategies strongly influenced outcomes (β = 0.673, t = 15.218). Accordingly, although the initial transition is largely driven by regulatory forces, the outcomes ultimately depend heavily on the strategies adopted by the organization.

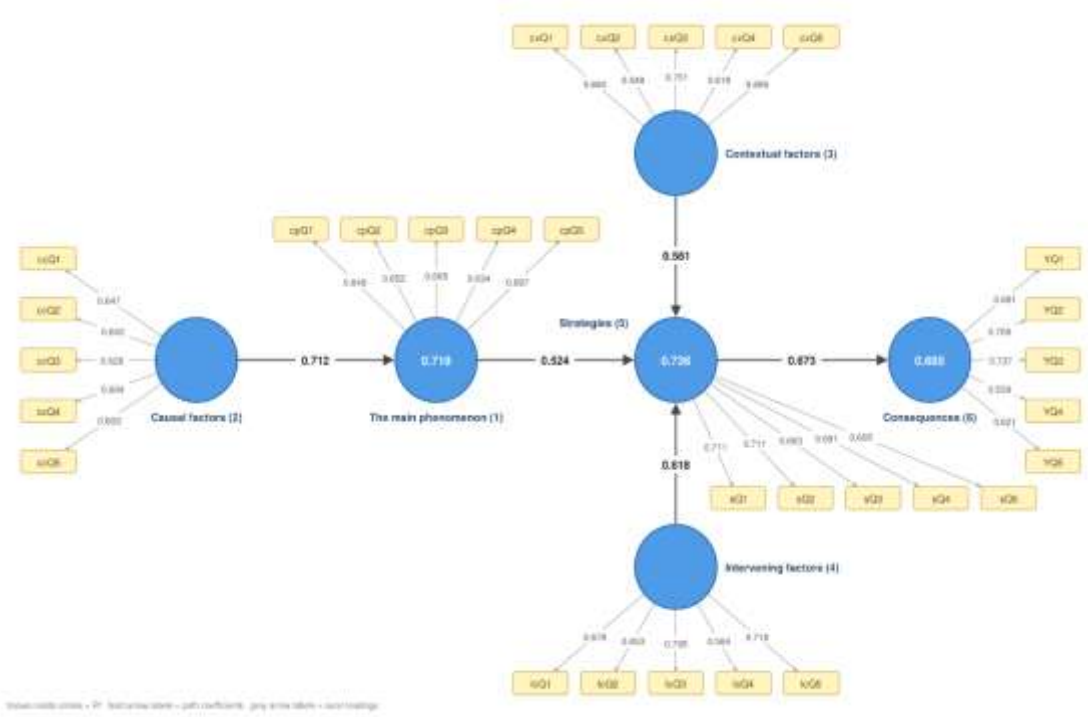


Figure 3. Structural Model of the Mandatory Transparency Scenario with Path Coefficients

The structural model indicates that causal conditions had the strongest effect on the central phenomenon (β = 0.712), followed by the effect of strategies on outcomes (β = 0.673). Thus, regulatory pressure and legal requirements serve as the dominant forces initiating integrated reporting under this scenario, whereas organizational strategies determine the extent to which compliance requirements are translated into meaningful reporting outcomes.

Scenario 4: Institutional Stagnation

The Institutional Stagnation scenario represents conditions characterized by economic instability, institutional weakness, resource scarcity, and low organizational and regulatory support. Under these circumstances, integrated reporting tends to be minimal and largely ethics- or survival-driven, with firms seeking to preserve limited stakeholder trust and comply only with baseline requirements.

All structural relationships were statistically significant at p = 0.001. Causal conditions positively affected the central phenomenon (β = 0.723, t = 19.634). Contextual conditions significantly influenced strategies (β = 0.541, t = 10.847), while intervening conditions exerted an even stronger effect on strategies (β = 0.634, t = 12.395). The central phenomenon also had a significant effect on strategies (β = 0.528, t = 9.762).

The strongest relationship in the entire model was the effect of strategies on outcomes (β = 0.741, t = 15.218). This result indicates that under conditions of institutional stagnation, survival-oriented and crisis-management strategies become particularly important in determining organizational outcomes. The relationship between causal conditions and the central phenomenon was also strong (β = 0.723), indicating that managerial ethical commitment and specific customer or stakeholder pressures can remain important even when the broader institutional environment is weak.

