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Exploring The Necessity and Challenges of Measuring ESG Risk by the Iranian Banking System Using Grounded Theory

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Abstract

This article examines the necessities, challenges, and solutions for measuring ESG (Environmental, Social, and Governance) risk within Iran's banking system. This research employed library studies and Grounded Theory, supplemented by interviews with 35 banking experts aged between 30 and 60 years to collect primary data and extract key propositions for forming a core dataset. Each interview lasted approximately 30 minutes. Through screening the textual transcripts of the interviews, relevant and significant statements were retained to form the main database, and indicators were categorized using open, axial, and selective coding. In managing ESG risk measurement challenges, factors such as ESG in banks, education and awareness-raising, measuring ESG risks in investments, national policymaking and strategies, applying data analytics and artificial intelligence to clarify necessities, data standardization, use of modern technologies, development of advanced analytical models for simulating ESG risks, and training and awareness in banks are effective. The benefits of measuring ESG risks for banks include increased transparency and trust, long-term risk measurement and reduction of financial crises, adaptability to market changes, enhanced social responsibility, and attraction of new customers. The findings of this study can facilitate the foundation for sustainability risk assessment for banks and credit institutions.

Keywords: ESG risks,
Sustainability Disclosure,
Quantification, Banking System.

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1. Introduction

The concept of ESG (Environmental, Social, and Governance) and its associated opportunities and threats are becoming one of the most critical topics for financial institutions. In the banking system, the belief that ESG issues should be integrated into banks' strategies, processes, and financial tools to create value from a medium- and long-term perspective is growing. For banks, sustainable development is not just an ethical issue. At the beginning of the third decade of the 21st century, it has also become an economic and existential issue (Galetta et al., 2022).

Although environmental protection measures have become an integral element of banks' business strategies, they create a new type of risk called ESG risk. However, ESG risk is not an independent type of risk; rather, it is a cross-cutting risk that affects other types of financial and non-financial risks for banks. Therefore, this risk impacts all traditional types of bank risks such as credit risk, market risk, operational risk, reputational risk, and compliance risk. For this reason, banks must adopt a comprehensive approach to ESG risk and integrate it into their risk management frameworks. However, this process requires adjusting banks' business strategies, including considering ESG risk in the design of banking products and services, as well as pricing and sales decisions. Integrating ESG risk into broad processes is essential and unavoidable for the future profitability of banks (Nocoń, 2024).

ESG risk is currently a topic of global discussion among representatives, researchers, business activists, policymakers, as well as regulatory bodies

and rating agencies. Simultaneously, from the perspective of financial institutions, this issue creates increasing demands for reporting and requirements related to their socially responsible activities, as well as methods for quantification and protection. Furthermore, new regulations bring significant compliance challenges for banks.

The main objective of this article is to analyze the necessity and challenges of measuring ESG risk by the Iranian banking system using contextual analysis. In fact, this article includes an analysis of the challenges associated with measuring ESG risk and provides solutions to overcome the obstacles to its quantification. This research utilized research methods such as library studies and contextual analysis. This article will fill the existing research gap in the field of ESG risk analysis and measurement in Iranian banks and will serve as a significant reference in the existing literature as well as a usable resource for banks.

This article has a theoretical and empirical nature. First, in the second section, it presents the results of in-depth library studies, which include contemporary international literature on the concept of ESG and ESG risk. Initially, the concept of ESG and the resulting risk are defined. Then, it is explained how ESG risk affects banking institutions. ESG factors and issues related to sustainable development in the banking sector are also examined, and the possibility of incorporating ESG risk into the banking risk management system after its measurement is discussed. This section, in fact, provides the theoretical foundations and research background. The third section addresses the research questions. The fourth section deals with the research

methodology, including the research design, data collection method, and data analysis method. The fifth section presents the research findings. The article concludes with the "Discussion and Conclusion" section.

2. Theoretical Foundations and Hypothesis Development

Sustainable development has been a topic of interest for several decades, both in academia and among economic actors. However, a significant increase in interest in this topic and the practical implementation of its assumptions occurred after the signing of the Paris Agreement for climate protection (Paris Agreement). This agreement, which committed 185 countries to change their approach towards a climate-compatible global economy, was adopted in December 2015 as a significant turning point in international climate policy. The agreement declared action to halt global warming at 1.5°C above pre-industrial

levels (European Council, 2015a and 2015b).

The second and equally important document was the UN 2030 Agenda for Sustainable Development, signed in 2015. This document introduced 17 Sustainable Development Goals (SDGs) focused on environmental and social objectives. Furthermore, the EU's Sustainable Finance Action Plan emphasized the urgent need for financial sustainability; for example, financing socially responsible activities, directing capital flows towards sustainable investments, and integrating sustainable development into risk management systems (European Commission, 2018).

Issues related to ESG have also been raised in the regulations and publications of many international financial institutions, including the Bank for International Settlements (BIS), the European Central Bank (ECB), the European Banking Authority (EBA), and the Network for Greening the Financial System (NGFS).

