




A systematic literature review: ESG criteria implementation in the insurance industry

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Received July, 2023

Accepted February, 2024

Abstract

Purpose: Sustainability and Environmental, Social and Governance (ESG) criteria are gaining more relevance, and the insurance industry is playing a relevant role in the sustainability transition. Therefore, this study aims to review existing academic literature on ESG criteria in the insurance industry. Specifically, it addresses the determinants in three objectives: First, analysing the focus on sustainability considering the three dimensions of the ESG framework: Environment, Social and Governance; the second one, focusing on the relevant topics in the insurance industry involving the ESG criteria. And finally, identifying the main gaps and point out new research lines.

Design/methodology/approach: The research was conducted through a systematic literature review considering published articles of Web of Science and Scopus.

Findings: Findings contribute to the body of literature on sustainable finance, providing a new and complete overview about how ESG criteria implementation has been approached in the insurance industry: mapping research streams, analysing the ESG approach, and identifying research gaps in this domain, principally in empirical analysis, research in social and governance actions, and in product and customer ESG perspective.

Practical implications: This article wants to provide a broader and a more structured knowledge about ESG criteria implementation, and to help managers and insurance companies to move forward with sustainability strategies, and to identify the future lines of research.

Social Implications: Business sustainability aims to combine market logic with social welfare logic. This article provide knowledge about how insurance companies develop the social dimension within the ESG perspective, as a way to influence the community by promoting equal practices, access to education, etc. Additionally, it helps society to be more aware of the impacts of climate change and the importance of knowing, assimilating and adopting the SDGs and other material elements about sustainability and ESG criteria.

Originality/value: Although the insurance industry has a very relevant weight into the economy and the society, and it plays a key role in promoting the transition to a low-carbon economy, there are not many scientific articles on this subject.

Keywords: Sustainability, ESG, Insurance, Environmental, Green, Climate, Social, Governance, Performance, Strategy, Ethic, Diversity

Jel Codes: D63, G22, G52, Q54 and Q56

To cite this article:

Marti, A., Bastida-Vialcanet, R., & Marimon, F. (2024). A systematic literature review: ESG criteria implementation in the insurance industry. *Intangible Capital*, 20(1), 193-214. <https://doi.org/10.3926/ic.2426>

1. Introduction

For a few years now, initiatives related to sustainability are gaining more and more relevance. The world, in general, and the financial sector, in particular, have begun a transition towards sustainability that is unstoppable. In short, for many economic agents, sustainability as a general concept, and the ESG criteria as something more tangible, already provide a roadmap towards a more durable development.

The research has been focussed on the financial sector because it has a key role in the sustainable transition. Only in the EU and until 2030, 2.6 trillion euros are needed to make this transition (Schroders, 2021). From the assets under management worldwide perspective, 30 billion dollars are classified as sustainable investments (OECD-UNDP, 2020).

The two large sectors that capture and manage this investment and that have to direct and promote monetary flows towards sustainable activities are the banking sector and the insurance one. The insurance sector competes in importance with the banking sector, and even has specific characteristics that add value to that important industry.

The study focuses on the insurance industry due to its enormous size and capital base (insurance premiums account for 7.1% of global GDP (Mapfre, 2022). And, above all, because insurance companies have something that makes it unique in the financial sector: a dual status, risk managers on the one hand, and asset managers on the other (Junsun, 2021). This characteristic positions the insurance industry as a very relevant actor to redirect capital flows towards carbon neutral activities (Braun, Utz & Xu, 2019).

In the risk side, climate risk management is a key aspect in the sustainable transition, and the insurance sector has the most experience and the greatest exposure in this topic (Sato & Seki, 2010).

Out of the ten main risks identified in the World Economic Forum (2022) Global Risk Report 2022, the first three are related to climate and the environment (climate action failure, extreme weather and biodiversity loss). There are two more in this category (human environmental damage and natural resource crises), and other three in the social category (social cohesion erosion, livelihood crises and infectious diseases).

Some economic analyses have been done to quantify the effects of climate change and the need to move towards a sustainable transformation. According to Dlugolecki (2008), in terms of underwriting, the economic cost of weather losses could reach over 1 trillion USD in a single year by 2040, and greenhouse gas emissions have to drop by 60 per cent by 2050, which means transforming the energy economy.

In relation to ESG criteria, the research use this variable because it is the most reliable and suitable way to analyze the sustainability implementation in the insurance industry, based on the contribution of several authors. Zhou, Liu and Luo (2022) consider ESG criteria in order to analyze the relationship between sustainable development, financial performance and company market value; Tettamanzi, Venturini and Murgolo (2022) explore the ESG concept into the European Taxonomy framework as a measure to control and implement sustainability actions; and Ortiz (2022) discusses the influence of ESG as a way to analyze the sustainability and the greenwashing impacts.

Insurance industry faces challenges and opportunities in the sustainability domain, where ESG criteria implementation will be a key element for its development and sustainable growth. In the practitioner world, sustainable transition is moving fast and the insurance industry increasingly incorporates ESG criteria throughout its value chain with a clear focus on risk management.

However, this prominence in the business world does not translate into the academic one, and that is where a gap is identified, and what this article wants to contribute to reduce.

Besides, it seems that currently there is a clear focus on the environmental dimension, but the study wants to corroborate this perception through a literature review, and widen the vision through the whole ESG pillars. Furthermore, the research wants to analyze how the ESG framework is being treated through the insurance industry traditional streams of research.

Because all of that, the research focuses the sustainability analysis on the insurance sector, to give visibility and promote research on two interrelated and very relevant topics, the insurance industry and ESG criteria.

This study aims to review existing literature on ESG criteria implementation in the insurance industry with three objectives:

- Analyze in which of the three ESG dimensions is the scientific research focus on.
- Identify which relevant areas of research in the insurance industry include the ESG criteria.
- Highlight the main research gaps and future research lines.

