

Identification and Evaluation of the Components of Regulatory Effectiveness in the Iranian Insurance Industry

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Abstract: The present study was conducted with the aim of identifying and evaluating the components of regulatory effectiveness in the Iranian insurance industry. In terms of purpose, the study was applied research; in terms of data type, it employed a sequential mixed-methods design with an exploratory approach; and in terms of nature, it consisted of a qualitative phase based on meta-synthesis/Delphi methodology and a quantitative phase based on descriptive-analytical (survey/correlational) methods. The qualitative population in the first stage included all relevant theoretical foundations and previous studies retrieved from domestic and international databases. Among these, 18 scientific publications were selected using a systematic exclusion technique and purposive non-probability sampling. In the second stage, the qualitative population consisted of theoretical and practical experts, from whom 19 participants were selected through the minimum sample size approach in the Delphi method and purposive non-probability sampling. The quantitative population comprised senior managers of the Financial Deputy Division of the Iranian Insurance Company. A total of 219 managers were selected as the sample using proportionate stratified random sampling and based on the minimum sample size requirement for confirmatory factor analysis. Data collection in the qualitative phase involved a systematic literature review during the meta-synthesis stage and a worksheet (semi-open-ended questionnaire) during the Delphi stage. In the quantitative phase, a researcher-developed questionnaire was used to assess the validity of the model from the perspectives of both the qualitative participants and the quantitative respondents. The validity and reliability of the instrument were examined and confirmed in both the qualitative and quantitative phases. Data analysis in the qualitative phase was conducted through thematic analysis following the approach of Braun and Clarke (2020) using MAXQDA 2018 software. In the quantitative phase, descriptive statistics (demographic characteristics and variables) and inferential statistical analyses (confirmatory factor analysis and one-sample t-test) were performed using SPSS Version 27 and SmartPLS Version 3. The findings indicated that the construct of regulatory effectiveness in the Iranian insurance industry consists of three dimensions: regulatory transparency (6 items), compliance (9 items), and risk prevention (9 items). Finally, based on the identified factors, the research model was developed. The results demonstrated both the internal and external validity of the model based on the evaluations of the qualitative participants and the quantitative respondents.

Keywords: Effectiveness, Insurance Industry, Risk, Regulatory Transparency

1. Introduction

The insurance industry is one of the most important pillars of financial systems and plays a critical role in promoting economic stability, facilitating investment, supporting risk transfer, and strengthening public

confidence in economic activities. Insurance companies provide mechanisms for mitigating uncertainty and managing risks faced by individuals, organizations, and governments. Consequently, the effectiveness of insurance operations is closely linked to the quality of the regulatory environment governing the industry. Effective regulations create a framework that balances market stability, consumer protection, operational efficiency, innovation, and competitiveness. In contrast, ineffective or outdated regulations can impede industry growth, increase compliance costs, weaken risk management practices, and reduce the overall performance of insurance institutions [1, 2].

Regulation has long been recognized as a fundamental mechanism for maintaining order and ensuring accountability within financial markets. The insurance sector is particularly dependent on regulatory systems because of its unique role in managing future uncertainties and safeguarding policyholders' interests. Regulatory authorities are expected to establish rules that enhance transparency, encourage fair competition, prevent systemic risks, and ensure the financial solvency of insurers. However, the complexity of insurance markets and the continuous evolution of economic and technological environments make the assessment of regulatory effectiveness a challenging task. As a result, identifying the factors and dimensions that contribute to effective regulation has become an important area of inquiry for scholars and policymakers worldwide [1, 3].

Theoretical discussions on regulation suggest that regulations are designed to address market failures, reduce information asymmetry, and protect stakeholders from opportunistic behavior. Different regulatory theories emphasize various objectives, including public interest protection, economic efficiency, institutional accountability, and market discipline. In the insurance industry, these objectives become particularly important because insurers operate by pooling risks and managing large volumes of financial resources. Therefore, regulations must not only ensure compliance but also support sustainable industry development and adaptability to changing market conditions [1, 4].

The relationship between regulation and organizational performance has attracted considerable scholarly attention. Previous studies indicate that regulatory frameworks can significantly influence the efficiency and productivity of insurance firms. Research conducted in the Australian private health insurance sector demonstrated that industry regulations and organizational characteristics substantially affect insurer efficiency and operational outcomes [4]. Similarly, investigations into the insurance industry of emerging economies have highlighted the importance of regulatory structures in shaping market performance and operational effectiveness. Evidence suggests that well-designed regulations can contribute to improved market efficiency, enhanced competitiveness, and stronger organizational performance [5].

Recent studies have further emphasized the dynamic nature of regulatory effectiveness. In the Iranian insurance industry, empirical findings indicate that regulatory interventions can influence the efficiency of insurance companies both positively and negatively, depending on their design, implementation, and adaptability to environmental conditions. Dynamic analyses have shown that regulation is not merely a compliance mechanism but a strategic factor capable of shaping long-term organizational outcomes and market performance [2]. These findings underscore the necessity of evaluating regulations beyond traditional compliance measures and examining their broader impacts on organizational effectiveness.

One of the most important dimensions of regulatory effectiveness is transparency. Transparent regulations facilitate stakeholder understanding, reduce uncertainty, and improve organizational accountability. Transparency enables insurance companies to interpret regulatory requirements accurately and implement them consistently across organizational processes. It also strengthens public trust by ensuring that regulatory expectations and

organizational responsibilities are clearly communicated. Research examining governance mechanisms within insurance companies has demonstrated that transparent structures and effective oversight contribute significantly to organizational efficiency and performance outcomes [6, 7].

Corporate governance has emerged as another important factor associated with regulatory effectiveness. Effective governance systems enhance managerial accountability, improve decision-making quality, and ensure alignment between organizational objectives and stakeholder interests. Studies conducted in the Indian insurance industry have revealed a significant relationship between governance quality and organizational performance, suggesting that regulatory effectiveness is closely linked to governance mechanisms that promote transparency, responsibility, and strategic oversight [7]. Similarly, board characteristics and governance structures have been shown to influence operational efficiency within insurance organizations, reinforcing the importance of regulatory frameworks that support sound governance practices [6].