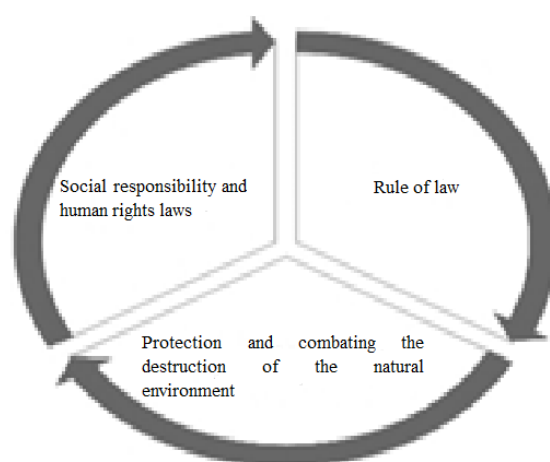


Figure (1): Pillars of the ESG Principle and Concept (Nocoń, 2024)

The ESG (Environmental, Social, Governance) concept, which emerged at the beginning of the 21st century, relates to activities that include environmental protection, social responsibility, and corporate governance. The foundation of the ESG concept is Corporate Social Responsibility (CSR) (Clément et al., 2022). However, the difference is that the CSR concept focuses on the responsibility of businesses to create a specific corporate image, while ESG covers more non-financial areas and focuses on the measurable evaluation of set goals (Dathe et al., 2022).

The ESG concept has three main pillars, as shown in Figure 1. These pillars are of equal importance and do not have a clear hierarchical structure. The first pillar of the ESG concept is environmental protection and prevention of degradation. This means that every business activity must develop its own environmental policy, in a way that allows for measurable verification of the assumptions made and the implementation of planned activities. This pillar particularly emphasizes the necessity of defining climate goals in business activities; including, examining energy consumption, pollutant emissions, raw material supply, water resource management, and the use of renewable energies. The second pillar, which is equally important, is social responsibility and human rights. This pillar emphasizes the need to ensure social equality in terms of gender, religion, and race, including equal pay for equal jobs regardless of gender, respect for workers' rights, and also ensuring data security and protection. The third pillar is dedicated to corporate governance, which affects trust in the business and the company. This pillar includes issues such as corporate oversight,

board structure, compliance with disclosure obligations to shareholders, fair executive compensation, respect for shareholder rights, tax transparency, and anti-corruption efforts (Amara and Ahmadi, 2023).

The implementation of the pillars of the ESG concept is now not only an option but an inseparable part of every company's responsibility, including banking institutions, which has been largely influenced by new legal regulations. Furthermore, responsible and sustainable development has become a tool for attracting new customers, borrowers, investors, and business partners. For this reason, the opportunities and risks associated with the implementation of the ESG concept have had a real and measurable impact on banking activities. On the other hand, socially responsible activities, although they bring many benefits, especially non-financial ones, also create a new type of risk, namely ESG risk or sustainability risk (KPMG, 2021). ESG risk refers to the risk of negative financial impacts resulting from ESG factors on a bank's customers or balance sheet items (PWC, 2022). The European Banking Authority (EBA) defines ESG risk for institutions as the negative realization of ESG factors through counterparties or invested assets (EBA, 2021).

In addition to negatively impacting institutions through counterparties, ESG risks can affect the entire financial system and economy, leading to systemic consequences. The negative impacts of ESG factors may affect various macroeconomic values, such as labor productivity, economic growth, public debt, gross domestic product (GDP), and socio-economic changes. For this reason,

ESG risk must be considered in the financial decisions of financial markets and companies. These, in turn, through their effects on the economy, can affect financial

institutions and consequently impact credit risk and market risk, which may ultimately affect their financial performance and debt repayment ability (Ziolo and Spoz, 2022).

Environmental Risk	Social Risk	Governance Risk
•Physical risk •Supply chain disruption •Rising sea levels •Drought •Transition risk •Regulatory/supervisory responses to promote sustainability for prohibitions on unsustainable activities •Structural changes in the supply and demand of products, services, and goods	•Non-compliance with labor laws •Insufficient employee pay •Inadequate assurance of industrial safety standards and employee health protection •Inadequate assurance of product safety	•Compliance with tax laws •Corruption or attempts at bribery •Inadequate senior management compensation •Inadequate assurance of data protection

Figure (2): Main Drivers and Types of ESG Risk (Nocoń, 2024)

ESG risk consists of three main types of risk: environmental risk, social risk, and governance risk (see Figure 2). However, different types of these risks may interact with each other and exacerbate shocks and stresses, which can lead to external effects that may disrupt the proper functioning of the entire financial system or parts of it (Nocoń, 2024).

ESG risk is not a separate type of risk. However, it is a cross-cutting risk that affects traditional types of risks – both financial and non-financial – (see Figure 3). Measuring ESG risk, similar to managing other types of risk, is an inevitable and essential part of banking operations. The

management of this risk is carried out as part of the management of other types of risk and is implemented by all departments and committees active in the bank. The purpose of measurement is to enable ESG risk management, support sustainable development, and create long-term value for the bank through integrated management of ESG factors' impact. Therefore, ESG risk measurement considers a new perspective – the perspective of double materiality, meaning that both the impact of ESG factors on the bank's operations, financial results, and development, and the impact of the bank's activities on society and the environment are considered (Nocoń, 2024).