This article has a triple-fold contribution. In the academic area, it contributes to shed light on the literature focused on the application of the ESG criteria in the insurance industry, which is a novel topic that is clearly understudied. In the word of practice field, it provides insights to the managers within the insurance industry, about the outputs of the most representative articles focused on the implementation of the ESG criteria, and it signals the gaps in research that should be addressed. In the social domain, the article contributes to the accountability of the application of sustainability criteria in a very relevant industry.

This article is structured as follows: section 2 set up the theoretical framework, section 3 describes the methodology adopted for a systematic literature review; section 4 describes the results (descriptive analysis, status of ESG criteria in the insurance industry and an integrative framework of ESG criteria by insurance dimensions); section 5 presents the Discussion, and, section 6, a short summary and new lines for future research.

2. Theoretical Framework

Industries must adapt and evolve their business model to continue operating in an increasingly changing and demanding market. Changes are continuous and occur for different reasons: new regulations, technological issues, consumer habits, corporate strategies, etc.

Currently, the implementation of ESG criteria and the sustainable transition are at the center of the strategies of most companies, and are some of the factors that guide the evolution and adaptation of business models, and the relationship with all stakeholders (Stricker, Pugnetti, Wagner & Zeier-Röschmann, 2022).

Within this new paradigm of sustainability that is evolving and changing business strategies, insurance companies are not an exception, but rather they are fully impacted due to the determining role they play as investment and risk managers.

The implementation of ESG criteria in the insurance industry has its roots in the concepts of Stakeholder Theory, due to the entire approach of maximizing the business dimension taking into account the contribution of value to society.

Freeman (1984) originally detailed the Stakeholder Theory of organizational management and business ethics by addressing morals and values in managing an organization taking into account corporate social responsibility and the market economy.

The implementation of a new business model, a new technology, a new culture,... has to be done looking at the whole stakeholders, because they are the ones who, in one way or another, position the company in the market and in the society.

Customers, investors, markets and society as a whole, not only expect large insurance companies to create value, but also expect them to contribute positively to society and that its economic development was inclusive by contributing to a just transition (Brickson, 2005).

Clients, through their behaviours, increasingly demand sustainable products and the application of ESG criteria (Mills, 2009); and investors, with their analysis and decision processes, increasingly consider ESG criteria when

deciding which companies to invest in (Gharizadeh-Beiragh, Alizadeh, Shafiei-Kaleibari, Cavallaro, Zolfani, Bausys et al., 2020; Thomae, Murray, Jerosch-Herold & Magdanz, 2021).

Institutions and policymakers, as stakeholders, set up regulations and frameworks in order to promote the implementation of ESG criteria and the disclosure of non-financial information (Junsun, 2021; Kraft, 2022).

Over the past years, a growing number of scholars and practitioners have been experimenting with the Stakeholder Theory, as a concept that facilitate the understanding of the complexities of today's business challenges by connecting business with sustainability and ethics (Balmer, Fukukawa & Gray, 2007; Barnett, 2007; Beekun & Badawi, 2005; Bendheim, Waddock & Graves, 1998; Berrone, Surroca & Tribo, 2007; Brammer & Millington, 2004; Brickson, 2005; Brickson, 2007; Buchholz & Rosenthal, 2004; Buchholz & Rosenthal, 2005; Butterfield, Reed & Lemark, 2004; Buysse & Verbeke, 2003; Choi & Shepard, 2005).

ESG criteria implementation takes into account the different dimensions of a company (strategy, sales, risk, investment...) to create value for the whole stakeholders (Godfrey, Merrill & Hansen, 2008). It also explores how the boundaries between business and society are constructed in different ways to improve the understanding of the effectiveness of sustainability and social responsibility within the broader institutional field of corporate governance (Brammer, Jackson & Matten, 2012).

Of all these dimensions, risk management is a key element for insurance companies; and climate change is one of the main pillars of the environmental dimension, and it has a relevant impact on the aforementioned risk perspective. The ESG focus is on embedding sustainability throughout the risk value chain, from the risk appetite framework to the approval process (Hawker, 2007).

The implementation of ESG criteria is being promoted from different international forums with the purpose that companies collaborate with all their stakeholders in the creation of shared and sustained value. In the insurance industry, different frameworks are set up, such as the ones promoted by the UNEP-FI (Sustainable Insurance Principles and Principles for Responsible Investment), the Net-Zero Alliance, the EU Taxonomy and the Task Force on Climate-Related Disclosures (TCFD) that try to align entities' strategies with the sustainable development, an objective materialized in United Nations Sustainable Development Goals (SDGs) and in the Paris Climate agreement.

In short, the study has taken the stakeholder theory as a basis because it is a theory widely used in the analysis of strategic implementations that involve a complete link between business and sustainability (Brammer et al., 2012). Some examples of the application of this theory in the field of sustainability are: Buyesse and Verbeke (2003) that used it to analyze strategies that included the environmental perspective; Beekun and Badawi (2005) in strategies with ethical and social responsibility models; Bucholz and Rosenthan (2004) in the study of public policies including the social vision; Argandona (1998) in models linked to the common good, and, Barnett (2007) in the relationship between financial variables and corporate social responsibility.

3. Methodology

For articles to be suitable for this specific study, the following conditions were required:

1. The Web of Science (WoS) and Scopus databases were identified as the sources for a reliable list of studies on the topic of interest (WoS has been used as the primary source, and Scopus has been added to complete the research).

WoS and Scopus are the most recognized and important international scientific databases (Codina, 2017). Additionally, they are the most transparent in relation to the information from the sources and their indexed documents are considered academic (something that does not happen in other databases where not all indexed documents can be considered academic) (Torres-Salinas, Ruiz-Pérez & Delgado-López, 2010). In relation to citations, those produced in both databases are the ones that are most taken into consideration when analysing the impact of a scientific communication (Codina, Cortiñas-Rovira, Monistrol & Pérez-Montoro, 2014).