Risk management represents another critical component of effective regulation in the insurance industry. Insurance companies operate in environments characterized by financial, operational, market, and strategic risks. Consequently, regulatory systems must establish mechanisms that encourage proactive risk identification, assessment, and mitigation. Studies have demonstrated that robust risk management practices contribute positively to financial performance and organizational sustainability. Evidence from the Kenyan insurance sector indicates that effective risk management significantly improves financial outcomes and organizational resilience [8]. Likewise, enterprise risk management has been found to enhance organizational performance through its influence on competitive advantage and financial literacy, highlighting the strategic importance of risk-focused regulatory frameworks [9].

The importance of risk prevention has become even more pronounced in light of increasing economic uncertainty and financial volatility. Insurance organizations face challenges associated with changing interest rates, evolving customer expectations, technological disruptions, and global economic fluctuations. Research has shown that changes in interest rates can substantially affect insurance sector profitability, emphasizing the need for regulatory systems capable of supporting organizational adaptability and resilience [10]. Effective regulations therefore play a preventive role by reducing vulnerabilities and encouraging risk-aware decision-making throughout the insurance value chain.

The implementation of international regulatory standards has further transformed the insurance landscape. Regulatory frameworks such as Solvency II have introduced comprehensive requirements related to capital adequacy, risk management, governance, and transparency. Evidence from the Mexican insurance sector demonstrates that the implementation of Solvency II has had significant financial implications for insurers, influencing their operational strategies and financial structures [11]. These developments illustrate the growing importance of regulatory systems that balance compliance requirements with organizational flexibility and market competitiveness.

Another emerging consideration in evaluating regulatory effectiveness is the capacity of regulations to adapt to technological innovation. Digital transformation is reshaping insurance operations through the adoption of artificial intelligence, machine learning, blockchain technology, and advanced analytics. These technologies have the potential to improve decision-making, enhance customer experiences, strengthen fraud detection, and optimize risk assessment processes. Research has highlighted the growing application of machine learning and data visualization techniques in supporting decision-making within the insurance sector [12]. Similarly, blockchain technology has been identified as a transformative innovation capable of enhancing transparency, efficiency, and

trust in insurance operations, particularly in areas such as claims management and third-party insurance systems [13].

The increasing integration of digital technologies into insurance operations raises important regulatory questions. Regulatory systems must ensure that innovation is encouraged while simultaneously protecting stakeholders from emerging risks. This challenge requires regulators to develop adaptive frameworks capable of responding to technological developments without imposing excessive restrictions on innovation. Consequently, the effectiveness of regulation increasingly depends on its ability to balance stability and flexibility within rapidly changing business environments [12, 13].

Consumer protection also remains a central objective of insurance regulation. Effective regulations should promote fairness, transparency, and accessibility while ensuring that insurance products meet the evolving needs of policyholders. Research examining government regulations and insurance operations in Nigeria has shown that regulatory interventions significantly influence industry performance and stakeholder outcomes [14]. Such findings suggest that regulatory effectiveness should be evaluated not only in terms of organizational compliance but also regarding its impact on customer satisfaction, market accessibility, and public confidence.

In addition to economic and operational considerations, regulatory effectiveness is influenced by institutional and cultural factors. The adoption of innovative insurance models, such as *Takaful*, depends on regulatory support, stakeholder awareness, organizational readiness, and market acceptance. Grounded theory research on *Takaful* adoption identified various characteristics, factors, and barriers affecting implementation, demonstrating the importance of regulatory environments that accommodate diverse market needs and cultural expectations [15]. These findings highlight the need for regulatory systems that are responsive to contextual conditions while maintaining consistency and accountability.

The efficiency of insurance companies is another important outcome associated with regulatory effectiveness. Studies examining productivity and efficiency within insurance organizations have reported significant variations across firms and market contexts, suggesting that regulatory structures can influence organizational performance through multiple mechanisms [16, 17]. Consolidation, market structure, governance quality, and compliance requirements all interact with regulatory frameworks to shape efficiency outcomes. Therefore, evaluating regulatory effectiveness requires a multidimensional perspective that considers organizational, market, and institutional factors simultaneously.

Despite the growing body of international research on insurance regulation, several challenges remain in understanding the specific dimensions that constitute regulatory effectiveness within the Iranian insurance industry. Existing studies have examined regulatory theories, efficiency outcomes, risk management practices, technological developments, governance mechanisms, and market performance; however, there remains limited consensus regarding the comprehensive components that define regulatory effectiveness and the relationships among these components in the Iranian context [1, 2]. Given the distinctive institutional, economic, and regulatory characteristics of Iran's insurance sector, there is a need for an integrated framework capable of identifying and evaluating the factors that contribute to effective regulation.

Furthermore, the increasing complexity of insurance operations, the expansion of digital technologies, the importance of risk prevention, and the growing expectations of stakeholders have intensified the need for evidence-based regulatory frameworks. Policymakers require reliable information regarding the dimensions of regulatory effectiveness to develop regulations that enhance transparency, improve compliance, strengthen risk management,

and support sustainable industry growth. Identifying these dimensions can contribute to the development of more effective regulatory strategies and improve the overall performance of insurance institutions [7, 8, 14].

Therefore, the aim of the present study was to identify and evaluate the components of regulatory effectiveness in the Iranian insurance industry and to develop and validate a comprehensive model explaining the dimensions and indicators of regulatory effectiveness.

2. Methodology

In terms of purpose, this study is applied research; in terms of data type, it follows a sequential mixed-methods design with an exploratory approach; and in terms of nature, it is based on meta-synthesis/Delphi methodology in the qualitative phase and descriptive-analytical methods (survey/correlational) in the quantitative phase. The statistical population of the qualitative phase in the first stage included all theoretical foundations and relevant prior studies available in domestic and international databases, from which 18 scientific works were selected using a systematic exclusion technique and purposive non-probability sampling. In the second stage, the qualitative population consisted of theoretical and experiential experts, from whom 19 interviewees were selected based on the minimum sample size criterion in the Delphi method and purposive non-probability sampling. The statistical population of the quantitative phase consisted of senior managers of the Financial Deputy Division of Iran Insurance Company, from whom 219 managers were selected as the sample using proportionate stratified random sampling and considering the minimum sample size requirement for confirmatory factor analysis. In this study, the strata consisted of the decades in which insurance companies were established, and questionnaires were randomly distributed and collected among senior managers of the Financial Deputy Divisions of insurance companies in proportion to the number of insurance companies in each decade. For this purpose, the questionnaire was distributed among eight senior managers in each insurance company. Table 1 presents detailed information on the distribution of questionnaires among the statistical population.

