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Review of Research Methodology in the Field of Information Technology Security Governance Model

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Abstract

The present study was conducted with the aim of clarifying the research methodology in the field of the information technology security governance model. The overall objective of this meta-analysis study is to examine research using keywords such as security governance, information technology security, information and communication technology security, data security, cybersecurity, and cyberspace security. This research is carried out in the form of a meta-analysis. The study covers the time period from 2010 to 2021. A total of 98 domestic and international studies were selected by applying relevant filters. During the review period, there was a significant increase in research related to information technology security governance. Findings show that in qualitative methodologies, data collection methods are primarily based on interviews, field observation, use of secondary sources, brainstorming, or a combination of these methods. In quantitative methodologies, the predominant data collection tool was the questionnaire. Data analysis methods in qualitative research were mainly content analysis, grounded theory, thematic analysis, and Delphi technique. In quantitative methodologies, correlation and regression analysis, structural equation modeling (SEM), analysis of variance (ANOVA), descriptive statistical analyses, and the F-test were used.

Keywords: governance, security, information and communication technology, cyber, data.

1. Introduction

In recent decades, the discourse of good governance has become a cornerstone of public sector reform, sustainable development strategies, and institutional performance improvement around the globe. Governance, in its most fundamental definition, refers to the processes and structures used to direct and manage public affairs, emphasizing transparency, accountability, efficiency, and participation (Keping, 2018). The evolution of governance from a hierarchical model to a more network-based, participatory, and digitally enabled structure has led scholars and policymakers alike to explore its multidimensional impact on institutional development, economic growth, public service delivery, and civic engagement (Fakhri et al., 2023; Gholipour Souteh et al., 2021). Within this trajectory, the concept of *good governance* has emerged as both a normative ideal and a practical framework, incorporating ethical values, legal legitimacy, and managerial effectiveness (Abolhasani & Ghobadi, 2021; Ambarwati et al., 2019).

The role of good governance has become particularly salient in developing countries, where institutional fragility, limited administrative capacity, and digital divides challenge the realization of equitable and effective governance structures. In Indonesia, for instance, studies have emphasized the significance of consistent public service management rooted in governance

principles to promote citizen trust and accountability (Amir et al., 2023). The challenges of implementing governance frameworks are compounded in the digital age, where the integration of information and communication technologies (ICTs) introduces both opportunities and complexities for transparency, data security, and citizen empowerment (Chatterjee et al., 2020; Taghva et al., 2020).

At the intersection of digital transformation and governance, e-government has emerged as a key instrument in actualizing good governance objectives. The deployment of digital infrastructures, big data systems, and cloud computing in public administration has not only enhanced service efficiency but also provided tools for participatory governance and real-time accountability (Li et al., 2019; Sakurai & Murayama, 2019). Research has shown that digital governance models must be aligned with ethical standards and institutional culture to avoid technocratic pitfalls and ensure inclusive access (Gholipour Souteh et al., 2021). In this vein, the digitalization of administrative processes, as observed in Iranian and Southeast Asian contexts, illustrates the double-edged nature of technology—capable of empowering both innovation and control (Ghiasi et al., 2021; Kirana & Majid, 2022).

A significant aspect of contemporary governance studies concerns the integration of good governance principles into sector-specific domains, including health, education, and economic policy. Empirical evidence from African nations underscores that good governance has a direct and measurable impact on human development indicators, particularly health outcomes and educational attainment (Ismail Shafa et al., 2024). In the context of foreign direct investment (FDI), countries with stronger governance frameworks and robust human capital systems are more successful in attracting and retaining international capital, thereby accelerating economic growth (Mansourlakouraj et al., 2024). Similarly, in Arab countries, good governance has mediated the relationship between digitalization and economic growth, demonstrating the importance of legal infrastructure, anti-corruption measures, and fiscal transparency (Fahmy, 2024).