2. The study is not segmented by years, so as not to lose any article, and, it only takes articles written in English.

3. Research in WoS and Scopus has been launched in based on general concepts about sustainability, ESG and insurance (keywords: sustainability or ESG and insurance) and specific keywords for each individual dimension of the ESG criteria (keywords: environment*, climate, green; social, ethic*; governance, inclusion, diversity, strategy and performance).

In the light of the study's aim, the search addressed documents in the category of articles and review articles and published in journals belonging to the category of Business Economics (WoS) and business management and accounting and economics, econometrics and finance categories (Scopus).

4. To ensure the selected articles' suitability, the articles that do not deal with the research objectives according to a qualitative review have been excluded (All the abstracts and some complete articles of each excluded category have been read to ensure that the exclusion criteria are correct and that the articles do not fit with the objective of the investigation).
5. Final substantive suitability was confirmed by reading most of selected articles for essential research perspective and satisfactory empirical data. The latter process forced the alignment between the selected articles and the research review objectives' (Sivarajah, Mustafa-Kamal, Irani & Weerakkody, 2017). Final sample of articles (WoS + Scopus) is **63**.

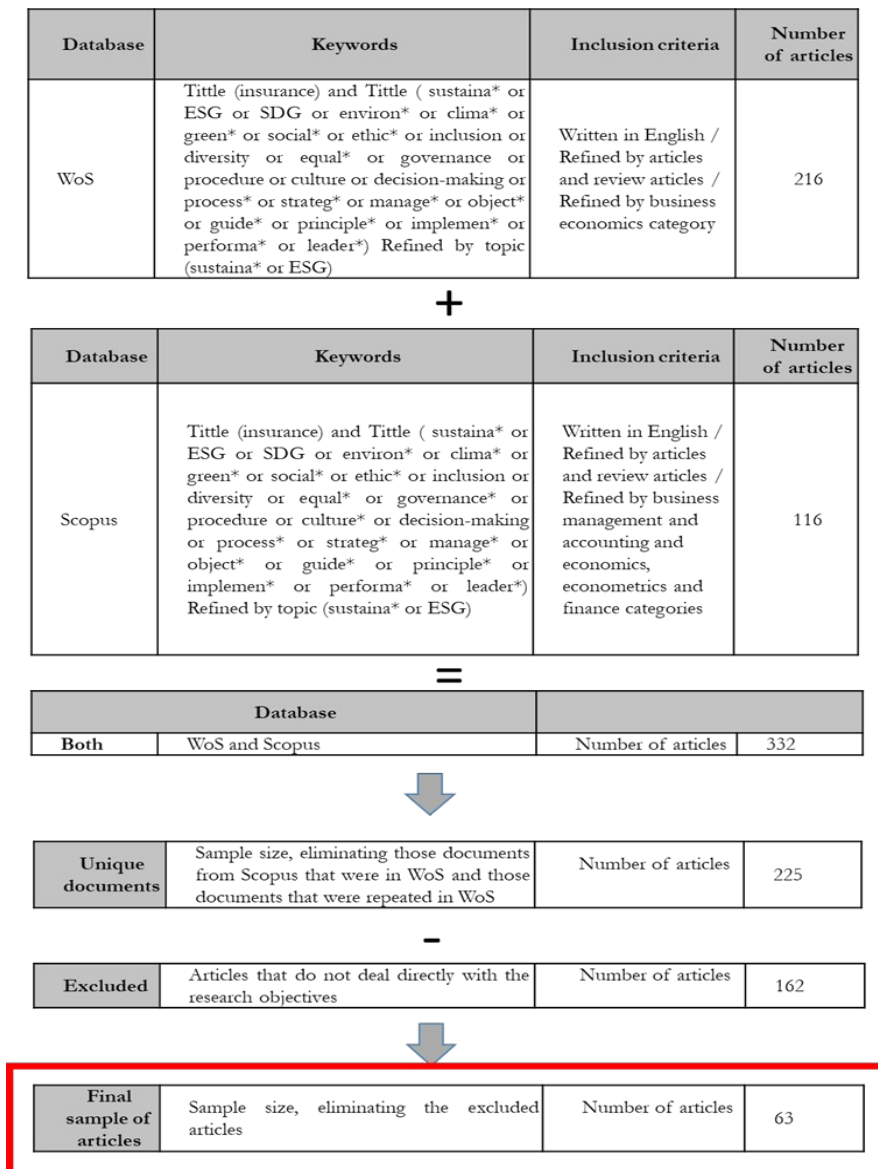


Figure 1. Search process implemented in Scopus and Web of Science and the inclusion/exclusion criteria

4.2. Number of Articles View

From 2019 onward, there is an increase in the number of published articles (Sustainable Finance Action Plan is launched in the European Union in 2018 and the Green Pact in 2019) although the number of articles does not exceed 10 in any year.

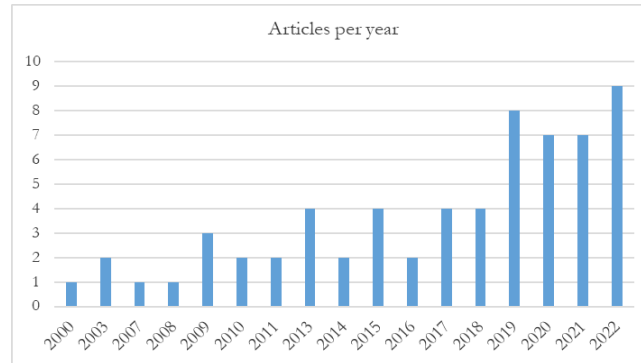


Figure 3. Number of articles per year view

4.3. Geographic View

Analysing the number of articles per geographic region, Europe takes the lead, followed by Asia and the United States. Europe is the area where the regulation of sustainable finance is evolving the most, especially with the publication of the Taxonomies and the SFDR regulation (disclosure regulation on sustainability information in the financial services sector); it is also in Europe where a Sustainable Finance Action Plan has been developed.