Table 1. Information on Questionnaire Distribution among the Statistical Population Using Proportionate Stratified Random Sampling

Decade	Name and Year of Establishment	Frequency of Insurance Companies in Each Decade	Frequency of Respondents in Each Decade
Before the Revolution	Iran Insurance (1935); Asia Insurance (1959); Alborz Insurance (1959); Dana Insurance (1973)	4	32
1990s	Moallem Insurance (1994); Omid Insurance (2000)	2	16
2000s	Hafez Insurance (2002); Karafarin Insurance (2002); Iran Moein Insurance (2003); Parsian Insurance (2003); Tose'e Insurance (2003); Razi Insurance (2003); Sina Insurance (2003); Mellat Insurance (2003); Day Insurance (2004); Saman Insurance (2004); Novin Insurance (2005); Pasargad Insurance (2006); Mihan Insurance (2008); Iranian Reinsurance (2009); Kosar Insurance (2010)	15	120
2010s	Arman Insurance (2011); Ma Insurance (2011); Asmari Insurance (2012); Taavon Insurance (2013); Sarmad Insurance (2013); Tejaratno Insurance (2016); Hekmat Saba Insurance (2016); Middle East Insurance (2016)	8	64
Total		29	232

Data collection in the qualitative phase involved a systematic literature review in the meta-synthesis stage and a worksheet (semi-open-ended questionnaire) in the Delphi stage. In the quantitative phase, a researcher-made questionnaire was used to assess the validity of the model from the perspectives of the qualitative participants and

the quantitative respondents. The validity and reliability of the instrument were examined and confirmed in both the qualitative and quantitative phases. In the qualitative phase, validity was examined in terms of credibility and quality, while reliability was assessed in terms of stability and replicability. In the quantitative phase, face validity, content validity, and construct validity were used to determine questionnaire validity. In this study, reliability was calculated using Cronbach's alpha coefficient, composite reliability, and McDonald's omega. The reported validity and reliability coefficients for the main questionnaire are presented in Table 2.

Table 2. Results of Validity and Reliability Calculations for the Main Research Questionnaire

Construct	α	CR	ω	AVE	MSV	ASV	HTMT
Regulatory effectiveness in the Iranian insurance industry	0.78	0.82	0.86	0.58	0.43	0.25	0.64
Regulatory transparency	0.75	0.85	0.84	0.53	0.39	0.23	0.52
Compliance with standards	0.79	0.86	0.82	0.54	0.41	0.25	0.66
Risk prevention	0.81	0.89	0.81	0.56	0.54	0.34	0.61

Based on the table above, it can be stated that the reliability of the dimensions was confirmed, because Cronbach's alpha and composite reliability coefficients were greater than 0.70 and AVE was greater than 0.50. Convergent validity was also confirmed because CR was greater than 0.70, CR was greater than AVE, and AVE was greater than 0.50. Moreover, discriminant validity was confirmed because MSV was lower than AVE and ASV was lower than AVE.

Data analysis in the qualitative phase included thematic analysis based on the approach of Braun and Clarke (2020) using MAXQDA 2018 software. In the quantitative phase, data analysis included descriptive analysis (description of demographic characteristics and variables) and statistical analysis (confirmatory factor analysis and one-sample t-test) using SPSS Version 27 and SmartPLS Version 3.

3. Findings and Results

The findings section is generally presented in two parts: statistical description of the data and statistical analysis of the data. Based on the collected data, the demographic characteristics of the qualitative phase were first statistically described. The results indicated that the highest frequency belonged to the age group of 45 to 50 years. Regarding relevant work experience, the results showed the dominance of participants with 10 to 20 years of experience in this population. In terms of gender, the results indicated the predominance of experiential expertise over theoretical expertise. Finally, regarding field of study, the results showed that the study group mainly consisted of men with 10 to 20 years of work experience in fields related to insurance management. Subsequently, the demographic characteristics of the quantitative phase, including age, gender, and work experience, were statistically described. Based on the results, the highest frequency was observed in the age group of 35 to 40 years. In terms of gender, the results indicated the predominance of men in this population. Regarding work experience, the data showed that the group with 7 to 13 years of work experience had the highest frequency.

Table 3. Statistical Description of the Main Research Constructs (Latent Variables) Using Central Tendency, Dispersion, and Data Distribution Indices (Sample Size = 219 Respondents)

Construct	Latent Variable	Number of Indicators	Mean (Likert)	Total Construct Mean	Standard Deviation	Skewness Statistic	Kurtosis Statistic	Minimum	Maximum
Effectiveness	Regulatory transparency	6	3.66	21.96	0.83	-0.36	-0.11	6	30
Effectiveness	Compliance with standards	9	3.14	28.26	0.81	0.18	-0.37	9	45
Effectiveness	Risk prevention	9	3.15	28.35	0.69	-0.08	0.32	9	45

Based on the data presented in the table, within the construct of “effectiveness,” the variable of “regulatory transparency” is identified as the strongest element, with a mean of 3.66 and a standard deviation of 0.83, indicating considerable attention to transparency of regulations in activities related to effectiveness. In contrast, “compliance with standards,” with a mean of 3.14, and “risk prevention,” with a mean of 3.15, were evaluated relatively lower than the other variables. In this construct, the minimum and maximum values of the indicators ranged from 6 to 70, respectively. Overall, the data obtained from these latent variables indicate the normality of data distribution for each of them, because they fall within the acceptable range of -2 to +2, as previously mentioned. This allows the researcher to use appropriate parametric statistical tests for statistical analyses.