From a theoretical standpoint, good governance encompasses a series of interrelated dimensions such as accountability, participation, rule of law, responsiveness, and consensus orientation (Khan, 2019). These dimensions function as both evaluative benchmarks and functional imperatives in governance practices. The institutionalization of these principles, however, requires strategic planning, capacity building, and stakeholder coordination (Rezazadeh Taloukolaei et al., 2024; Sawmar & Mohammed, 2021). For example, in the higher education sector, the governance model of Mazandaran University of Medical Sciences was enhanced through the identification of governance dimensions aligned with organizational development needs (Rezazadeh Taloukolaei et al., 2024). Similarly, in local governance structures, village administrations in Indonesia were able to strengthen legitimacy and efficiency through adherence to governance norms and citizen engagement protocols (Ambarwati et al., 2019).

Ethical considerations remain central to the operationalization of good governance. The moral foundation of governance is deeply intertwined with cultural expectations, social capital, and political philosophy. For example, the ethical framework presented in Nahj al-Balagha offers an Islamic perspective on good governance, emphasizing justice, consultation, and servant leadership (Montazeri et al., 2018). Additionally, ethical governance demands sensitivity to the implications of decision-making on vulnerable populations and future generations (Pomeranz et al., 2021). This ethical orientation is especially vital in sectors such as environmental sustainability, where governance decisions have long-term consequences for land use, biodiversity, and food security (Rodorff et al., 2019).

Furthermore, the intersection of religion and governance provides a unique lens for evaluating institutional integrity. Zakat institutions in Indonesia, for example, have witnessed performance improvements through the integration of Shariah forensic accounting and governance reforms (Wahyuni-Td et al., 2021). The conceptualization of governance in Islamic political philosophy, particularly through the notion of *ihsan*, adds a spiritual and moral dimension to governance discourse (Khan, 2019). These multidimensional interpretations enrich our understanding of governance as not only a technical or administrative function but also a culturally and morally embedded process.

Information security and data ethics constitute additional layers of contemporary governance challenges. The increasing reliance on digital platforms raises concerns about cyber threats, surveillance, and data misuse. Studies from Iran and China

highlight the importance of IT training, awareness of data policies, and digital literacy in shaping secure governance ecosystems (Karimi & Peykari, 2018; Li et al., 2019). These concerns are particularly pronounced in smart city projects, where the convergence of ICT, urban planning, and citizen services demands high levels of coordination and technological resilience (Jameel et al., 2019).

The methodological orientation in governance research has also evolved. While earlier studies often relied on normative theorization, more recent inquiries have utilized empirical models, structural equation modeling, and factor analysis to validate governance constructs (Amalia, 2019; Amini Shad et al., 2019). Such quantitative frameworks allow for the testing of causal relationships between governance inputs and developmental outputs. For example, the confirmatory factor analysis applied to zakat institutions revealed critical governance variables affecting transparency and accountability (Amalia, 2019). Similarly, in Tehran Municipality, a tailored governance model was developed through multi-criteria decision-making processes and stakeholder interviews (Amini Shad et al., 2019).

Good governance also plays a mediating role in organizational agility and innovation. As digital ecosystems demand faster adaptation and resource reconfiguration, governance frameworks that support IT ambidexterity and adaptive leadership become crucial (Arianfar & Rajabi Farjad, 2022; Chatterjee et al., 2020). Organizations embedded in such governance environments are more likely to align their innovation capabilities with public value creation and long-term institutional resilience.

In summary, the multifaceted literature on good governance reveals a dynamic and context-sensitive framework that integrates ethical, technological, administrative, and developmental dimensions. Whether through the reform of public institutions, the deployment of e-governance platforms, or the cultivation of participatory culture, governance remains a critical determinant of institutional performance and societal well-being. This study seeks to build on the aforementioned insights by systematically reviewing empirical and theoretical contributions from diverse national contexts. The goal is to provide an integrative perspective on how good governance is conceptualized, implemented, and evaluated across sectors and regions, particularly in the digital age.

2. Methods and Materials

This study is descriptive–analytical in nature and conducts a meta-analysis of existing studies in the field. The bibliometric method was used in this research. Bibliometrics is an approach that quantitatively, objectively, and statistically examines patterns within the literature of a particular field or subject. This approach aims to visualize various aspects of a specific scientific domain.