In the USA, where regulatory issues are also beginning to be developed, and sustainability is relevant above all from the point of view of asset management, not much academic activity has been developed on ESG criteria in the insurance world.

In Asia, the countries where more articles have been published on the subject of the study are China (5 articles), Taiwan (2), Malaysia (2) and Japan (2).

In less developed areas, there are some articles, especially related to insurance associated with extreme events and the social function of insurance, but they are few in number.

4.4. Authors View

Table 2 shows the authors with 2 or more published articles. Johannsdottir is the top author with 4 published articles.

Author	Number of articles	Author's affiliation	Keywords & Expertise
Johannsdottir, Lara	4	University of Iceland	Sustainability, Corporate social responsibility, SDG, Covid-19 and Climate change
Mills, Evan	2	Lawrence Berkeley National Laboratory	Energy, Green Buildings, Climate Change, Insurance and Lighting
Nobanee, Haitham	2	Abu Dhabi University	Anti Financial Crime, Cooperative Finance, Credit Management, Stock Market, Microstructure and Cash Management
Olafsson, Snjolfur	2	University of Iceland	CSR, Sustainability, Ethics and Governance
Davidsdottir, Brynhildur	2	University of Iceland	Sustainable Development, Systems Modeling, Sustainability Indicators, energy transitions and Climate change
Pestieau, Pierre	2	Université de Liège	Long term care insurance, Social insurance, Tax redistribution, longevity and demography

Table 2. Authors with two or more published articles

Table 3 shows the most influential articles as per citation count. There are 11 articles with more than 20 citations and Mills (2009) is the most cited (74).

Authors	Article title	Source title	Times cited, WoS Core
Mills, Evan	A Global Review of Insurance Industry Responses to Climate Change	Geneva Papers on Risk and Insurance-Issues and Practice	74
Wang, Chan; Nie, Pu-yan; Peng, Da-heng; Li, Zheng-hui	Green insurance subsidy for promoting clean production innovation	Journal of Cleaner Production	70
Lock, Irina; Seele, Peter	Analyzing Sector-Specific CSR Reporting: Social and Environmental Disclosure to Investors in the Chemicals and Banking and Insurance Industry	Corporate Social Responsibility and Environmental Management	62
Herweijer, Celine; Ranger, Nicola; Ward, Robert E. T.	Adaptation to Climate Change: Threats and Opportunities for the Insurance Industry	Geneva Papers on Risk and Insurance-Issues and Practice	53
Casamatta, G; Cremer, H; Pestieau, P	Political sustainability and the design of social insurance	Journal of Public Economics	47
Mueller, Birgit; Quaas, Martin F.; Frank, Karin; Baumgaertner, Stefan	Pitfalls and potential of institutional change: Rain-index insurance and the sustainability of rangeland management	Ecological Economics	35
Beiragh, Ramin Gharizadeh; Alizadeh, Reza; Kaleibari, Saied Shafiei; Cavallaro, Fausto; Zolfani, Sarfaraz Hashemkhani; Bausys, Romualdas; Mardani, Abbas	An integrated Multi-Criteria Decision Making Model for Sustainability Performance Assessment for Insurance Companies	Sustainability	31
Mills, Evan	The insurance and risk management industries: new players in the delivery of energy-efficient and renewable energy products and services	Energy Policy	28
Linnerooth-Bayer, Joanne; Warner, Koko; Bals, Christoph; Hoeppe, Peter; Burton, Ian; Loster, Thomas; Haas, Armin	Insurance, Developing Countries and Climate Change	Geneva Papers on Risk and Insurance-Issues and Practice	27
Dlugolecki, Andrew	Climate change and the insurance sector	Geneva Papers on Risk and Insurance-Issues and Practice	25
Lee, Chen-Ying; Chang, Wei-Chen; Lee, Hsin-Ching	An investigation of the effects of corporate social responsibility on corporate reputation and customer loyalty - evidence from the Taiwan non-life insurance industry	Social Responsibility Journal	20

Table 3. Most influential articles as per citation count

4.5. Journals View

The journals view (according to the Academic Journal Guide 2021), illustrates the transversal nature of the sustainability issue in the insurance industry, although journals linked to risk and environmental issues are the most active.

Table 4 shows the journals with 2 or more articles published and with the AJC classification (4+ means the most relevant category and 1 the lowest, according to the AJC classification).

	Field	Number of articles	AJG 2021
Geneva Papers on Risk and Insurance-Issues and Practices	Finance	8	2
Journal of Cleaner Productions	Sector-Environmental Science	5	2
Zeitschrift fur die Gesante Versicherungswissenschaft	Economics	5	
Ecological Economics	Economics	4	3
Corporate Social Responsibility and Environmental Management	Regional Studies, Planning and Environment	3	1
Journal of Risk and Financial Management	Finance	3	
Global Environmental Change-Human and Policy Dimensions	Regional Studies, Planning and Environment	2	3
Journal of Industrial Integration and Management-Innovations and Entrepreneurship	Management	2	
Environmental Engineering and Management Journal	Sector-Environmental Science	2	

Table 4. Journals with 2 or more articles published and with the AJC classification

4.6. Status of ESG Criteria in the Insurance Industry

The first objective of the study is to explore in which ESG dimensions are focused the insurance industry research in the field of sustainability. So, in the research, a categorization is made to classify the articles according to the ESG criteria on which they are focused.