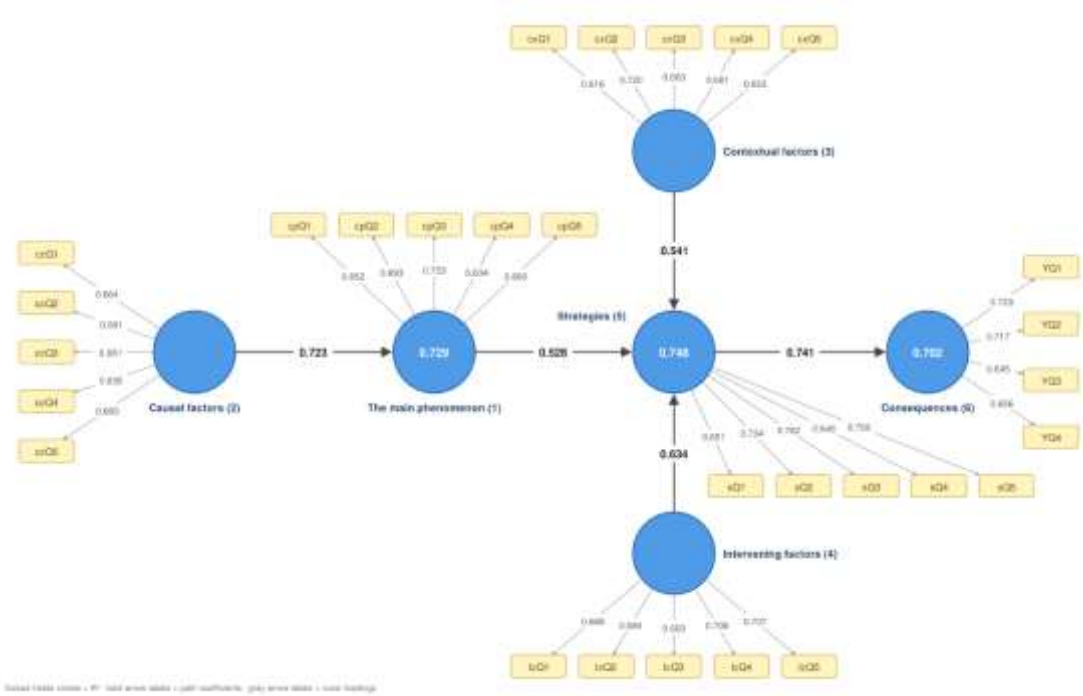


Figure 4. Structural Model of the Institutional Stagnation Scenario with Path Coefficients

The model shows that the strongest relationship was between strategies and outcomes (β = 0.741), followed by the effect of causal conditions on the central phenomenon (β = 0.723).

The outcome pattern in this scenario revealed an important dichotomy. On the one hand, organizations may achieve a minimum preservation of stakeholder trust, with a reported coefficient of 0.723. On the other hand, the forfeiture of long-term opportunities was also substantial (0.717), while the risk of corruption increased (0.645). These results indicate that strategies capable of supporting short-term organizational survival under institutional stagnation may simultaneously undermine long-term sustainable value creation.

Comparison across the four scenarios revealed several consistent patterns. First, causal conditions had a positive and statistically significant effect on the central phenomenon in every scenario, with coefficients ranging from β = 0.624 under Digital Transformation Leadership to β = 0.723 under Institutional Stagnation. This result confirms that technological, regulatory, social, institutional, and environmental forces consistently shape the transition toward integrated reporting, although their relative importance varies across future conditions.

Second, contextual conditions significantly influenced strategies in all scenarios, with coefficients ranging from β = 0.541 to β = 0.584. Intervening conditions also had significant effects on strategy formation, ranging from β = 0.518 to β = 0.634. Their influence became particularly pronounced under the Mandatory Transparency and Institutional Stagnation scenarios, suggesting that barriers, constraints, ambiguity, and institutional conditions become increasingly important when integrated reporting is driven by compliance or organizational survival rather than proactive transformation.

Third, the central phenomenon significantly affected strategies in all four scenarios, with coefficients ranging from β = 0.524 to β = 0.587. However, the most consistent and substantively important relationship across the models was the effect of strategies on outcomes. This coefficient increased from β = 0.639 under Digital Transformation Leadership to β = 0.648 under Gradual Development, β = 0.673 under Mandatory Transparency, and β = 0.741 under Institutional Stagnation. Strategies therefore represented the principal mechanism through which organizational and environmental conditions were translated into tangible reporting outcomes.

Taken together, the qualitative and quantitative findings indicate that the establishment and quality of integrated reporting cannot be achieved solely through regulatory pressure or the formal adoption of reporting standards. Internal organizational capacity—particularly information systems quality, senior management commitment, workforce competence, coordination across organizational units, and a culture of transparency and accountability—constitutes the foundation for effective implementation. External forces, including regulatory requirements, investor expectations, market competition, public scrutiny, and international standards, can accelerate adoption, but their effectiveness depends on the existence of sufficient internal capability.