The components of regulatory effectiveness in the Iranian insurance industry were then identified and evaluated using thematic analysis. At this stage, through meta-synthesis, systematic review, the PRISMA model approach, and the meta-synthesis method, the dimensions of regulatory effectiveness in the Iranian insurance industry were identified. The stages of this process were carried out as follows:

First stage: determining the research scope and identifying the studies whose findings would be used.

Second stage: systematic appraisal of the selected documents.

Third stage: synthesis, that is, creating something new from separate elements.

The results of the search of all journals related to the dimensions, components, and indicators of regulatory effectiveness and its influencing factors in the Iranian insurance industry, both domestically and internationally, showed that between 2011 and 2023 domestically and between 2000 and 2024 internationally, only 18 articles using meta-synthesis or non-meta-synthesis approaches had been published in this field with keywords such as productivity, efficiency, effectiveness, Iranian insurance industry, and factors affecting the productivity of the insurance industry. It should be noted that after analysis, the selected articles were categorized according to their nature into three groups: synthesis, review, and qualitative articles, in order to provide the conditions for synthesis. Table 4 presents the frequency and percentage of these three article categories.

Table 4. Frequency and Percentage of Analyzed Articles Based on Nature

Nature of Articles	Synthesis	Review	Qualitative	Total
Frequency	12	3	3	18
Percentage	66.66	16.67	16.67	100

Finally, the 27-item PRISMA checklist was used to examine the quality of the selected articles. The results showed that all articles had either acceptable or high quality, because the quality percentage for each item was either higher than 75% or between 50% and 75%. If the obtained quality percentage had been lower than 50%, the quality of the respective item could have been considered low.

Finally, indicators related to efficiency were identified. Due to the lengthy research process and the limitations of article writing, this process is presented in summary form. In the initial section, 24 codes were extracted based on the systematic literature review. At this stage, basic themes, organizing themes, and overarching themes were identified.

Table 5. Identified Dimensions, Components, and Indicators of Regulatory Effectiveness in the Iranian Insurance Industry Extracted from Meta-Synthesis

Construct	Dimension	Component	Indicators	Source
Regulatory effectiveness in the Iranian insurance industry	Regulatory transparency	Clarity of regulations	Existence of clear and comprehensible documentation	(Al-Hassan & Bucky, 2020)
Regulatory effectiveness in the Iranian insurance industry	Regulatory transparency	Clarity of regulations	Easy access to legal information	(Azizi et al., 2020)
Regulatory effectiveness in the Iranian insurance industry	Regulatory transparency	Clarity of regulations	Regular training for employees	(Lee et al., 2021)
Regulatory effectiveness in the Iranian insurance industry	Regulatory transparency	Public disclosure	Informing stakeholders	(Markazmalmiri, 2022)
Regulatory effectiveness in the Iranian insurance industry	Regulatory transparency	Public disclosure	Use of social media for information dissemination	(Ajao & Oluwadamilola, 2020)
Regulatory effectiveness in the Iranian insurance industry	Regulatory transparency	Public disclosure	Holding public meetings for discussion and exchange of views	(Abraham & Schwarz, 2022)
Regulatory effectiveness in the Iranian insurance industry	Compliance with standards	Performance evaluation	Existence of internal evaluation systems	(Haghighi Kaffash et al., 2022)
Regulatory effectiveness in the Iranian insurance industry	Compliance with standards	Performance evaluation	Compliance with international standards	(Haghighi Kaffash et al., 2022)
Regulatory effectiveness in the Iranian insurance industry	Compliance with standards	Performance evaluation	Periodic performance reports	(Rasouli & Rahmani, 2022)
Regulatory effectiveness in the Iranian insurance industry	Compliance with standards	Updating regulations	Regular scheduling for updates	(Nili Ahmadabadi et al., 2023)
Regulatory effectiveness in the Iranian insurance industry	Compliance with standards	Updating regulations	Stakeholder participation in the updating process	(Clamps, 2022)
Regulatory effectiveness in the Iranian insurance industry	Compliance with standards	Updating regulations	Assessment of the impact of changes on performance	(Arefmanesh et al., 2022)
Regulatory effectiveness in the Iranian insurance industry	Compliance with standards	Alignment with market needs	Identification of new customer needs	(Oladoni & Aneni, 2024)
Regulatory effectiveness in the Iranian insurance industry	Compliance with standards	Alignment with market needs	Flexibility in regulations	(Hajpirozbakht et al., 2021)
Regulatory effectiveness in the Iranian insurance industry	Compliance with standards	Alignment with market needs	Periodic customer surveys	(Mametzki et al., 2024)
Regulatory effectiveness in the Iranian insurance industry	Risk prevention	Risk assessment	Existence of risk assessment systems	(Habibi, 2024)

Regulatory effectiveness in the Iranian insurance industry	Risk prevention	Risk assessment	Use of statistical data to predict risks	(Asadnezhad et al., 2022)
Regulatory effectiveness in the Iranian insurance industry	Risk prevention	Risk assessment	Periodic training for risk identification	(Ivan & Jennifer, 2023)
Regulatory effectiveness in the Iranian insurance industry	Risk prevention	Risk management	Existence of risk management policies	(Maverick, 2022)
Regulatory effectiveness in the Iranian insurance industry	Risk prevention	Risk management	Regular evaluation of risk management policies	(Azizi et al., 2020)
Regulatory effectiveness in the Iranian insurance industry	Risk prevention	Risk management	Cooperation with international institutions for risk management	(Ahmadi et al., 2021)
Regulatory effectiveness in the Iranian insurance industry	Risk prevention	Organizational culture	Promotion of a risk-prevention culture in the organization	(Almasi et al., 2023)
Regulatory effectiveness in the Iranian insurance industry	Risk prevention	Organizational culture	Encouragement of innovation in risk management	(Zare Mehrjerdi & Khani, 2024)
Regulatory effectiveness in the Iranian insurance industry	Risk prevention	Organizational culture	Continuous assessment of organizational culture in relation to risk	(Beshkhor, 2022)

In this study, the Delphi technique was used to screen the indicators. After screening the indicators, the final research model was presented. According to this technique, each group member was first given a questionnaire containing the intended sub-criteria. Then, experts in this field, consisting of 19 selected participants who were familiar with all relevant issues, examined each sub-criterion according to the Delphi method. The scores assigned in Delphi ranged from 1 to 5; therefore, sub-criteria with scores below 4 were eliminated. Accordingly, experts assigned a score between 1 and 5 to each indicator based on its importance. In each Delphi round, several indicators were removed and several indicators were introduced by experts. Ultimately, the Delphi process stopped in the fourth round. Kendall's coefficient of concordance was used to ensure the consistency of responses. The findings indicated that Kendall's coefficient for all factors in all rounds was greater than 0.70, indicating strong expert consensus. The significance level for Kendall's coefficient of concordance for all factors was also greater than 5%, indicating significant agreement among experts. Therefore, it can be stated that a general consensus among experts was achieved at this stage. Accordingly, the Delphi process was stopped in the fourth round. Finally, the identified factors were classified as shown in the following table.