To set up this classification, firstly, a search by the keywords, that were used to select the articles, was launched; and then a qualitative review was carried out, reading all the summaries and some complete articles. A global ESG category has also been added to assign articles that discuss ESG as a global concept not being focus on specific dimensions (E, S or G).

Code	ESG Dimension	Number of articles
1	E	41
2	S	20
3	G	11
4	Global ESG	12
	TOTAL	84

Table 5. Articles by ESG dimensions

The previous table shows the articles classified according to where the focus is between the different dimensions of the ESG criteria (environmental (E), social (S), governance (G) or on a global ESG criterion (Please note that the same article could be in different dimensions. Some articles focus on several ESG dimensions and therefore are placed in more than one category).

The research shows that the most treated topic is undoubtedly the environmental one (E), due to the impact that climate change has on the risk management perspective. The environmental dimension is especially relevant, as the insurance industry is focus on risk management, and climate change has become a major problem from the risk perspective.

The study highlights some contributions where insurance industry address climate change from an actuarial and a political point of view (Robineau, 2019). There are also some research lines that are exploring how insurers are adapting their business models to climate change reality (they integrate environmental goals into their culture, core business, strategy and structure).

Some articles provide an assessment of the development of the innovative mechanism of environmental insurance in some geographical areas, identifying the main problems of regional development, and suggest a set

of organizational and regulatory innovations for the introduction of the environmental insurance market (Krutova, Kulikovsky & Isaev, 2021).

About the social dimensions within sustainability, the found articles are focused on the most vulnerable geographical areas, where insurance industry is seen as a tool that helps fight against the effects of extreme weather events and the resulting poverty.

The governance dimension, in the ESG framework, deal mainly about management, organizational structures and business models in the insurance industry.

In relation to the global ESG approach, there are twelve articles that focus their research on conceptual and implementation criteria of the global ESG concept as a transversal element of what is considered sustainability in a broad set.

4.7. Integrative Framework of ESG Criteria by Insurance Industry Dimensions

The second objective is to identify in which relevant areas of research in the insurance industry, the ESG criteria are being studied.

A literature review through WoS has been conducted to identify the most relevant research areas in the insurance industry. The outputs can be grouped into the following 8 main areas or topics of research:

a) Risk Management

Academic articles related to this topic explain how insurance companies manage and analyse the risks in all the processes, especially in the underwriting, risk and the pricing ones. According to WoS database, more than 400 articles are directly linked to this topic, and the most cited article is Gordon, Loeb and Sohail (2003) that deals with cyber-risk management from the insurance perspective; and the second one is the Lodree and Taskin (2008) article that analyses different risk management frameworks.

b) Strategy and business model

Strategy is a very broad concept and Porter (1996) defined it as a series of procedures arranged for decision-making and actions aimed at achieving one or several objectives, but focused on what could truly give a differential advantage and not on what would be operating efficiencies.

The strategy concept is widely discussed in the insurance industry academic literature. There are 548 articles in WoS linked to this topic, and that means that it is a relevant line of research. The two most cited articles are Kim, Yom and Kim (2017) and Lillie-Blontum and Hoffman (2005) that treat about health insurance systems; the third most cited article is Di Falco, Adinolfi and Capitanio (2014), which analyses the insurance strategy against climate change.

c) Social impact dimension

The social concept is intrinsic to the insurance activity itself, and it is reflected in the academic world with almost 3.000 articles that connect the social issue with the insurance industry. The most cited article (+ 500 citations) is Hubbard, Skinner and Zeldes (1995) where topics related to administration public systems and insurance systems are analysed to address problems of different segments of the population, especially the most vulnerable. Another article, Moene and Wallersteing (2001), with 355 citations, approaches social insurance as a public administration tool to deal with inequalities and redistribution.

d) Product approach

The scope of products within the insurance industry also has a very significant weight in the academic research with, 643 articles in WoS, that deal with this topic. Spence (1978) is the most cited article (129) and analyses how product differentiation affects in the results of insurance markets.

Other articles with many citations are Epstein (1985) that studies specific categories of products such as liability; and Gaurav, Cole and Tobacman (2011) that focuses on the product development in emerging countries such as India.

e) Regulatory framework

Regulation has always had a very direct impact on the insurance industry, and this importance is shown in the academic world with nearly 800 articles that connect regulation with the insurance industry. The most cited article is Joskow (1973) which explores competitiveness and regulation in the insurance industry; Harrington (2009), has also many citations, and point the future of insurance industry regulation taking into account systemic risks and financial crisis consequences.

f) Customer approach

Customer approach is an analysis that is usually done from different perspectives and gets the interest of the whole industries. The insurance sector is no exception, and in the academic research there are more than 500 articles directly linked to the customer approach. The most cited article is Verhoef and Donkers (2001) that studies customer value applied to the insurance industry. Smith's, Willis and Brooks (2000), is the second most cited, exploring customer retention analytical model.

g) Asset Management

Asset Management is a topic that is widely studied throughout the financial sector. There are more than 4.000 articles that study asset management in different sectors: investment funds, pension plans, banks and insurance companies. Introducing insurance as a topic in the WoS search, 163 articles appear, that specifically connect asset management with the insurance industry. Basak and Shapiro (2001) is the article with the most citations (458) and analyses the relation between risk management and asset value management.

h) Technology

The technology topic linked directly with the insurance industry has been found in more than 300 articles in WoS database. The Gine and Yang (2009) article, with more than 250 citations, investigates the adoption of technology in risk management; and Lee, Cheng and Cheng (2009) article, with almost 200 citations, goes into the use of mobile technology in the insurance sector.

To set up this classification, firstly, a search, using the key dimensions as keywords has been launched, and then, a qualitative review, reading all the abstracts and some complete articles, has been done.