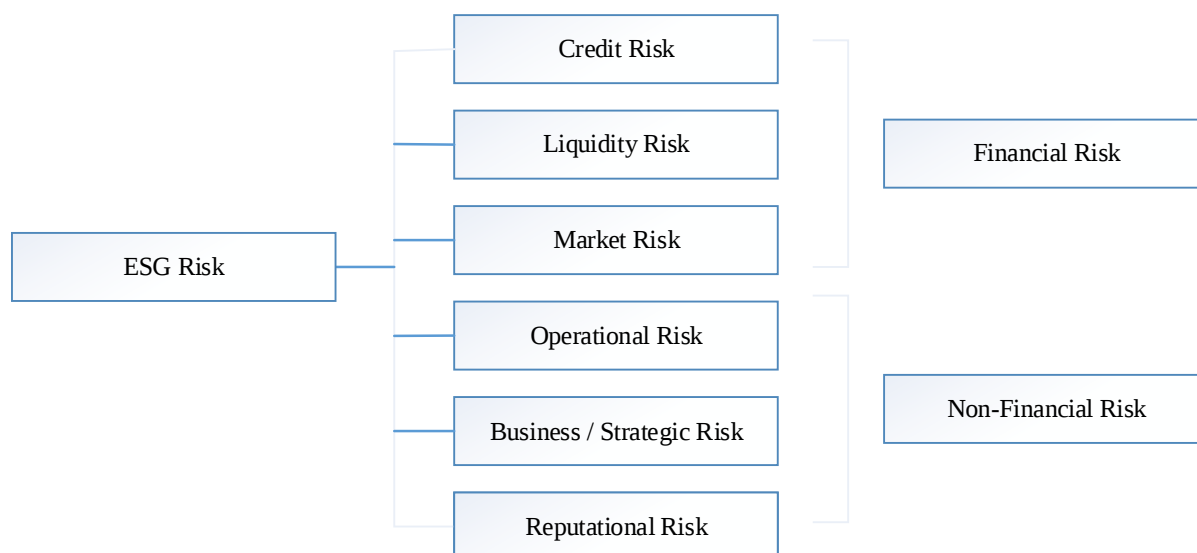


Figure (3): ESG Risk versus Traditional Types of Banking Risk (Nocoń, 2024)

Banking institutions, following global trends, have incorporated sustainable development initiatives into their activities. At the same time, these institutions are aware that a passive approach, even now, will exclude them from the market. In the future, focusing on social and environmental goals will become a necessity. Furthermore, regulatory requirements related to the implementation of sustainable development principles have forced banks to make immediate changes in almost all areas of their operations. Although many institutions (including banks) and regulatory bodies have begun to incorporate ESG factors into their risk management systems, the practical assessment of ESG risk is still in its early stages of development. After identifying the most important ESG variables, researchers have raised the issue of their measurement (Antolín-López and Ortiz-de-Mandojana, 2023; Risso and Longarini, 2023).

Various organizations, companies, and entities have begun to develop initiatives and guidelines for assessing and measuring

ESG criteria using different lines and metrics (Arvidsson and Dumay, 2022).

Banks worldwide face challenges related to identifying and measuring ESG risk. There is no standard method for measuring ESG risk, neither in terms of methodological approach nor in terms of obtaining the necessary data or the objective of the analyses. These objectives include defining risk appetite on the one hand, and limiting and securing risk exposure on the other. Assessing ESG risk is similar to assessing an immeasurable subject; meaning it is very difficult to measure certain non-quantitative values without a clear assessment of their impact on the environment or financial results. Common indicators (quantitative and qualitative) as well as methodological tools for assessing the impact of ESG risk play an important role in supporting the integration of sustainability aspects into financial and regulatory decision-making, preventing a phenomenon known as "greenwashing," and ultimately increasing transparency, consumer protection, and information disclosure (Przychodzeń, 2013).

Information from external sources plays a very important role in measuring ESG risk. Rating agencies that evaluate companies, countries, or instruments collect data on the exposure of counterparties (including banks) to ESG factors and risks. In addition, new specialized institutions have been established that provide reliable information on the exposure of companies to various components of ESG risk. Therefore, the biggest challenge in measuring ESG risk is data and their sources. Other problems in collecting data for measuring this risk have been raised as follows (Dathe et al., 2022):

- New data sources: Until now, some areas of banks' activities have not been under supervision. However, with the emergence of a new type of risk, the extent of exposure to ESG risk factors has become a crucial aspect in the preparation of data, and the construction and application of ESG risk models.
- Integration: Integration requires collecting datasets that have not yet been integrated, standardizing classification, categorization, and measurement, and the lack of alignment in reporting frameworks across different jurisdictions, which creates complexity for large financial groups. Furthermore, existing systems in banks for storing ESG-related data have not yet been fully adapted.
- Standardization: There is still no specific standard for ESG risk measurement methods. Also, the inability to verify ratings provided by external providers due to the lack of widespread methodology and the necessity of ensuring that the ESG

risk measurement strategy aligns with the rating approach of external providers are other challenges.

- Data management: One of the important aspects in measuring ESG risk is considering the potential business risks arising from inaccurate ESG reporting and inappropriate classification of investments. Maintaining transparency throughout the data collection and processing process, especially due to the high volume of information and new types of data required, is a significant challenge.