Table 6. Summary of Qualitative Findings

Construct	Dimension	Component	Number of Indicators
Regulatory effectiveness in the Iranian insurance industry	Regulatory transparency	Clarity of regulations	3
Regulatory effectiveness in the Iranian insurance industry	Regulatory transparency	Public disclosure	3
Regulatory effectiveness in the Iranian insurance industry	Compliance with standards	Performance evaluation	3
Regulatory effectiveness in the Iranian insurance industry	Compliance with standards	Updating regulations	3
Regulatory effectiveness in the Iranian insurance industry	Compliance with standards	Alignment with market needs	3

Regulatory effectiveness in the Iranian insurance industry	Risk prevention	Risk assessment	3
Regulatory effectiveness in the Iranian insurance industry	Risk prevention	Risk management	3
Regulatory effectiveness in the Iranian insurance industry	Risk prevention	Organizational culture	3

The output of MAXQDA 2018 for data analysis is as follows. The Shannon matrix is used as a tool for displaying and analyzing qualitative data. In this matrix, various components and themes are presented in a structured manner, and this structure can help identify relationships among the components and different dimensions of the study.

Next, confirmatory factor analysis was performed using SmartPLS software. The results of confirmatory factor analysis for regulatory efficiency in the Iranian insurance industry are presented in the following figures.

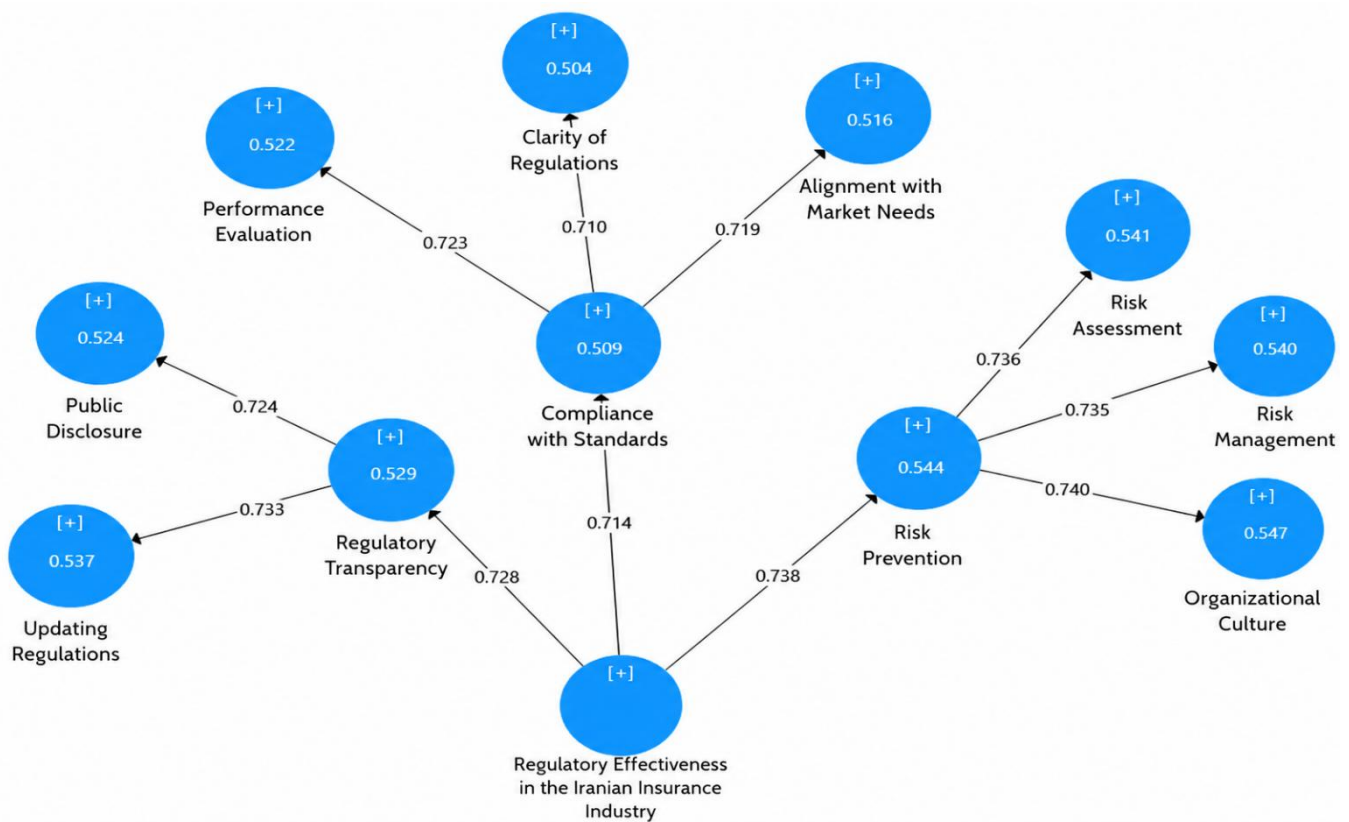


Figure 1. Graphical Representation of Factor Loadings in the Measurement Model of Regulatory Effectiveness in the Iranian Insurance Industry

The measurement model of regulatory effectiveness in the Iranian insurance industry included the dimensions of regulatory transparency, compliance with standards, and risk prevention, with factor loadings of 0.728, 0.714, and 0.738, respectively. These factor loadings indicate a strong relationship with the main construct. Moreover, based on the results, risk prevention had the highest factor loading, while compliance with standards had the lowest factor loading.