Code	Lines of research	Number of articles
1	Risk management	20
2	Strategy and business model	19
3	Social impact dimension	11
4	Product approach	9
5	Regulatory framework	5
6	Customer approach	3
7	Asset Management	2
8	Techonology	1
	TOTAL	70

Table 6. Articles by insurance industry key dimensions

The table above depicts the number of articles by cluster, where the domain in “Risk management” is the most frequent category, demonstrating a heightened research interest in risk issues, followed by “Strategy”, “Social Impact” and “Insurance Products”; domains as “Regulation”, “Customer approach”, “Asset management” and “Technology” are the least frequent (please note that there are some articles that focus on several research areas of insurance industry and therefore are placed in more than one category).

The third objective is to identify the research gaps in the domain of ESG criteria in the insurance industry. Therefore, to have a complete view to discuss the results and point out the gaps, the study has joined the axis of the insurance industry key dimensions and their focus on the ESG pillar.

A matrix has been built to show the global view joining the ESG criteria and the insurance industry key dimensions.

	Risk management	Social impact	Strategy	Insurance Products	Regulation	Customer approach	Asset management	Technology	Total
E	18	12	9	8	3	1	2	0	53
S	5	8	2	2	1	2	0	1	21
G	1	2	4	0	1	2	0	0	10
Global ESG	2	2	8	0	1	0	0	0	13
Total	26	24	23	10	6	5	2	1	97

Table 7. Global view joining ESG criteria + insurance industry key dimensions

This analysis shows that the environmental dimension (E) is treated in all the insurance key dimensions (except technology), but mostly in the fields of risk management, social impact, strategy, and insurance products and to a lesser extent in regulation, asset management and customer approach (please note that the same article could be in different lines of research. Therefore, total numbers do not match with total numbers in previous tables, because in table 7 there are articles that are categorized in different lines of research, and because of that, they are duplicated).

Risk management is the more treated topic due to the all the correlations linked to climate change, but the study identifies very few articles in asset management, regulatory, customer approach and technology areas (however, these topics are widely treated in the world of practice and in other industries). Although there are eight articles about insurance products into the environmental dimension, they are basically conceptual and there are scarce empirical approaches to analyse how the insurance companies are launching and developing green or sustainable products, and what they mean in comparison with the whole product portfolio.

The social dimension (S) is addressed above all from the social impact and the risk management perspective (in both cases linked mostly to extreme climate events in non-developed regions). There is a gap in the analysis of positive social impact actions implemented by insurance companies, as part of their social approach, within the ESG criteria framework. There is also little academic research in customer approach in significant topics as diversity and vulnerable groups.

The governance pillar (G) in the axis of ESG criteria, is generally underdeveloped. There are some articles about strategy, and a few articles in the field of social and customer approach; but in general, the research presents a gap in studying the governance perspective through the sustainability dimension, in terms for example of retribution schemes and organizational structures.

The global ESG concept is also treated with some articles in the domain of strategy, where it seeks to analyse globally how ESG criteria are managed and implemented from the most corporate sphere of companies. This issue is treated, above all, in conceptual terms, but there are few empirical studies to analyse the ESG criteria implementation in the role model insurance companies and their correlation with economic KPIs.

5. Discussion

The first objective of the study is to analyze where the academic research is focusing when the ESG criteria are studied into the insurance industry.

The results of the literature review show that ESG criteria are not widely analyzed in the academic literature. But in the practitioner world, the main insurance companies have signed the Principles for Insurance Initiatives (PSI), developed by UN Environment Programme's (UNEP), meaning that ESG factors are more and more integrated into conventional financial decision-making and modification of underwriting and financing criteria, including positive and negative criteria aligned with sustainability objectives.

Regarding the results, the environmental dimension (E) is the most studied and is especially relevant, as the insurance industry is focused on risk management, and climate change has become a major problem from the

risk perspective. The social impact dimension would be the second most analyzed one, but with a focus on less developed countries and on social solutions through products linked to climate events. The governance part, dealing with conceptual issues about business models and organizational structures, would be the least developed in the sustainability axis.

There are some topics related to the social and governance dimensions, such as the launch of products and initiatives related to gender's equality and to the most vulnerable groups (aging people, rural areas...) that are treated more and more in the practitioner world, e.g. (Capgemini Institute Research, 2022), but are scarcely reflected in the academic area.

In the second objective, the research is focused on an assessment of the articles including ESG criteria, clustered by the most relevant areas of research. The outputs of this analysis allow concluding that risk management, is the most studied topic. ESG criteria are embedded throughout the whole risk value chain, from the risk appetite framework to the approval process (Hawker, 2007).

This study also shows that articles connect sustainability with customers, investors, society and policymakers. In this sense, research outputs confirm that ESG criteria implementation emanate from the Stakeholder Theory, taking into account the connection between corporate social responsibility and the market economy (Risi, 2020).

When the two analyses are crossed, the results highlight that risk management is been covered in all ESG dimensions, although environmental (E) is the vertical with the major number of articles, due to everything related to climate change (climate change is a major risk in the insurance industry, that affects all risk processes, specially, underwriting, pricing and product management ones).

The second most studied research field is strategy, especially in the environmental dimension and in the global ESG concept, where it is analyzed, basically, from a conceptual perspective, how companies manage and develop the criteria at a corporate level. In the social impact dimension, the most analysed topics are social and risk management, basically in underdeveloped countries (Jegade, Addaney & Mokoena, 2020; Ramakrishnan, Hishan, Shahabuddin & Kanjanapathy, 2016) and from the point of view of how to manage the social impact, caused by extreme weather events, through insurance products with coverage for such events (Fisher, Hellin, Greatrex & Jensen, 2019; Mueller, Quaas, Martin, Frank & Baumgaertner, 2011).