The scenario findings further demonstrate that the future of integrated reporting in Iranian SMEs is strongly conditioned by the interaction between management commitment and regulatory support. The Digital Transformation Leadership scenario provides the most advanced pathway, but it requires substantial organizational and technological capacity. Mandatory Transparency can establish a minimum reporting baseline but may result in compliance-oriented disclosure without deeper organizational transformation. Institutional Stagnation may preserve limited short-term trust but carries considerable long-term risks. By contrast, the Gradual Development scenario provides a phased pathway based on organizational learning, progressive capacity building, manageable resource requirements, and incremental improvement in sustainability disclosure, making it a particularly feasible pathway for SMEs operating under resource constraints.

4. Discussion and Conclusion

The present study examined the internal and external drivers, barriers, and plausible future pathways influencing the implementation and quality of integrated reporting in Iranian small and medium-sized enterprises, with particular emphasis on sustainability and climate-related disclosure. The findings showed that the transition toward integrated reporting is not driven by a single organizational or institutional factor; rather, it emerges from the interaction of technological capacity, managerial commitment, organizational culture, workforce competence, governance mechanisms, stakeholder expectations, regulatory requirements, and access to resources. The qualitative phase identified 13 final drivers, comprising seven internal and six external factors, while the quantitative analysis demonstrated that causal conditions significantly influenced the central phenomenon across all four scenarios, contextual and intervening conditions shaped strategy formation, and strategies exerted the strongest direct influence on outcomes. Taken together, these results indicate that integrated reporting should be understood as a multidimensional organizational transformation rather than as a narrow disclosure exercise.

A major finding was the dominant role of internal organizational capacity. Information systems quality, senior management commitment, transparent and accountable organizational culture, and workforce skills and training were among the highest-ranked drivers. This result is consistent with the growing literature suggesting that integrated and sustainability reporting quality depends heavily on the internal capability of firms to generate, process, interpret, and connect financial and non-financial information. Integrated reporting can create value only when reporting systems are embedded in broader organizational processes and supported by adequate managerial and technological infrastructure [1, 4]. Similarly, previous studies have emphasized that voluntary ESG disclosure quality in SMEs is affected by internal resources, governance arrangements, and organizational characteristics rather than solely by external disclosure pressures [5]. The present findings extend this argument by showing that the effectiveness of external pressures is contingent on the existence of strong internal foundations.

The particularly high ranking of information systems quality is theoretically and practically significant. Integrated reporting requires organizations to combine financial, environmental, social, governance, risk, and

strategic information, which is difficult to accomplish through fragmented or manual systems. The finding that information systems quality was the most important driver therefore appears consistent with research highlighting the relationship between digitalization and sustainability transformation. Digital infrastructure can improve data integration, traceability, analytical capacity, and organizational responsiveness, thereby supporting sustainability-oriented decision-making [28]. Research on digital green innovation has similarly shown that digital capabilities can facilitate environmentally oriented information flows and strengthen sustainability-related organizational processes [29]. For SMEs, where resources are limited, the implication is that relatively accessible and scalable digital systems may be more important than highly sophisticated but costly technologies.

Senior management commitment also emerged as one of the strongest internal drivers and became one of the two pivotal uncertainties in the scenario-planning exercise. This result is aligned with previous research emphasizing the role of leadership, ethics, and managerial orientation in embedding sustainability into organizational practice. Ethical leadership has been associated with stronger CSR engagement, trust, and organizational commitment in SMEs [20], while business ethics has been linked to organizational sustainability in smaller enterprises [21]. The present findings support the view that management commitment does more than provide formal approval; it influences resource allocation, employee motivation, interdepartmental coordination, technological investment, and the degree to which reporting is treated as a strategic priority rather than a compliance obligation.

The importance of transparent and accountable organizational culture further reinforces this interpretation. Sustainability and integrated reporting require a willingness to disclose not only favorable performance but also risks, limitations, and areas of weakness. Such practices are difficult to institutionalize in organizations where transparency is perceived as threatening or where decision-making is highly centralized and informal. This finding is compatible with research on corporate governance and ethical behavior in SMEs, which suggests that accountability structures and responsible governance can shape organizational sustainability and stakeholder relations [22, 31]. It also corresponds with evidence showing that stakeholder salience can influence environmental proactivity by directing managerial attention toward issues perceived as strategically important [23]. Accordingly, the culture of reporting and the architecture of governance appear to be mutually reinforcing.