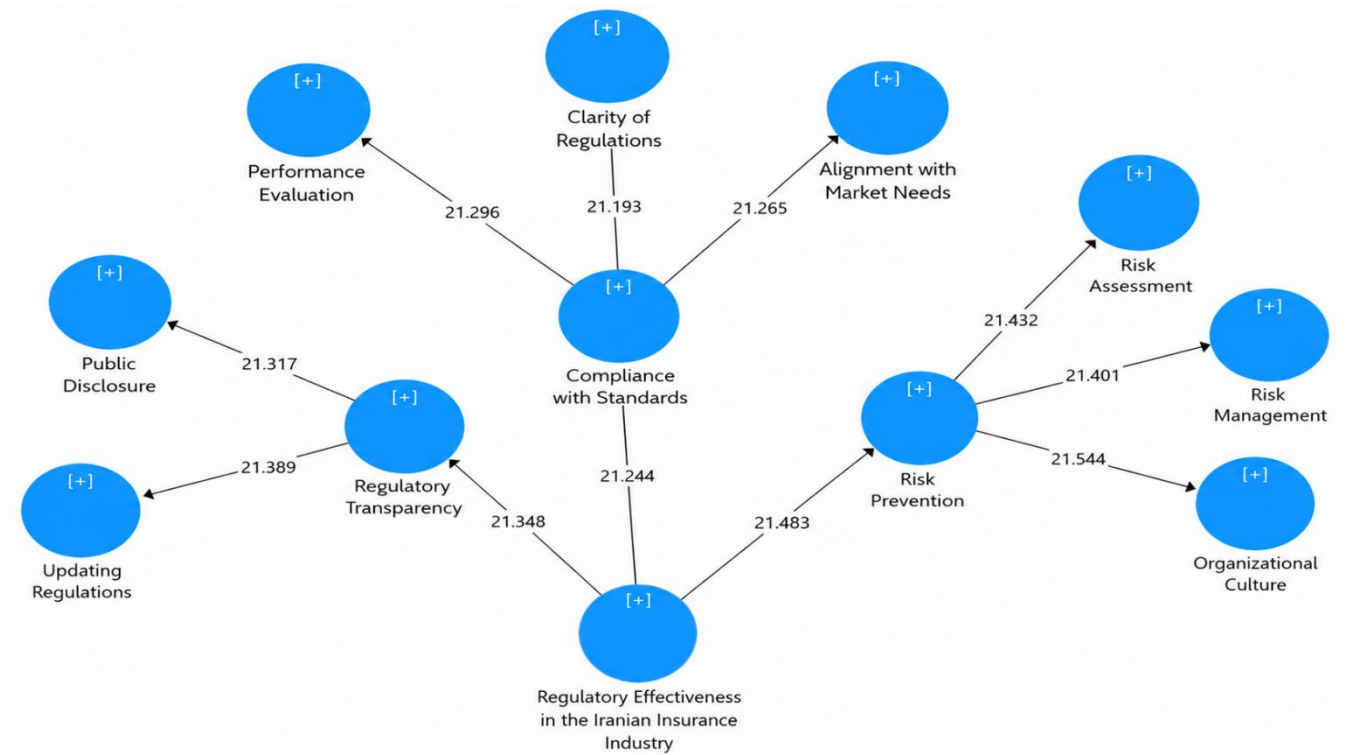


Figure 2. Graphical Representation of Significance Coefficients in the Measurement Model of Regulatory Effectiveness in the Iranian Insurance Industry

The purpose of evaluating the overall model fit is to determine the extent to which the entire model is compatible and consistent with the empirical data used. Structural equation modeling is a combination of confirmatory analysis and multivariate regression. In this method, the overall model test includes testing the measurement model (examining reliability and validity) and testing the structural model (path coefficient and explained variance).

The coefficient of determination index (R^2) for dependent variables refers to endogenous latent variables and indicates the effect of an independent variable on a dependent variable. The three values of 0.19, 0.33, and 0.67 are considered criteria for weak, moderate, and strong R^2 values, respectively. The R^2 values for the dimensions of regulatory transparency, compliance with standards, and risk prevention were calculated as 0.529, 0.509, and 0.544, respectively.

The communality index indicates how much of the variability of the indicators (questions) is explained by their related construct. The mean communality index is used to determine convergent validity, and this index was 0.57.

The goodness-of-fit criterion was calculated using the geometric mean of R^2 and the average communality index for the entire model, resulting in a value of 0.549.

$$GOF = \sqrt{(\text{mean communalities} \times \text{mean } R^2)} = \sqrt{(0.57 \times 0.530)} = 0.549$$

Since the calculated GOF value for the main research hypothesis model was greater than 0.36, it indicates an appropriate model fit.

The predictive relevance index (Q^2) indicates the predictive power of the model for dependent variables. The criteria for interpreting Q^2 are 0.02, 0.15, and 0.35, representing low, moderate, and strong predictive power, respectively. The Q^2 value for the research variable was 0.202, which is at a desirable level. Accordingly, it can be stated that the predictive power of the model for the variables is acceptable.

The NFI index is the non-normed fit index, which indicates that the proposed model improves fit by up to 90%. The value of this index should be greater than 0.90. The NFI value for this model was 0.925.

Based on these findings, it can be concluded that the tested model had an appropriate fit in the studied sample. Moreover, since the factor loadings of all observed variables in the model were greater than 0.40 and their significance values were greater than 1.96, it can be stated that the present construct has acceptable validity.

To assess the validity of the findings, a 34-item questionnaire based on a 5-point Likert scale ranging from very low to very high was distributed among 30 experts in the research field and in insurance- and economics-related areas. Table 7 presents the statistical results of the one-sample t-test in detail.