To retrieve data, inclusion and exclusion criteria were applied. First, the Web of Science database and its sub-collections were selected as the inclusion criteria for data retrieval. The reason for choosing this database was its extensive use in various bibliometric studies and the credibility and reliability of its indexed research.

For data retrieval, article titles, abstracts, and keywords were selected and reviewed. The starting point for the studies was set at 2010 to encompass the majority of relevant research, and the endpoint was limited to 2021 to ensure a complete year is included. Additionally, based on the research literature, appropriate keywords were searched within the Web of Science database. Initially, 230 scholarly outputs were extracted, and then filters and exclusion criteria were applied.

The first exclusion criterion was article type, which was limited to research and review articles, as such studies undergo more rigorous peer-review and evaluation processes. Language was another exclusion criterion, and studies were limited to English and Persian to align with the study's objective—examining the research methodology in the field of information and communication technology security governance and its subfields. Ultimately, 98 articles were selected for analysis.

In the next phase—i.e., the analysis phase—complete bibliometric data for each study, such as title, abstract, methodology, and references, were examined.

3. Findings and Results

To conduct a systematic analysis of the identified articles, the studies were classified based on involved theoretical domains, topics (themes), and the methodologies used. Subsequently, the methodologies employed in this field were extracted.

According to *Figure 1*, the review of articles indicates that researchers utilized quantitative, qualitative, and mixed-methods approaches. Among the reviewed articles, 64% employed qualitative methodology, 21% used quantitative methodology, and 4% adopted a mixed-methods approach. The remaining 10% were theoretical and conceptual research articles.

As shown in *Figure 2*, most qualitative articles used interviews as their primary tool, while quantitative articles also predominantly relied on interviews. Other tools such as field observation and library studies were used with comparable frequency across the reviewed studies.

According to *Figure 3*, the dominant data analysis methods used in qualitative research were content analysis and grounded theory. In quantitative research, structural equation modeling (SEM) was the most widely used method for data analysis.