Furthermore, the ESG risk assessment methodology has not yet been precisely defined. ESG risk differs in nature from known types of banking risks, and its identification and measurement require attention to several issues. First, high uncertainty: the impact and timing of social responsibility activities are difficult to assess. Second, data scarcity—although banks report important information such as CO2 emission volumes, waste generation, or compliance with International Labour Organization (ILO) conventions, assessing the impact of ESG factors on financial results remains challenging. Relevant, comparable, reliable, and usable data to understand the potential impact of ESG risk on financial results is lacking. Regulations such as the EU's "Corporate Sustainability Reporting Directive" indicate the need for more detailed disclosure of ESG factors, but this data is still insufficient for measuring ESG risk. Third, methodological limitations—most traditional models for risk estimation use historical data, while ESG factors like climate change are not reflected in historical data. Therefore, estimating certain risk parameters such as

probability of default (PD) or loss given default (LGD) is not clear. Other limitations include translating ESG risks into financial risks, understanding their impact on business models, and the absence of a harmonized definition of sustainability-related activities. Fourth, mismatch in time horizon—the consequences of ESG factors, especially environmental ones, are observed over several decades. For example, climate scenarios analyze potential climate changes until the end of the 21st century, while traditional risk management tools typically focus on short-term strategic planning. Fifth, the cross-sectional nature of ESG risk—ESG risk affects various business sectors and impacts financial categories differently. For example, the degradation of business areas financed by a bank can lead to higher credit losses or a decrease in market value if exposed to financial instruments. ESG risk can also affect banks' business models, capital adequacy assessment methods, and funding costs. Sixth, the non-linear nature of ESG risk—most ESG risks, especially those related to climate change, are non-linear. This can create complex chain reactions and cascading effects, which in turn can generate unpredictable environmental, geopolitical, social, and economic dynamics (Bolton et al., 2020).

In 2004, the United Nations Environment Programme first introduced the concept of ESG, which stands for Environmental, Social, and Governance. ESG refers to issues related to environmental protection, social responsibility, or corporate governance that can have positive or negative impacts on the financial performance or debt-paying ability of an entity, government, or individual. ESG

factors can affect financial institutions through external and internal channels. Externally, the impact of ESG factors such as climate change can lead to direct physical effects on financial institutions. Internally, ESG factors can affect the financial status of institutions by influencing their core business activities.

Przychodzeń (2013), in a study titled "The Role of ESG in Financial Reporting," focused on the role of ESG metrics in financial reporting and identified challenges such as data collection, analysis methods, and transparency in reporting as key obstacles to ESG risk disclosure.

Studies show that attention to ESG risk has been seriously discussed in recent decades, especially since the beginning of the 21st century. The concept of ESG initially originated from Corporate Social Responsibility (CSR) but gradually evolved into a framework that includes environmental and governance criteria in addition to social aspects. The turning point for this attention was the signing of the Paris Agreement (2015) and the United Nations Sustainable Development Goals (SDGs), which highlighted the necessity of considering environmental, social, and governance impacts on financial and non-financial operations. The first serious attention to ESG risk in the banking sector emerged when central banks and regulatory bodies, such as the Network for Greening the Financial System (NGFS), emphasized that ESG risks not only have environmental and social consequences but can also have destructive impacts on the financial stability of banking institutions and the global financial system.

Berg et al. (2019), conducted a study titled "Aggregate Confusion: The Divergence of

ESG Ratings." This research showed that differences in ESG rating methodologies have created a fundamental challenge for transparent ESG risk disclosure. Due to the lack of harmonized standards in rating methodologies, banks face serious difficulties in collecting and disclosing reliable data.

Dobler and Kotsovos (2020), in their study titled "Barriers to Effective ESG Reporting in Banks," examined various obstacles banks face in disclosing ESG risks. Their findings indicate that the main challenges in this regard are the lack of unified international standards, insufficient technical information and specialized human resources, and resistance to changes in management systems.

Hameed et al. (2021), in their research titled "The Role of Banks in Managing ESG Risks," focused on a new model for responsible financial conditions and investigated why banks should pay more attention to ESG risks and how they can enhance their credibility and demonstrate greater responsibility by disclosing these risks in the decision-making process. Their results show that transparency in ESG risk disclosure can attract more informed investors.

Thompson and Park (2019), examined the necessity of disclosing ESG risks by financial and regulatory institutions such as banks. Their analyses in their research, "Why ESG Transparency Matters," which highlights the role of regulatory frameworks, show that accurate disclosure of ESG risks can serve as a tool for compliance with regulatory laws and strengthening banks' social responsibility.

Arvidsson and Dumay (2022), in their research titled "Sustainability Reporting: Challenges and Opportunities for Financial Institutions," addressed the opportunities and challenges of sustainability reporting and showed that transparency in ESG risk disclosure can prevent "greenwashing" and increase public trust.

Risso and Longarini (2023), in their study titled "Measuring and Disclosing ESG Risks in the Banking Industry," concluded that traditional risk management methods cannot adequately cover ESG risks. The reason for this is the non-linearity of environmental risks and the lack of sufficient and standardized data for analyzing these risks.

Nocoń (2024), in a study titled "ESG Risk Management in Banks: Moving Towards Its Measurement," while examining the issue in Polish banks, showed that some banks in Poland are at an advanced stage of ESG risk management, while others have only recently started their activities in this area. His results showed that banks' involvement in ESG issues globally is one of the leading market trends. In fact, for institutions wishing to maintain their market position, it has not only become an option but a necessary and unavoidable imperative. Therefore, commercial banks can and should participate in implementing sustainable development assumptions in the coming years.

Sajadi and Banabi Ghadim (2014), in their article titled "System and Indicators of Sustainable Performance Management," examined the system and indicators affecting sustainable performance management. Their results showed that a company can create value only when its management method includes various

characteristics, especially in relation to integrating economic, environmental, and social dimensions. The existence of stakeholders with conflicting and heterogeneous interests increases the demand for multi-dimensional measures. Based on stakeholders' perception of a company, a company can continue its activities if it is able to create, maintain, and strengthen stable and lasting relationships with all its stakeholders, which is achieved through sustainable accounting and performance management. Sustainability management requires defining sustainability goals that must be continuously reviewed and evaluated through strategies and indicators.