Table 7. Findings of the One-Sample t-Test for Assessing the Validity of the Model for Promoting Regulatory Effectiveness in the Iranian Insurance Industry

Components	Mean	Standard Deviation	Calculated t	Significance Level	Mean Difference	Lower Bound	Upper Bound
External validity	4.20	0.65	9.00	0.000	1.20	3.90	4.50
Objective	4.20	0.70	8.90	0.000	1.20	3.90	4.50
Research method design	4.25	0.70	9.10	0.000	1.25	3.90	4.60
Control of confounding variables	4.10	0.75	8.30	0.000	1.10	3.80	4.40
Adaptation	4.05	0.80	7.50	0.000	1.05	3.70	4.40
Internal validity	4.35	0.60	9.20	0.000	1.35	4.00	4.70
Logical review	4.15	0.75	8.00	0.000	1.15	3.80	4.50
Expert feedback	4.30	0.60	9.50	0.000	1.30	4.00	4.60
Sensitivity analysis	4.40	0.55	9.80	0.000	1.40	4.10	4.70

Based on the table above, the significance level for external validity, internal validity, and all components of both external and internal validity was less than 0.001. Moreover, the calculated means ranged from 4.05 to 4.40, clearly indicating the statistical significance of the findings at the 99% confidence level. This means that the obtained findings were not produced randomly and confirm the high validity of the model. In addition to the above, according to expert opinions, the internal validity of the designed model, with a mean of 4.35 and a calculated t-value of 9.20, was higher than its external validity. Furthermore, among the components of external validity, research method design, with a mean of 4.25 and a calculated t-value of 9.10, had the highest validity. On the other hand, among the components of internal validity, sensitivity analysis, with a mean of 4.40 and a calculated t-value of 9.80, had the highest validity.

4. Discussion and Conclusion

The present study aimed to identify and evaluate the components of regulatory effectiveness in the Iranian insurance industry and to develop a valid model explaining the dimensions and indicators of this construct. The findings demonstrated that regulatory effectiveness in the Iranian insurance industry consists of three major dimensions, namely regulatory transparency, compliance with standards, and risk prevention. The qualitative phase identified these dimensions and their associated components through meta-synthesis and Delphi analysis, while the quantitative phase confirmed the validity and reliability of the proposed model. The confirmatory factor analysis results indicated that all dimensions possessed acceptable factor loadings and contributed significantly to explaining the overall construct of regulatory effectiveness. Furthermore, the model demonstrated satisfactory levels of convergent validity, discriminant validity, predictive relevance, and overall goodness of fit, indicating that the proposed framework provides a comprehensive explanation of regulatory effectiveness within the context of the Iranian insurance sector.

One of the most important findings of the study was the identification of regulatory transparency as a core dimension of regulatory effectiveness. The results revealed that transparency consists of two key components, namely clarity of regulations and public disclosure. Moreover, among the dimensions of the model, regulatory transparency exhibited a relatively high factor loading and a higher mean score compared with other dimensions. This finding suggests that transparency is perceived by industry experts and managers as one of the most influential determinants of effective regulation. The significance of transparency can be explained by the fact that insurance companies operate in highly regulated environments where misunderstanding, ambiguity, or inconsistency in regulatory requirements may lead to compliance failures, operational inefficiencies, and increased organizational risk. Therefore, regulations that are clearly articulated and effectively communicated are more likely to be understood and implemented by industry participants.

The importance of transparency identified in the present study is consistent with previous research emphasizing the role of governance structures and information disclosure in enhancing insurance sector performance. Research has shown that effective governance mechanisms improve organizational accountability and facilitate efficient operations through greater transparency and oversight [6]. Similarly, evidence from the Indian insurance industry indicates that corporate governance practices characterized by transparency and accountability contribute significantly to organizational performance and market confidence [7]. The findings of the present study extend these observations by demonstrating that transparency should not be viewed solely as a governance mechanism but also as a fundamental characteristic of effective regulatory systems.

The identified component of clarity of regulations is particularly noteworthy because modern insurance environments are becoming increasingly complex due to technological innovation, changing customer expectations, and evolving financial risks. Under such conditions, insurance companies require regulations that are comprehensible, consistent, and easily interpretable. Clear regulations reduce uncertainty and facilitate organizational decision-making. Moreover, public disclosure was identified as another important component of transparency. The growing emphasis on stakeholder engagement and public accountability in financial services reinforces the importance of providing timely and accurate information regarding regulatory requirements and industry practices. These findings support the argument that transparency functions as a bridge between regulators, insurance companies, and policyholders, thereby enhancing trust and institutional legitimacy.

Another major finding of the study was the identification of compliance with standards as a critical dimension of regulatory effectiveness. This dimension consisted of three components, including performance evaluation, updating regulations, and alignment with market needs. The results indicated that compliance with standards had a significant contribution to the overall model, suggesting that effective regulation requires more than the establishment of rules; it also requires mechanisms that ensure continuous monitoring, evaluation, and adaptation. This finding reflects the dynamic nature of modern insurance markets, where regulatory systems must continuously evolve to remain relevant and effective.

The importance of compliance with standards aligns closely with previous studies examining the relationship between regulation and insurance sector efficiency. Research conducted in Australia demonstrated that regulatory frameworks significantly influence organizational efficiency and operational outcomes among private health insurers [4]. Similarly, studies in the Iranian insurance industry have shown that regulatory interventions can directly affect organizational efficiency and performance outcomes [2]. The current findings suggest that compliance should be understood as an ongoing process involving continuous assessment and adaptation rather than merely adherence to static rules.

The component of performance evaluation identified in this study highlights the necessity of systematic monitoring and assessment within insurance organizations. Performance evaluation enables regulators and managers to determine whether regulatory objectives are being achieved and whether corrective actions are required. This finding is consistent with studies emphasizing the importance of efficiency assessment and productivity measurement in insurance companies. Research on insurance productivity has demonstrated that systematic evaluation mechanisms contribute to improved organizational outcomes and resource utilization [16]. Similarly, evidence from emerging insurance markets indicates that efficiency and performance are closely associated with institutional structures and regulatory oversight mechanisms [5].