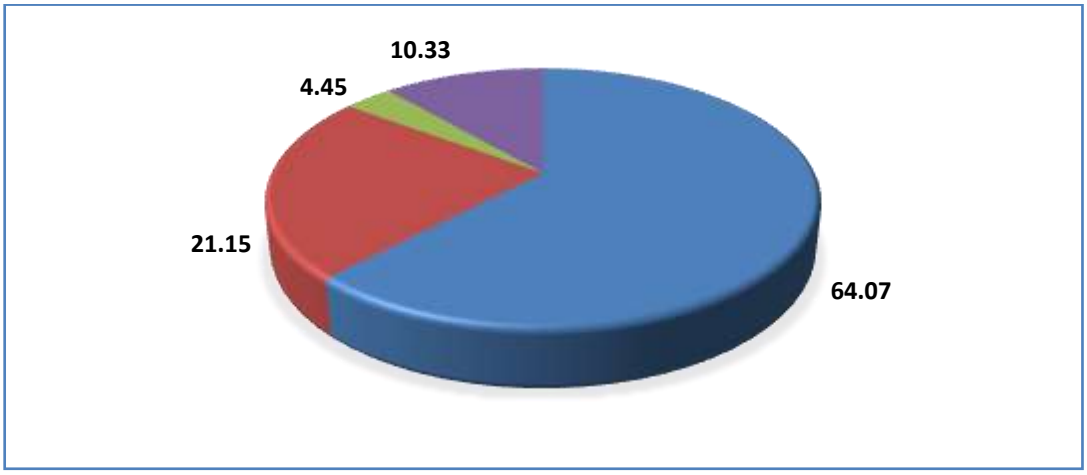

Figure 1. Methods Used in the Reviewed Articles

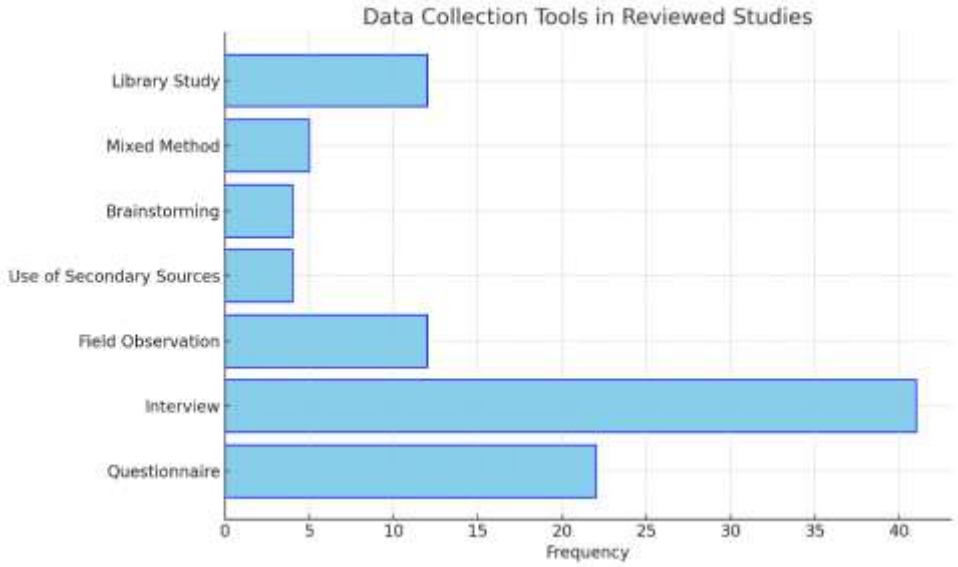

Figure 2. Tools Used in the Reviewed Articles

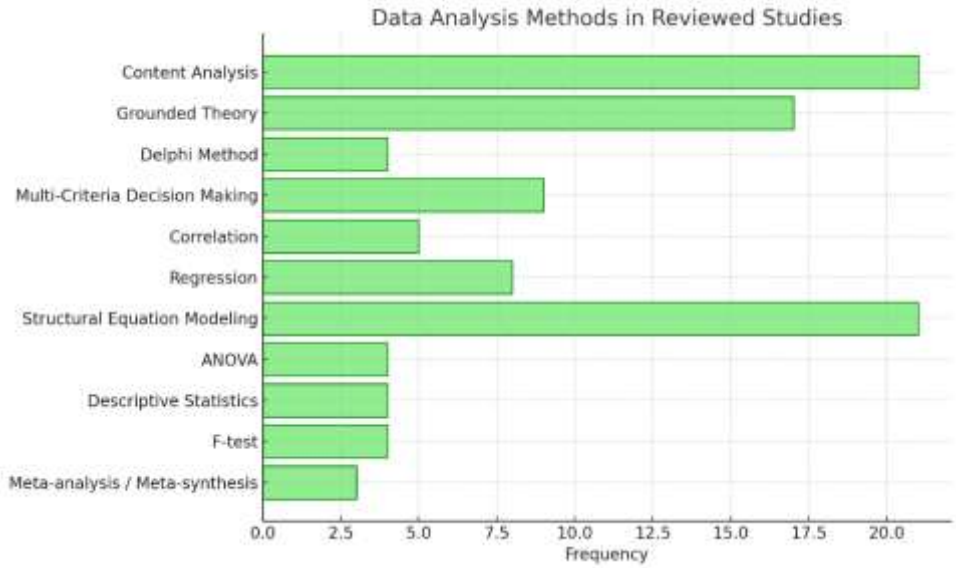

Figure 3. Data Analysis Methods in the Reviewed Articles

Table 1. Methodological Analysis of the Reviewed Research

Methodology	Data Collection Tools	Data Analysis Methods
Qualitative	Interviews (in-depth interviews, semi-structured interviews, focus group discussions), field observations, use of secondary sources (reports, books, articles, web content, and social media), brainstorming, and hybrid methods	Content analysis, grounded theory, Delphi method, multi-criteria decision-making methods
Quantitative	Questionnaire	Correlation and regression analysis, structural equation modeling (SEM), analysis of variance (ANOVA), descriptive statistical analysis, and F-test
Review	Library study	Meta-analysis, meta-synthesis

In greater detail, within the qualitative methodology of the studies reviewed in the present research, data collection methods were based on interviews (including in-depth interviews, semi-structured interviews, and focus group discussions), field observations, the use of secondary sources (such as reports, books, articles, web content, and social media), brainstorming, or a combination of these methods. In the quantitative methodology, the primary data collection tool was the questionnaire.