Yousefi and Shariati (2018), in their research titled "The Role of Disclosing Environmental and Social Indicators in Increasing the Transparency of Iranian Banks," examined the role of ESG indicators in increasing the transparency of banking information. The results indicate that the disclosure of environmental and social indicators can strengthen customer trust and reduce non-financial risks.

Mohammadi and Ahmadi (2019), in a study titled "Investigating the Impact of Environmental and Social Information Disclosure on Bank Value," examined the impact of environmental and social information disclosure by banks on their organizational value and financial performance. Their findings show that transparency in ESG can increase investor confidence and lead banks towards more sustainable performance.

Akbari and Karami (2020), in an article titled "Investigating the Impact of Compliance with Global ESG Standards on the Performance of Iranian Banks,"

analyzed the compliance of Iranian banks with global ESG standards and showed that adopting these standards can help banks reduce environmental and social risks.

Hoseini and Alavi (2021), in a study titled "Obstacles and Challenges of Implementing Social Responsibility in Iranian Banks," investigated the obstacles to implementing social responsibility in Iranian banks. Their findings indicate that the lack of codified laws, insufficient employee awareness, and the high costs of establishing ESG-related systems are among the most significant challenges to disclosing ESG risks in the Iranian banking system.

Nazari and Amiri (2022), in their research titled "Assessment of Environmental and Social Risks in the Iranian Banking Industry," examined the types of environmental and social risks that affect the performance of Iranian banks. Challenges such as climate change and social pressures were among the issues investigated.

Shamsadini et al. (2022), in their article titled "Presenting a Model for Developing Corporate Social Responsibility," showed that the model for implementing social responsibility has 7 levels, and stakeholder pressure factors, company ownership, and company size are among the most effective factors of corporate social responsibility and its underlying implementation. Furthermore, factors such as increased public trust, improved financial performance, investment efficiency, and reduced stock price risk have an impact. Their results showed that since the impacted factors are obtained as a result of social responsibility activities, managers and policymakers should focus on other

factors that lead to these factors (the underlying factors of the model).

Based on agency theory, organizations should report information related to their performance transparently and accurately to ensure the interests of various stakeholders (such as shareholders, customers, and the government). In this regard, banks must regularly and transparently disclose information related to ESG risks to prevent conflicts of interest and legal problems. According to this theory, ESG information disclosure enables organizations to gain public and investor trust and protect themselves against legal and financial risks (Tirole, 2006). On the other hand, legitimacy theory can contribute to the necessity of disclosing ESG risks in banks. This theory states that organizations must respond to the expectations and needs of society to maintain their social and economic legitimacy. In this regard, banks must transparently report their ESG risks to maintain their social and legal legitimacy (Suchman, 1995). In Iran, due to economic and international developments, compliance with global standards and adherence to ESG risks can not only attract customer and shareholder trust but also help improve international relations and the competitiveness of banks in global markets.

First objective: Identifying the necessities for measuring ESG risks in the Iranian banking system.

Agency cost theory refers to costs arising from conflicts of interest between managers and shareholders or other stakeholders. In the context of ESG risks, banks must transparently disclose information related to these risks to prevent conflicts of interest and maintain investor and customer trust. If

banks fail to accurately report this information, they may face legal issues and a decline in credibility. This challenge is particularly significant in developing countries like Iran, where precise laws and regulations for ESG reporting do not exist (Jensen and Meckling, 1976). On the other hand, institutional accounting theory can help identify cultural and social challenges in the process of measuring ESG risks. According to this theory, organizations and institutions are influenced by their social and cultural environment and must respond to social and cultural expectations (Scott, 2005). In Iran, social and environmental issues may not receive as much attention as in developed countries, which can be a major challenge for measuring and reporting ESG risks. For example, a lack of sufficient awareness and cultural challenges in accepting concepts related to ESG risks in the Iranian banking system may hinder the proper development of these processes. These challenges can prevent banks from progressing in adapting to international standards regarding ESG risks.

Second objective: Explaining the main challenges in the process of measuring ESG risks in Iranian banks.

Based on Corporate Social Responsibility (CSR Theory), banks and organizations should pay attention to their social responsibilities and, in addition to profitability, address the social and environmental impacts of their activities. Measuring ESG risks in banks can help improve brand reputation, customer trust, and attract sustainable investments. As a result, by effectively managing these risks, banks will be able to reduce financial costs arising from non-financial risks and

achieve better financial performance in the long run. For example, research has shown that banks that pay attention to social and environmental responsibilities tend to have better long-term returns and benefit from sustainable investments (Porter and Kramer, 2006). Furthermore, Information Asymmetry Theory in accounting points out that transparency in ESG information disclosure can help reduce problems arising from information asymmetry between banks and stakeholders. Banks that effectively identify and measure ESG risks can better manage financial risks and prevent negative impacts from social or environmental crises. This can help improve financial performance, reduce systemic risks, and increase efficiency (Healy and Palepu, 2001). In Iran, given the increasing international pressures to comply with ESG standards and improve the image of financial organizations, banks can use this information to achieve sustainable growth and improved profitability.

Third objective: Discovering the predictable effects of measuring ESG risks in Iran on banks' financial performance.