Workforce skills and training were also identified as important internal determinants. This result is expected because sustainability reporting requires competencies that extend beyond conventional accounting, including familiarity with ESG indicators, environmental metrics, non-financial data, climate risks, stakeholder analysis, and integrated thinking. Previous research has shown that SME sustainability is often constrained by lack of expertise, insufficient awareness, and limited human-resource capacity [15, 16]. The current study confirms that these limitations are not peripheral but central to implementation quality. In SMEs, where specialized sustainability departments may not exist, multi-skilled employees may be particularly important because they enable firms to integrate accounting, operational, environmental, and strategic information within existing structures.

The external drivers identified in the study were also important, especially legal and regulatory requirements, pressure from regulators and investors, public and media expectations, industry competition, international standards, and access to financial and technological resources. These findings align with prior research demonstrating that sustainability reporting is strongly influenced by institutional, regulatory, and stakeholder pressures [25, 26]. Uneven adoption across countries and sectors has been linked to differences in regulatory maturity, institutional support, professional norms, and traditional accounting cultures. The present study adds to this literature by demonstrating that external pressures are necessary but insufficient. Their impact depends on

whether organizations possess the internal systems and managerial commitment required to translate external expectations into high-quality reporting.

The role of investors and financial markets is also noteworthy. The increasing use of ESG information in financing and credit assessment means that sustainability reporting may influence access to capital and the perceived risk profile of SMEs. Recent research has proposed ESG ratings as a useful instrument for supporting credit assessment in small and medium-sized firms [30]. Green governance and green finance have also been associated with improved sustainable performance [31]. The current findings are consistent with these developments, particularly the identification of investor pressure and access to financial resources as significant external drivers. This suggests that integrated reporting may become increasingly relevant not only for legitimacy and regulatory compliance but also for financing opportunities.

The study also identified several barriers, including financial and human resource limitations, organizational resistance to change, lack of domestic standards and locally tailored frameworks, and insufficient coordination among regulatory bodies. These findings closely resemble barriers reported in earlier SME sustainability studies. Limited budgets, shortages of specialized personnel, weak awareness, and uncertainty regarding implementation processes have repeatedly been identified as major impediments to sustainability adoption [15, 17]. Likewise, prior reviews have emphasized the cost-benefit tensions surrounding sustainability reporting, especially for smaller firms that may perceive disclosure requirements as disproportionately burdensome [14]. The current study therefore confirms that implementation barriers are both resource-based and institutional.

The lack of locally tailored standards is particularly important in the Iranian context. International sustainability frameworks provide useful guidance, but their effective application requires adaptation to local regulatory structures, industrial conditions, data availability, and organizational maturity. The wider literature suggests that the integration of ESG principles into organizations depends on contextual alignment rather than formal adoption alone [7]. Similarly, ESG and sustainability practices are most effective when they are connected to organizational strategy and value creation [6, 8]. The findings of the present study therefore support the development of context-sensitive reporting frameworks rather than simple replication of international models.

The scenario analysis provided an additional layer of interpretation by demonstrating how different combinations of senior management commitment and regulatory support may lead to divergent futures. The Digital Transformation Leadership scenario represented the most advanced pathway, combining high managerial commitment with strong regulatory support. In this scenario, integrated reporting was associated with technological integration, active oversight, accountability, and value creation. This configuration is consistent with studies showing that digitalization and sustainability can jointly strengthen resilience and organizational performance [28]. It is also aligned with evidence indicating that sustainability-oriented innovation can be enhanced when internal capabilities and external collaboration are combined [19].

The Gradual Development scenario, characterized by high management commitment but relatively low regulatory support, emerged as a realistic pathway for SMEs. This result is important because it suggests that firms do not necessarily need a fully mature regulatory environment to begin improving integrated reporting. Organizational learning, pilot projects, incremental technological investment, and voluntary adoption can create a foundation for later institutionalization. This interpretation is supported by studies emphasizing the benefits of innovation and sustainability practices in SMEs, especially when implementation is phased and adapted to resource limitations [11, 18]. The gradual pathway may therefore be particularly suitable for organizations that lack the resources required for immediate large-scale transformation.

In contrast, the Mandatory Transparency scenario demonstrated the consequences of high regulatory support combined with low management commitment. In this setting, regulatory pressure becomes the dominant force shaping the central phenomenon, and reporting risks becoming compliance-oriented rather than strategically integrated. The quantitative results supported this interpretation, as the path from causal conditions to the central phenomenon was especially strong in this scenario. This result is consistent with research showing that sustainability reporting adoption can be driven by regulatory or institutional pressures without necessarily leading to deep organizational transformation [25, 26]. The implication is that regulation can establish minimum standards, but management commitment remains necessary for improving quality, connectivity, and strategic relevance.