The data analysis methods in qualitative research predominantly included content analysis, grounded theory, thematic analysis, and the Delphi method. Models and processes formulated for governance at various scales generally employed grounded theory. Articles that reviewed the theoretical literature on information technology security governance mainly used meta-analysis and content analysis as their primary methodological approaches. In quantitative methodology, data analysis was conducted using correlation and regression analysis, structural equation modeling (SEM), analysis of variance (ANOVA), descriptive statistical analyses, and the F-test. Table 2 contains the completed PRISMA checklist.

Table 2. PRISMA Checklist

Row	Item	Description
1	Research Topic	Includes keywords such as *security governance*, *information technology security*, *information and communication technology security*, *data security*, *cybersecurity*, and *cyberspace security*.
2	Research Method	Describes the methodology from quantitative, qualitative, and review perspectives, with precise details including research tools, population selection, and analysis methods.
3	Databases	According to the topic and field of research, three databases were used: *Web of Science* for English articles, and *noormags.ir* and *SID* for Persian articles.
4	Database Platforms	No platform currently exists that aggregates all domestic (Iranian) databases in a unified system.
5	Study Registration	All extracted studies from the databases are recorded, and their data are compiled in one place.
6	Online and Ongoing Sources	Sources were extracted from the aforementioned three databases (*noormags.ir*, *sid.ir*, *Web of Science*).
7	Citation Tracking	References within secondary study texts were extracted, and after screening, their abstracts, research methods, and related content were reviewed and analyzed.
8	Target Audience	Given the volume of existing literature, using primary studies for data extraction is considered sufficient.
9	Logical Justification	Provides a rationale for conducting the study and reviewing the literature.

10	Search Strategy	Two types of keywords were used in the search protocol: *security governance*, *information technology security*, *information and communication technology security*, *data security*, *cybersecurity*, and *cyberspace security*. Accordingly, studies containing these keywords were identified in the three databases.
11	Limitations	The limitations considered for this study are: (1) Language: Persian and English; (2) Timeframe: 2010 to 2021; (3) Search strategy: keyword search; (4) Target population: all studies related to the topic and keywords; (5) Study condition: only studies approved by experts; (6) Only scientific research and review articles were selected.
12	Search Filters	Filters applied in the databases to ensure precise research retrieval based on limitations (as per item 11), research topic, and field are as follows: (1) Persian and English language; (2) Published after 2010; (3) Field of information technology security governance; (4) Studies from Iran and other countries; (5) Scientific research and review articles only.
13	Previous Work	Relevant literature was searched. Abstracts, keywords, and research methods were reviewed, and the extracted information was used to advance the present research.
14	Updating	This study will contribute to expanding and enriching the knowledge base in this field.
15	Search Timeline	The time frame for this research is from 2010 to 2021 and includes all studies conducted within this period.
16	Peer Review	According to the defined timeframe, no other study on this topic has yet been conducted.
17	Total Records	230 articles.
18	Final Articles Included	98 articles.

The homogeneity assumption in meta-analytic studies examines whether all the reviewed studies report similar results regarding information technology security governance, or whether their results differ and are heterogeneous (i.e., high, moderate, or weak correlations).

The evaluation of the obtained statistics ($Q = 740.119$, $p < 0.001$) indicates that the null hypothesis regarding homogeneity among the studies is rejected with 99% confidence, confirming the presence of heterogeneity among the studies. Unlike the Q test, the I-squared (I^2) statistic is not sensitive to the number of effect sizes. This coefficient presents the extent of heterogeneity as a percentage, and the closer its value is to 100, the greater the heterogeneity in the effect sizes.