The issue of data and information challenges in measuring ESG (Environmental, Social, and Governance) risks has become one of the key issues in accounting and auditing research. One related theory is information asymmetry theory, which refers to differences in access to information between organizations and stakeholders. This theory indicates that due to a lack of transparency and low data quality, companies may not be able to accurately measure ESG risks, which leads to uncertain or incorrect decision-making (Akerlof, 1970). In this regard, using

international standards for ESG reporting and improving auditing processes can help reduce information asymmetry. Theories related to human resource accounting and risk management (such as risk management theory) can provide solutions to address these challenges. According to these theories, accurate measurement of ESG risks requires the development of advanced analytical tools and the creation of comprehensive information systems capable of processing data related to various ESG dimensions (Healy and Palepu, 2001). In this regard, solutions such as using data mining models to simulate various scenarios and analyze ESG risks help companies better manage these risks and make decisions based on more accurate information.

Fourth objective: Provide solutions to address data and information challenges in measuring ESG risks.

3. Research Methodology

This study uses the interview method to collect primary data and extract effective propositions to form a core set. Based on the objective of this study and citing relevant research findings, the authors designed a semi-structured interview protocol.

To ensure the content validity of the interview protocol, a pre-test was conducted before the formal interviews. Based on the analysis of interview data from three pre-test participants and their feedback suggestions on the interview questions, specific changes were made to the questions and phrases in the interview protocol, leading to the overall semi-structured interview outline.

The main interview format used in this study is face-to-face interviews, with online interviews as a supplementary method. Before each interview, researchers introduced their objectives and guidelines to the interviewees and firmly committed to maintaining the confidentiality of relevant data to alleviate their concerns about personal information disclosure and privacy. Interviews were conducted between September and December 2024, and each interview lasted 20 to 30 minutes. During the interview process, informed consent was obtained from the interviewees, and audio and written records were maintained. Throughout the interviews, the authors guided interviewees to actively express their experiences and feelings. In addition to the predefined interview outline, new questions were asked impromptu based on interviewees' responses to ensure the comprehensiveness and richness of the interview data.

After collecting raw interview data in this research, grounded analysis was used. Grounded theory, introduced by Anselm Strauss and Barney Glaser in 1980, is a qualitative research method that involves collecting and analyzing data to generate inductive conclusions about a specific phenomenon using systematic procedures. For example, Li used grounded theory to create a model of the impact of digital communication on intangible cultural heritage in the handicraft sector. In this paper, data was collected through semi-structured interviews. After the interviews were completed, interview transcripts were screened, and relevant effective statements were retained to form the core database. Grounded theory was then used to systematically examine the necessity and challenges of measuring ESG risk by the

Iranian banking system. The relevant analyses were conducted through open coding, axial coding, and selective coding.

Open coding is the first step in the grounded theory coding method, which involves carefully reading the original data, conceptualizing key phrases, and further summarizing the process of inducing initial categorization. In this study, recordings obtained from interviews were transcribed. While respecting the original intentions of interviewees' statements, meaningless pauses and ambiguous sentences were removed from the text. Additionally, simple merging and non-repetition of textual data were performed to obtain clearer and more meaningful textual material. Subsequently, in the secondary analysis, this study once again removed specific phrases from the original data that were either not very relevant to the topic of how to assess ESG risk or lacked clarity in meaning, resulting in revised raw data. Initially, propositions were categorized based on their original meanings, and elements with similar nature and content were combined in conceptualization.

Axial coding is an important step in planning based on grounded theory, which, building on open coding, merges similar codes to form general macro concepts. Axial coding means connecting different concepts identified in the initial coding stage. In this stage, an effort is made to clarify the relationships between identified concepts and codes and to create more general categories. In fact, the goal of axial coding is to identify and analyze the relationships between codes to achieve a more comprehensive picture of the data. This stage usually involves identifying causes, consequences, conditions, and

processes present in the data, which ultimately leads to a more organized structure for analyzing and understanding phenomena.

Selective coding is the final stage of data analysis, where the focus is on selecting and concentrating on core and key codes that best represent the main topics or phenomena of the research. In this stage, researchers conduct a more detailed analysis, considering the main concepts identified in previous stages, and highlight the codes most relevant to the research questions. The goal of selective coding is to create a conceptual model or a final theory from the data that fully and accurately represents the research findings.

4. Research Findings

As shown in Table 1, the description of the demographic data of the research indicates that out of the total statistical sample of 35 individuals, 12 are women and the rest are men. Given that senior banking managers are predominantly men, such a distribution seems logical. The majority of interviewees hold a master's degree, and some are pursuing doctoral studies, which is justifiable given the trend towards higher education. Most interviewees are under 50 years old but possess valuable experience, which is logical considering private banks'

inclination to employ young managers with high levels of knowledge. The main work experience of the interviewees ranged from 10 to 20 years, indicating acceptable experience in the banking industry.

The table provided in the appendix presents details and initial concepts for the primary codes obtained. Based on the interviewees' opinions, the analysis of ESG (Environmental, Social, and Governance) risks in Iran's banking system reveals extensive challenges and opportunities that these risks create for banks. From an environmental perspective, Iran faces crises such as climate change, depletion of natural resources, and pollution, which can lead to financial and operational banking risks. While social risks, including human rights issues, gender discrimination, and social responsibility, can affect banks' relationships with stakeholders, customers, and even local communities, governance risks remain one of the biggest challenges in Iran. Corruption, lack of transparency in decision-making, and weaknesses in internal oversight and controls are key factors that can lead to a decrease in public trust and threaten the financial security of banks.