Although there are some articles that deal with how ESG criteria are implemented in the insurance industry, these are mostly conceptual; there are few empirical studies that analyze the implementation of ESG actions in insurance companies, and there is only one that analyses the correlation between business performance and ESG criteria implementation (Stricker et al., 2022).

In the next section, the main insurance dimensions into the ESG framework are discussed.

5.1. Risk Management

Risk management is the most relevant issue in the insurance industry. Results point out that it is treated in all the ESG dimensions, but mainly in the environmental (E) one.

Some economic analyses have been done to quantify the effects of climate change, according to Dlugolecki, (2008), in terms of underwriting, the economic cost of weather losses could reach over 1 trillion USD in a single year by 2040 and greenhouse gas emissions have to drop by 60 per cent by 2050, which means transforming the energy economy.

With a clear focus on the risk management and the insurance industry, climate change poses a great risk to management because an increase in natural disasters will lead to an increase in insurance payments (Sato & Seki, 2010).

All these economic analyses have to be integrated into actuarial, risk and underwriting processes. Robineau (2019) analyzes and reviews the way that insurance takes into account climate change in the pricing and underwriting models; and Braun et al (2019) suggest an asset pricing approach to detect carbon-intensive positions on their balance sheets in order to redirect the major capital flows towards carbon-neutral activities.

A specific derivative of climate risk and risk management in the insurance industry is the impact caused by extreme weather events that increase the intensity and/or frequency of risks. Weather and climate are core business for the insurance industry. Climate change presents a strong case for the need for business, governments and community groups to work together to find sustainable solutions to this critical challenge (Hawker, 2007).

The risk management intersects with the social dimension when the impacts on more vulnerable economies are analyzed, especially in less developed regions (Jegade et al., 2020) and Linnerooth-Bayer, Warner, Bals, Höppe, Burton, Loster et al. (2009).

Beyond the specific focus on climate risk, there are also articles that address risk management from a global ESG perspective where the risk management analyses is conducted through the role of insurance industry in the society (Dahlstrom, Skea & Stahel, 2023) and the ESG implementation from a more strategic perspective (Kraft, 2022).

Even the risk management is the most treated topic; the fields linked to social and governance issues into the sustainability concept are scarcely treated. There are some articles connected to the social dimension, but the most of them link to extraordinary climate events; however, there is a lack of risk management analysis in terms of underwriting or price management seeking solutions to satisfy social needs (for example, coverage linked to the education of vulnerable groups, solutions for the development of disadvantaged areas...)

The study shows that there are few articles from the governance perspective; there are some conceptual articles about risk management into business models, but it is hard to find empirical studies related to how insurance companies are implementing risk management processes, from the sustainability point view, in the culture and organizational structures into the insurance companies.

5.2. Strategy and Business Model from ESG Perspective

ESG strategy refers to stakeholder theory by considering long-term non-financial factors such as environment, society and governance (Junsun, 2021).

Nogueira, Lucena and Nogueira (2018) propose an integrative model to understand the management of ESG and Johannsdottir and McInerney (2018) intend to contribute to the implementation of corporate ESG practices by presenting a framework or blueprint for insurance companies to follow which will enable them to integrate sustainability goals into their culture, core business, strategy and stakeholders relationship.

There is also some quantitative studies that analyze ESG implementation in different insurance companies; e.g. Gharizadeh-Beiragh et al. (2020) has driven a quantitative and qualitative research in 14 insurance companies and Thomae et al (2021) conducted a survey with swiss pension funds and insurances companies to analyze the ESG criteria implementation.

However, there is limited literature about empirical results in how insurance companies are implementing the ESG criteria (actions, measures...) and what would be the correlations between ESG factors and performance. There is only one article that explores the interaction between a set of financial ratios and environmental social governance scores of 107 large, listed US insurance companies for the period 2010-2018 (Brogi, Cappiello, Lagasio & Santoboni, 2022).

5.3. Social Impact Dimension

Business sustainability emanates from stakeholders theory by combining market logic with social welfare logic (Risi, 2020). The current existing literature is mainly based on the impact of insurance in less developed regions of Africa, Asia and some of Latin America. Jegede et al. (2020) defend that insurance is a vital part of a comprehensive set of responses targeted at adapting to future climate change in Africa and Ramakrishnan et al (2016) analyse the insurance role in the flood disaster in India.

In this point, the study identifies a gap and an open research line, in the stream of social solutions linked to key topics in the industry as equality for women, the challenge of population aging and how to influence the community by promoting equal practices and access to education.

5.4. Regulatory Framework

Kraft (2022) analyses the work that the different policymakers and EU (European Union) are doing in regulation to boost the development of ESG criteria in the insurance companies. Moreover, Dropulic and Cular (2019) make an analysis about the level of Corporate Social Responsibility (CSR) reporting for insurance and reinsurance companies in Croatia and its impact on reporting quality Global ESG.

Although the taxonomy and the EU's Sustainable Finance Disclosure Regulation (SFDR) are starting to normalize financial market participant reporting on sustainability matters globally, and it is a key topic in the practitioner world (e.g., Schroders, 2021); this is not being translated in the academic research, as there is not a relevant number of articles about regulation and reporting.

Another gap comes from the lack of empirical studies in relation to the effective implementation of the specific regulation. Therefore, an empirical study could be launched to investigate if the regulatory exercise is leading to a “check the box” approach instead of financial institutions actually living it, reflecting for themselves and understanding what is behind the formal rules.

5.5. Customer Approach

The push towards ESG products must not only come from regulation and internal company policies, but also from greater interest on the part of consumers and society in general as stakeholders.

Mills (2009) says that customers, as stakeholders, are eager to see insurers providing more products and services that respond to “the greening” of the global economy and expanding their efforts to improve disaster resilience and otherwise be proactive about the climate change threat. There are several surveys in the practitioner world e.g. (Guidewire's, 2022; EY Knowledge Analysis, 2022) about this topic, but the research points a gap in empirical studies about preferences and purchasing habits of consumers of insurance products.