The I^2 value was found to be 79, meaning that 79% of the total variance in the related research documents is due to heterogeneity in their effect sizes. Therefore, the impact of information technology security governance varies across studies, and this relationship is strongly influenced by the specific characteristics and features of each study. Under such conditions, moderator variables must be used to determine the source and location of this variance. In fact, the heterogeneity of the studies suggests the presence of moderation effects on the effect sizes. Thus, in addition to the effect size itself, other contributing factors can be identified, and a random effects model should be used to interpret the overall effect size.

The second assumption examined in the meta-analytic approach is *publication bias* or error due to inaccessibility to all relevant studies conducted on the subject within a given time frame. To assess this bias, three tests were applied. Figure 4, an inverted funnel plot in relative dimensions, indicates a relative symmetry in the research documents. The results of the Begg and Mazumdar rank correlation test (tau = 0.049, p (one-tailed) = 0.612, p (two-tailed) = 0.780) suggest that although there is a relationship between effect size and precision, this relationship is not statistically significant, and the null hypothesis regarding symmetry in the funnel plot and the absence of publication bias is confirmed.

Findings from Egger's regression test also show that the intercept, confidence interval, and significance levels for one-tailed and two-tailed tests were −3.021, 1.612, 0.081, and 0.312, respectively. Hence, the assumption of no publication bias is reaffirmed.

Table 3. Evaluation of Homogeneity and Publication Bias Coefficients

Type of Assumption	Test Type	Coefficient Value	Intercept (B)	Significance Level	Standard Error
Homogeneity	Q	740.119	–	0.001	–
Homogeneity	I^2	79.002	–	0.001	–
Publication Bias	Begg and Mazumdar Correlation	0.049	–	One-tailed: 0.612 Two-tailed: 0.780	–
Publication Bias	Egger's Linear Regression	1.612	−3.021	One-tailed: 0.081 Two-tailed: 0.312	2.14

Table 4. Fail-safe N Coefficient Evaluation

Assumption	Z-score	Significance Level	Alpha	Residual	Z for Alpha	Observed Studies	Missing Studies
Publication Bias	61.526	0.001	0.05	2	1.714	98	0±