The Institutional Stagnation scenario revealed the strongest effect of strategies on outcomes, with a path coefficient of 0.741. This finding suggests that when both managerial commitment and regulatory support are weak, organizational strategies become especially consequential because firms have fewer institutional supports on which to rely. In such conditions, survival-oriented strategies may preserve minimal trust but can simultaneously increase the risk of losing long-term opportunities. This pattern reflects the broader literature on SME sustainability, which emphasizes the vulnerability of smaller firms to weak institutional environments, limited resources, and uncertain external support [11, 24]. The result also illustrates that short-term adaptation and long-term sustainability may diverge under conditions of institutional weakness.

Across all four scenarios, strategies consistently exerted strong effects on outcomes. This supports the grounded theory logic underlying the model, in which contextual and intervening conditions shape the strategy set through which organizations respond to the central phenomenon. The quantitative results indicate that organizational outcomes are not produced automatically by favorable drivers; they depend on how organizations respond through concrete actions. Human capital empowerment, digitalization, governance improvement, cultural change, institutional networking, and phased implementation therefore function as mechanisms that convert environmental and organizational conditions into reporting outcomes. This interpretation is consistent with studies linking sustainability practices to innovation, governance, stakeholder engagement, and resilience [18, 19, 31].

Another important implication concerns reporting quality. The study did not treat the existence of integrated reporting as sufficient evidence of success. Instead, quality was linked to comprehensiveness, transparency, coherence, connectivity, and the reliability of underlying data. This approach is supported by research showing that the quality of ESG communication varies considerably across SMEs and communication channels [5]. It is also consistent with the growing emphasis on assurance and sustainable auditing as mechanisms for improving credibility and trust in non-financial information [33]. The findings therefore suggest that integrated reporting policy should focus not only on encouraging adoption but also on strengthening the systems that determine information quality.

Finally, the study contributes to the broader literature on sustainability in SMEs by integrating drivers, barriers, scenarios, and structural relationships within a single explanatory framework. Prior reviews have called for more integrated approaches that connect sustainability practices, organizational characteristics, and future research directions [10, 12, 13]. The present study responds to this need by showing that the future of integrated reporting is shaped by interactions among internal capabilities, institutional pressures, stakeholder expectations, and strategic responses. Its scenario-based design also moves beyond static determinant models by highlighting how different combinations of uncertainty can lead to qualitatively different reporting pathways.

The study has several limitations. First, the quantitative sample was obtained through convenience sampling, which limits the statistical generalizability of the findings to all Iranian SMEs. Second, the study used a cross-

sectional design, meaning that the relationships among the variables were assessed at one point in time and cannot demonstrate long-term causal changes. Third, the scenario evaluations were based on expert judgment and respondent perceptions, which may be influenced by subjective interpretation, organizational position, or familiarity with sustainability reporting. Fourth, although the study incorporated firms and experts from relevant financial, accounting, academic, and sustainability backgrounds, the results may differ across industries with distinct regulatory, environmental, and technological conditions. Finally, some of the concepts related to climate disclosure and integrated reporting are still evolving, which may affect how respondents interpret specific indicators.

Future research should examine the proposed model longitudinally to determine how organizational readiness, regulatory pressure, and reporting quality change over time. Comparative studies across industries, firm sizes, and countries would also help assess the transferability of the identified drivers and scenarios. Future studies could use probability sampling where feasible and combine survey data with archival reporting measures, actual sustainability reports, and objective indicators of ESG performance. Additional research could also test alternative scenario dimensions, such as technological maturity, investor pressure, or access to finance, and examine whether these produce different future pathways. More detailed investigation of climate-related disclosure, assurance mechanisms, digital reporting tools, and artificial intelligence applications would further extend understanding of how SMEs can improve reporting quality under constrained conditions.

From a practical perspective, SMEs should prioritize internal readiness before attempting full-scale integrated reporting. Investment in information systems, employee training, cross-functional coordination, and management commitment should precede or accompany formal disclosure initiatives. Regulatory bodies should develop phased, locally adapted guidelines that reflect the financial and technological capacities of SMEs rather than imposing uniform requirements designed for large corporations. Professional associations and universities can support implementation by providing training, templates, benchmarking tools, and advisory services. Firms should also adopt a gradual implementation roadmap, beginning with basic data integration and material sustainability indicators before moving toward advanced climate disclosure and fully integrated reporting. Such an approach can reduce implementation risk, improve reporting quality, and support a more sustainable transition from traditional financial reporting to integrated reporting.

Authors' Contributions

Authors equally contributed to this article.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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