Table (1): Demographic characteristics of the surveyed sample

Variable	Group	Frequency	Percent
Gender	Female	12	65.71%
	Male	23	34.29%
Education Level	Bachelor	4	11.43%
	Master	24	68.57%
	Ph.D	7	20.00%
Age	30 to 40	14	40.00%
	40 to 50	17	48.57%
	Over 50	4	11.43%
Years of Experience	5 to 10 years	5	14.29%
	10 to 20 years	27	77.14%
	Over 20 years	3	8.57%
Total		35	100

On the other hand, analyzing and measuring ESG risks can bring significant benefits to Iran's banking system. Paying attention to these risks can contribute to sustainable development and strengthen banks' financial performance. For example, banks that are leaders in assessing and managing ESG risks can benefit from reduced long-term costs, increased transparency, and enhanced public trust. Furthermore, this attention to ESG standards will lead to greater alignment with international requirements and attract foreign investors. However, at the same time, cultural and economic challenges such as legal and regulatory limitations, sanctions, and internal resistance to change are serious obstacles to the adoption and implementation of these standards in Iran's banking system.

The interviewees believed that analyzing the main challenges in the process of measuring ESG risks in Iranian banks indicates numerous problems at the structural, cultural, and executive levels that hinder the adoption and implementation of these standards. One of the major challenges is the lack of legal and regulatory frameworks. In Iran, there are no

clear and comprehensive laws and regulations for assessing and reporting ESG risks, which leads to non-compliance with international standards. This issue not only complicates the process of measuring and managing ESG risks but also puts banks in a position where they cannot effectively integrate these risks into their financial and strategic processes. On the other hand, cultural and organizational resistance to change is another serious obstacle. Many bank managers and employees, especially in government organizations, refrain from adopting ESG standards due to concerns about executive complexities and additional costs. This organizational resistance prevents banks from effectively improving processes and assessing risks.

Another important challenge is the lack of reliable data and information for assessing ESG risks. Many banks face difficulties in collecting accurate and transparent data in environmental, social, and governance areas. This lack of information prevents banks from accurately assessing their risks, which in turn jeopardizes their financial decisions and strategies. Furthermore, economic constraints and limited financial resources, especially during economic

crises and sanctions, prevent the allocation of necessary resources for implementing ESG-related processes. Similarly, the lack of specialized training in this area is another challenge. Bank employees and managers often lack sufficient awareness and knowledge to measure ESG risks, which means that even if appropriate tools are available, the ability to use them at the operational and strategic level does not exist. As a result, banks will not be able to effectively utilize the benefits of ESG risk assessment.

According to the interviewees, analyzing the impact of measuring ESG risks on the financial performance of banks in Iran shows that this approach can bring significant long-term benefits to banks. One of the main impacts is cost reduction. Banks that effectively manage ESG risks will be able to reduce costs arising from environmental, social, and governance crises. For example, by reducing energy consumption, minimizing legal penalties, and optimizing internal operations, banks can better manage their financial resources. This, in turn, leads to a reduction in operational costs, which ultimately has a positive impact on profitability. Also, implementing ESG standards can help improve the credibility and reputation of banks. By gaining the trust of customers and investors, banks can attract more financial resources and strengthen their position in global markets.

In addition to these benefits, measuring ESG risks can increase investor attraction and reduce financial risks. By demonstrating a commitment to managing environmental and social risks, banks can attract more responsible investors who seek to invest in sustainable and green projects.

This investor attraction can lead to increased financial resources and improved financial standing for banks. On the other hand, accurate assessment and management of ESG risks reduce banks' long-term and short-term financial risks, including credit, operational, and reputational risks. This will enhance the financial stability of banks and reduce the likelihood of future financial crises. Furthermore, by improving operational efficiency and internal productivity, banks can increase their competitiveness in domestic and global markets and strengthen their position in international rankings. These factors collectively can contribute to sustainable financial performance and improve banks' standing in global markets.

According to experts, the main challenges in measuring ESG risks primarily stem from a lack of reliable and credible data, the absence of global standards for data collection and reporting, and the difficulty in assessing non-financial ESG dimensions such as social and environmental impacts. Insufficient ESG data and scattered, unintegrated data are among the key problems many organizations face. Specifically, a lack of transparency in ESG reporting and the absence of unified global standards create challenges in data comparison and integration. These issues can lead to inaccurate analyses and ineffective decision-making. Additionally, high data collection costs and existing technological limitations exacerbate the problems in processing and analyzing ESG data, as many organizations still use outdated technologies for collecting and processing this data, which limits their ability to process large and complex data volumes.

Under these circumstances, the challenges of non-financial data availability and the difficulty in quantifying ESG variables particularly add to the complexity of ESG risk assessment processes. Data related to social, environmental, and governance dimensions are often difficult to measure and cannot be analyzed using traditional quantitative methods. These problems, coupled with organizational resistance to adopting new methods for data collection and analysis, clearly indicate the need for fundamental changes in organizational processes. To address these challenges, establishing global standards for ESG reporting, utilizing new technologies such as artificial intelligence and blockchain for data collection and analysis, and enhancing organizational culture through training and awareness can help improve the current situation.

Table 2 presents the axial and selective codes based on the initial codes obtained.

Based on the interviews, the necessities of measuring ESG risk can be attributed to the impact of addressing social and environmental issues on enhancing social responsibility and sustainable development of banks, risks that are not visible in the short term but may turn into economic and financial crises in the long term, the importance of alignment with international ESG standards for competitiveness in global markets, the impact of domestic and international laws and regulations in compelling banks to adopt ESG criteria, and the importance of building trust among customers and stakeholders by addressing ESG risks to reduce reputational risks and increase transparency.