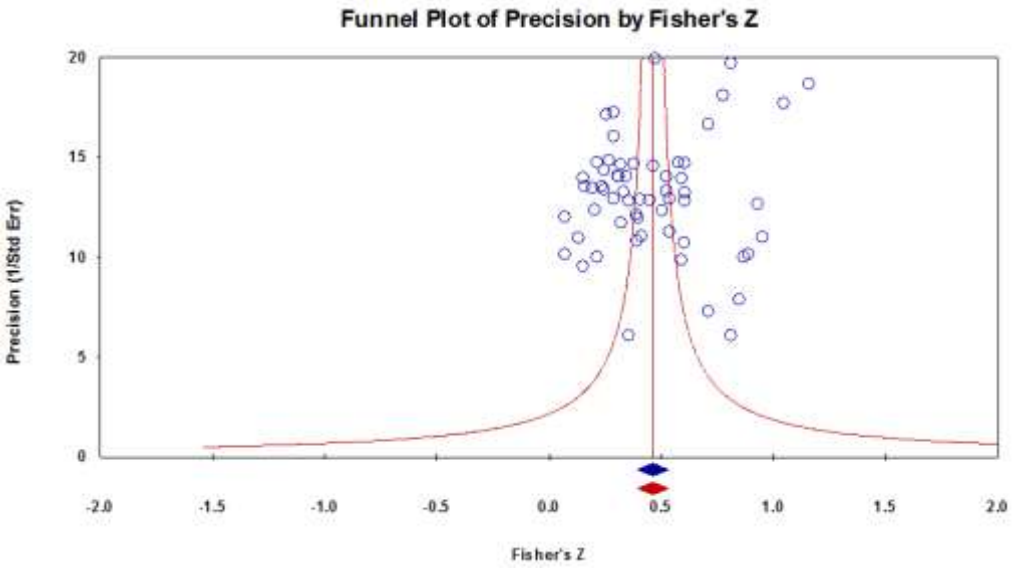

Figure 4. Funnel Plot for Evaluating Publication Bias or Reporting Error

4. Discussion and Conclusion

The results of the present meta-analytical study on good governance, particularly in relation to information technology integration and institutional development, offer compelling insights into methodological trends, governance components, and sectoral applications across a diverse array of countries. The systematic analysis of 98 studies spanning from 2010 to 2021 revealed distinct patterns in research orientation. The most utilized data collection method was qualitative interviewing, especially semi-structured and in-depth formats, followed by questionnaires. Quantitative studies commonly employed structural equation modeling (SEM) and regression analysis, whereas qualitative works relied heavily on content analysis, grounded theory, and Delphi techniques. This methodological diversity reflects the evolving complexity of governance studies and the multidimensional nature of good governance in the context of digital transformation and public sector reform.

The findings confirm a high degree of heterogeneity among the reviewed studies, as evidenced by the Q-statistic ($Q = 740.119$, $p < 0.001$) and an I^2 index of 79%. This substantial heterogeneity suggests that the impact of good governance varies significantly across institutional settings, governance dimensions, and regional contexts. For instance, studies in Southeast Asia emphasized the role of ethical governance in village-level administrations, highlighting transparency, community participation, and leadership accountability as crucial factors (Ambarwati et al., 2019; Wahyuni-Td et al., 2021). In contrast, Middle Eastern research has given precedence to governance ethics derived from religious and cultural frameworks, such as Nahj al-Balagha and the philosophy of *ihsan*, to ground administrative practices in Islamic moral foundations (Khan, 2019; Montazeri et al., 2018).

Furthermore, the significant role of digital technologies in enhancing or reshaping governance structures is consistently affirmed throughout the reviewed studies. Multiple articles identified the potential of ICTs, big data systems, and cloud computing to promote e-government, increase transparency, and facilitate more responsive public services (Chatterjee et al., 2020; Ghiasi et al., 2021; Taghva et al., 2020). The integration of digital platforms in governance processes has been particularly effective in reducing bureaucratic inefficiencies and improving service accessibility, as shown in empirical analyses from Iran, China, and Indonesia (Gholipour Souteh et al., 2021; Kirana & Majid, 2022; Li et al., 2019). These outcomes align with Baldwin's broader thesis that globalization and technological convergence have redefined governance paradigms on both macroeconomic and institutional scales (Baldwin, 2018).

Another critical observation is the intersection between good governance and socio-economic development. The review showed a consistent positive correlation between governance quality and human development indicators, particularly in the areas of health, education, and economic growth. Studies from African and Arab countries demonstrated that governance

reforms have the capacity to enhance GDP growth, improve health outcomes, and elevate educational outputs by enforcing transparency, merit-based recruitment, and strategic resource allocation (Fahmy, 2024; Ismail Shafa et al., 2024). Similarly, research on FDI inflow into developing nations underscores the necessity of robust governance mechanisms and human capital investments to attract sustainable investments and foster macroeconomic stability (Mansourlakouraj et al., 2024).

Institutionally, the components of good governance—transparency, accountability, rule of law, responsiveness, and citizen participation—were repeatedly cited as essential for successful organizational transformation. In the context of universities and health institutions, governance frameworks were shown to be effective in promoting innovation, aligning strategic goals with stakeholder expectations, and enhancing organizational development (Amini Shad et al., 2019; Rezazadeh Taloukolaei et al., 2024). For example, at Mazandaran University of Medical Sciences, the incorporation of participatory mechanisms and performance monitoring systems improved organizational coordination and policy implementation (Rezazadeh Taloukolaei et al., 2024). This reinforces the view that good governance not only shapes external relations with the public but also strengthens internal institutional coherence.