The component of updating regulations also emerged as a key factor in regulatory effectiveness. Insurance markets are constantly influenced by economic, technological, and social developments. Consequently, regulations that fail to evolve may become ineffective or even counterproductive. This finding corresponds with international evidence showing that major regulatory reforms, such as Solvency II, have significantly altered insurance sector operations and financial structures [11]. Furthermore, research on regulatory theories in the Iranian insurance industry emphasizes the need for adaptive regulatory approaches capable of responding to environmental changes [1]. Therefore, the ability of regulatory systems to revise and update requirements appears to be essential for maintaining long-term effectiveness.

The third component of compliance with standards, namely alignment with market needs, reflects the increasing importance of customer-centered and market-responsive regulatory frameworks. The insurance industry has undergone substantial transformation due to digitalization, demographic changes, and evolving consumer preferences. Effective regulations must therefore support innovation while simultaneously protecting stakeholders. This finding is consistent with studies demonstrating that government regulations significantly influence insurance operations and market outcomes [14]. It is also compatible with research highlighting the growing importance of technological innovation and data-driven decision-making in contemporary insurance systems [12]. Consequently, regulations that align with emerging market needs are more likely to facilitate sustainable industry growth and competitiveness.

The third major dimension identified in the present study was risk prevention. This dimension consisted of three components, namely risk assessment, risk management, and organizational culture. Among all dimensions, risk prevention demonstrated the highest factor loading, indicating that participants considered it the strongest determinant of regulatory effectiveness. This finding is understandable given the fundamental role of insurance organizations in managing uncertainty and transferring risk. Effective regulations are expected to establish structures that promote proactive risk identification, assessment, and mitigation.

The prominence of risk prevention is strongly supported by previous literature. Research has consistently demonstrated that risk management practices contribute significantly to financial performance and organizational sustainability within insurance companies [8]. Similarly, studies examining enterprise risk management have shown that effective risk frameworks improve organizational performance by strengthening competitive advantage and enhancing strategic decision-making [9]. The current findings suggest that regulatory effectiveness depends heavily on the extent to which regulations encourage comprehensive risk management practices.

Risk assessment emerged as a particularly important component because it enables organizations to identify potential threats before they materialize into significant losses. Advances in analytics, artificial intelligence, and predictive modeling have increased the ability of insurance companies to assess risks accurately. Research has demonstrated that machine learning and advanced data analysis tools can significantly improve decision support

processes within insurance organizations [12]. Therefore, regulatory systems that encourage evidence-based risk assessment practices are likely to enhance overall industry effectiveness.

Risk management was another critical component identified in the study. The importance of this finding is reinforced by evidence indicating that fluctuations in macroeconomic conditions, such as interest rate changes, can substantially affect insurance sector profitability and stability [10]. Effective regulations help organizations establish formal risk management frameworks capable of addressing such challenges. Furthermore, emerging technologies such as blockchain have created new opportunities for improving transparency and risk management in insurance operations [13]. Consequently, regulatory systems that support modern risk management approaches can significantly enhance organizational resilience.

The final component of risk prevention was organizational culture. This finding highlights the importance of behavioral and institutional factors in achieving regulatory objectives. Regulations alone cannot guarantee effective outcomes unless they are supported by organizational cultures that encourage compliance, accountability, and risk awareness. The significance of organizational culture is also reflected in studies examining the adoption of innovative insurance models, where cultural and institutional factors have been shown to influence implementation success [15]. Therefore, effective regulation should not focus exclusively on formal requirements but should also promote organizational values that support responsible behavior and continuous improvement.

The validation results of the model further strengthen the credibility of the study findings. The one-sample t-test results indicated high levels of both internal and external validity, suggesting that experts considered the proposed framework to be theoretically sound and practically relevant. The high ratings assigned to research design, expert feedback, and sensitivity analysis indicate strong confidence in the comprehensiveness and applicability of the model. These findings are particularly important because they demonstrate that the proposed dimensions and components capture the essential characteristics of regulatory effectiveness within the Iranian insurance industry.

Overall, the findings indicate that regulatory effectiveness is a multidimensional construct encompassing transparency, compliance with standards, and risk prevention. These dimensions are interrelated and collectively contribute to the achievement of regulatory objectives. The study supports previous evidence suggesting that effective regulation enhances organizational performance, efficiency, governance quality, and risk management capabilities [4, 5, 7]. At the same time, the results contribute to the existing literature by providing a comprehensive and context-specific framework for understanding regulatory effectiveness in the Iranian insurance industry. The proposed model offers a valuable foundation for future policy development, organizational assessment, and academic research aimed at improving the quality and effectiveness of insurance regulation.

One limitation of the present study is that the quantitative phase was conducted exclusively among senior managers of the Financial Deputy Division of Iran Insurance Company, which may limit the generalizability of the findings to other insurance companies and stakeholder groups. Additionally, the study relied on self-reported perceptions regarding regulatory effectiveness, which may be influenced by subjective judgments and organizational biases. The cross-sectional nature of the quantitative data collection also restricts the ability to examine changes in regulatory effectiveness over time. Furthermore, the complexity of regulatory systems means that certain contextual, political, and economic factors may not have been fully captured within the proposed model.

Future studies are encouraged to examine the proposed model in different segments of the insurance industry and among broader stakeholder groups, including regulators, policyholders, and independent industry experts. Comparative studies between public and private insurance organizations could provide additional insights into

the determinants of regulatory effectiveness. Longitudinal research designs may also help evaluate how regulatory effectiveness evolves in response to technological innovation, economic fluctuations, and policy reforms. Researchers may further investigate the relationships between regulatory effectiveness and organizational outcomes such as innovation capability, customer satisfaction, financial performance, and competitive advantage.

Insurance regulators should prioritize the development of transparent and easily understandable regulatory frameworks that facilitate stakeholder compliance and trust. Regulatory authorities should establish systematic mechanisms for periodic evaluation and updating of regulations to ensure alignment with changing market conditions and technological developments. Insurance companies should strengthen internal risk assessment and risk management systems while fostering organizational cultures that support compliance, accountability, and proactive risk prevention. Investment in digital technologies, data analytics, and employee training programs can further enhance the implementation and effectiveness of regulatory requirements. Finally, continuous collaboration among regulators, insurance companies, industry associations, and policyholders can contribute to the creation of a more responsive, efficient, and sustainable regulatory environment.

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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