Table (2): Initial, Axial, and Selective Codes

Selected Codes	Axial Codes	Initial Codes
ESG Auditing in Banks Education and Awareness Measuring ESG Risks in Investments	• Social and economic necessities • Hidden and long-term risks • Sustainability and compliance with global standards	B1-Environmental risks
		B2-Social risks
		B3-Governance risks
		B4-Importance of analyzing and measuring ESG risks
		B5-Impact of ESG risks on financial performance

National Policies and Strategies Application of Data Analytics and Artificial	- Legal and regulatory pressures - Role in building public and customer trust	B6-Specific challenges of Iran's banking system
Lack of suitable analytical tools Structural limitations and resources Internal challenges of banks Need for international cooperation and expert consultations	Legal and regulatory challenges Cultural and organizational barriers Information and data problems Economic and human resource limitations Need for expertise and training	B7-Lack of legal and regulatory frameworks B8-Cultural and organizational resistance B9-Absence of unified international standards B10-Lack of reliable data and information B11-Economic constraints and financial resources B12-Insufficient training and awareness
Increased transparency and trust Managing long-term risks and reducing financial crises Flexibility in the face of market changes Increasing social responsibility and attracting new customers	Positive financial impacts (cost reduction and attracting investors) Positive impacts on credibility and reputation Long-term impacts on financial sustainability Alignment with global standards	B13-Cost reduction B14-Improved credibility and reputation B15-Increased investor attraction B16-Reduced financial risks B17-Competitiveness in global markets B18-Increased operational efficiency
Standardization of ESG data Utilizing new technologies such as blockchain and AI Developing advanced analytical models for simulating ESG risks Training and awareness in organizations	Lack of reporting transparency and data standardization Costs of data collection and technological limitations Dispersed data and difficulty in information integration Technological challenges and lack of scalability Organizational resistance and training	B19-Insufficient ESG data B20-Lack of transparency in ESG reporting B21-Challenges in the availability of non-financial B22-High costs of data collection B23-Limitations of existing technology B24-Resistance to change B25-Difficulty in evaluating quantitative ESG variables B26-Absence of global ESG standards B27-Dispersed and ununified data B28-Inaccurate simulations

Based on the above, the need to implement auditing and reporting systems for reviewing and evaluating ESG risks, the necessity of training banking employees and managers to better understand ESG risks and how to manage them, banks' strategies for evaluating and managing ESG risks in investments and credits, the need for the government to formulate supportive policies for the adoption of ESG standards in the banking system, and the use of new technologies for accurate evaluation and prediction of ESG risks

should be considered in the discussion of measuring ESG risks.

5. Discussion and Conclusion

Measuring ESG risks in Iranian banks, especially in the current economic and financial conditions, is of particular importance. Given the growing global attention to environmental, social, and governance transparency issues, banks must pay special attention to these risks to both contribute to sustainable development and manage potential risks arising from changes in international laws and standards.

In this regard, measuring and analyzing ESG risks can help banks become more resilient to crises and environmental and social changes, maintain their credibility with investors and customers, and benefit from long-term advantages and new opportunities in financial markets. Furthermore, ignoring these risks may lead to a reduction in foreign investment, damage to reputation, and a decrease in banks' competitive power. Therefore, banks in Iran must establish the necessary frameworks for measuring and managing these risks to align with international standards and prevent potential threats.

This research was conducted in a question-driven manner without any hypotheses. Based on the questions and interviews conducted, the necessity of measuring ESG risks is formed by social and economic necessities, hidden and long-term risks, sustainability and compliance with global standards, legal and supervisory pressures, and the role in building public and customer trust. Along this path, there are challenges, the most important of which are legal and supervisory challenges, cultural and organizational barriers, information and data problems, economic and human resource limitations, and the need for expertise and training. Positive financial impacts (cost reduction and attracting investors), positive impacts on credibility and reputation, long-term impacts on financial sustainability, and alignment with global standards are among the outcomes that measuring ESG risks can bring. Finally, solutions should be considered for reporting opacity and data standardization, data collection costs and technology limitations, scattered data and problems in information integration, technology

challenges and lack of scalability, organizational resistance, and training.

The solutions that can be considered in the Iranian banking system regarding explaining the necessities, resolving challenges, benefiting from the effects, and ultimately removing measurement obstacles are as follows. ESG auditing in banks, education and culturalization, measuring ESG risks in investments, national policies and strategies, and the application of data analytics and artificial intelligence can be instrumental in explaining the necessities. The use of appropriate analytical tools, removal of structural and resource limitations, resolution of internal bank challenges, international cooperation, and expert consultations will be effective in managing ESG risk measurement challenges. Increased transparency and trust, measurement of long-term risks and reduction of financial crises, flexibility in the face of market changes, increased social responsibility, and attracting new customers can be the results of measuring, managing, and disclosing ESG risks that banks can benefit from. Standardizing ESG data, using new technologies such as blockchain and AI, developing advanced analytical models for simulating ESG risks, and education and awareness-raising in organizations are also of particular importance in removing measurement obstacles.

It should be noted that this research was conducted with a number of banking specialists, and interviews were held with some of them based on contextual analysis. The analyses can be further enriched by using real data in cooperation with banks,

and an analysis of the current situation and quantification of effects can be presented.

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