Ethical and cultural dimensions were also foregrounded as critical to governance success. Ethical governance was repeatedly emphasized in theoretical and empirical studies, particularly in the Iranian and Islamic contexts where social justice, collective responsibility, and religious accountability frame public expectations (Abolhasani & Ghobadi, 2021; Fakhri et al., 2023). In the zakat sector, governance frameworks informed by Islamic principles—augmented by forensic accounting and transparency measures—enhanced institutional legitimacy and financial compliance (Sawmar & Mohammed, 2021; Wahyuni-Td et al., 2021). These findings suggest that good governance cannot be wholly detached from the sociocultural ecosystem in which it operates; rather, it must be interpreted and localized to reflect specific ethical and community values.

On the technological front, the role of information security and digital literacy emerged as both an enabler and a challenge to governance development. With the increasing prevalence of cyber threats, smart city projects, and cloud infrastructures, the importance of IT awareness and data protection policies was prominently highlighted (Jameel et al., 2019; Karimi & Peykari, 2018). The reviewed studies suggest that institutional capacity building must now incorporate IT training, cybersecurity frameworks, and digital policy development to preserve data integrity and public trust. For instance, the Iranian Research Institute for Information Science and Technology's redesign of IT service models reflects a growing emphasis on digital responsiveness and agile management (Sajedi Nejad, 2019).

Moreover, methodological developments within governance research have shown a shift from normative descriptions to empirical testing. The use of confirmatory factor analysis, structural modeling, and multi-criteria decision-making frameworks has provided more robust evidence for the effectiveness of governance models across different contexts (Amalia, 2019; Amini Shad et al., 2019; Imawan et al., 2024). This methodological rigor enhances the credibility of governance studies and allows for more nuanced understanding of causality, feedback mechanisms, and contextual dependencies. It also supports cross-national comparisons and benchmarking efforts, essential for regional development strategies and global governance assessments.

Lastly, the review reveals the need for multi-actor governance approaches that integrate public institutions, private entities, civil society, and international frameworks. As observed in sustainability-focused governance research, particularly in land management and conservation domains, successful governance requires participatory policy design, conflict resolution mechanisms, and adaptive leadership (Pomeranz et al., 2021; Rodorff et al., 2019). These principles are equally applicable to urban planning, health governance, and education reform, where collective action and evidence-based policymaking are increasingly indispensable.

Despite the comprehensiveness of the meta-analysis, certain limitations must be acknowledged. First, the study's reliance on published peer-reviewed research, predominantly in English and Persian, may have excluded valuable insights from grey literature or works published in other languages. Second, the reviewed articles span different countries with varying socio-political contexts, which may limit the comparability of governance outcomes across settings. Third, while the analysis covered both qualitative and quantitative methodologies, a meta-regression or moderator analysis was not applied to isolate contextual variables such as regime type, technological infrastructure, or institutional maturity. Additionally, some studies had limitations

in methodological transparency, such as insufficient reporting of sampling techniques or validity assessments, which could impact the interpretation of aggregated findings.

Future research should aim to integrate more longitudinal studies that track the evolution of governance reforms over time, particularly in response to digital innovation and political change. Comparative studies across regions with similar development levels but different governance models could yield valuable insights into context-specific enablers of institutional performance. It is also recommended that researchers conduct mixed-methods studies that incorporate both macro-level policy analysis and micro-level organizational case studies to explore how governance principles are internalized and operationalized. Furthermore, there is a need for greater exploration of the ethical dimensions of digital governance, including AI-based decision-making, algorithmic transparency, and privacy protection. Expanding the scope of governance research into emerging sectors such as climate policy, blockchain governance, and digital finance would also enrich the field.

Practitioners and policymakers should adopt a multidimensional governance strategy that aligns technological innovation with ethical standards, participatory frameworks, and performance accountability. Capacity-building initiatives must prioritize IT literacy, digital infrastructure investment, and cybersecurity awareness. Public institutions should institutionalize feedback loops to ensure citizen engagement and adaptive governance. Tailoring governance models to local cultural and ethical contexts will increase their legitimacy and effectiveness. Finally, inter-organizational collaboration—between government agencies, academic institutions, civil society, and the private sector—should be promoted to foster innovation, share best practices, and address governance challenges holistically.

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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