5.6. Product Approach

Products, coverage and services related to combating climate change are the most important part of non-life insurance activity in the field of sustainability (Mills, 2009). Stricker et al. (2022) develop a comprehensive roadmap along the insurance value chain for executive management to design their company's sustainability efforts, with special focus also on property and casualty products

The analysis of the literature shows some documents about indexed products to climatic events (Fisher et al., 2019) and (Mueller et al., 2011), and some others about products as social development tools in underdeveloped countries (Jegede et al., 2020) and (He, 2016). However, there is still little literature focused on social coverage in developed countries.

Most of the top insurance companies have signed the PSI developed by UNEP FI and they are moving forward with the green products; there are also some studies in the practitioner world linked to sustainable insurance products, e.g. (Capgemini Instituted Research, 2022; Lloyds, 2022). So, it seems that product development evolution linked to ESG criteria is going further in the practitioner world than in the academic one. Therefore, the study highlights a gap in the academic research stream of what products the companies are launching within the ESG concept and what it is their weight in their portfolios.

5.7. Asset Management & Technology

In relation to the technology domain, in the practitioner world, there is an increasing focus on topics as big data and digitalization and its link with ESG criteria e.g. (PwC, 2021), but, currently, this is not still being translated in an academic research around the insurance industry.

Sustainability is being widely analysed in the asset management industry (investment funds, investment index...) e.g. (Blackrock, 2022; JP Morgan Chase & Co., 2022), but not in the insurance industry vertical.

Therefore, the study points some gaps in the technology and asset management academic domains to analyse what are the effects and the impacts because of ESG criteria implementation in the insurance industry.

6. Conclusions and Future Lines of Research

The insurance industry has an important weight in the global economy and also has a relevant role in the entire process of climate change and the transition towards a low-carbon economy. Additionally, the whole stakeholders boost insurance companies to implement ESG criteria throughout their value chain, especially in the risk management process. Policymakers develop specific regulations to measure, control and implement ESG criteria at a global level; customers and investors are getting more and more interested in sustainability, and because of that, insurance companies apply ESG criteria in product development, investment management and in generating positive social impact on society. Although in the world of practice, the implementation of ESG criteria in the insurance industry is a key element; in the academic world, there is still a lot of room to analyze and investigate.

Risk management is dealt with in all ESG dimensions, and environmental (E) is the dimension with the major number of articles, for everything related to climate change (as mentioned before, climate change is clearly linked to risk management, and this is a core business topic that affects the entire value chain in the insurance industry).

Strategy and business model and product development topics are studied mostly in the environmental dimension and in the global ESG concept, but the analysis is basically done, from a conceptual perspective.

The social dimension (S), linked to corporate social responsibility, is addressed above all from the social impact and the risk management perspective (in both cases linked mostly to extreme climate events in non-developed regions). And the governance pillar (G) in the axis of ESG criteria, is the less developed one (there are some articles about strategy, and a few articles in the field of social and customer approach, but there is no studies in terms of retribution schemes and organizational structures).

6.1. Implications

The article puts forward several implications in different dimensions.

The main contributions for the Academia are:

- Clear picture for teachers and researcher of the current published articles about sustainability and ESG criteria in the insurance industry. Researchers and teachers can find in the paper the whole articles grouped by the ESG perspective and by the key variables of the insurance industry.
- Gap analysis to identify areas with currently little research but with interest to be studied in new research lines.
- Provide a wide range of bibliographic references about insurance sustainability topic.
- Improve the knowledge of published articles on the implementation of ESG criteria in the insurance industry.
- There is a great focus on climate change, but little about social and governance issues. Currently, the major interest is on what is happening in developed countries, but not so much about the impacts in less developed parts of the world. For this reason, this article seeks to provide a global approach to what is being carried out throughout the entire world, and in all the ESG criteria dimensions.

Contributions for policymakers:

- Identify the ESG dimension less investigated but with a key contribution in the insurance industry to allocate funds, develop research and further regulation.
- In the category of the social dimension, some papers focus their analyses on how insurance products are part of public policies to reduce inequalities and minimize the impacts of climatic and catastrophic events, above all in the least developed areas. These analyses have a lot of value from the perspective of government policy management and public-private collaboration, and not only for underdeveloped countries, which is where the studies largely focus, but also for first world countries that are being more and more affected by extreme weather events.

From the World of Practice point of view, the main contributions are:

- Help managers to integrate, from a conceptual point of view, ESG criteria in the different areas, and in the decision-making processes in insurance companies.
- Provide a broader, and a more orderly and structured knowledge of how the implementation of ESG criteria is being studied that help managers and companies around insurance industry to move forward with sustainability strategies.
- From the managerial perspective, sustainability and ESG criteria are relatively new concepts for organizational structures and strategies in insurance companies. Therefore, this article can be very useful so that, the managers had a complete vision of the current lines of research on ESG criteria in the insurance sector, and see how these concepts are treated within the main areas of the industry (risk management, strategy, pricing, underwriting, social impact, product development, social impact, customer approach, legal...).
- From an economic point of view, risk management is the most relevant issue in the insurance industry and has a direct correlation with insurers' income statements. Environmental risks are identified within the ten main risks of the world in the next ten years. This paper provides studies and analysis allowing insurance managers to identify and follow these risks in a more appropriate and rigorous way

In this sense, this article helps managers highlighting some studies about how the environmental issue affects the risk management perspective, and it provides some interesting articles about this topic.

Contribution for the society:

- Sustainability and ESG criteria are topics that have a very important impact on society. This article helps companies, and individuals see the link between sustainability and the insurance sector, from a conceptual perspective. The study contributes to make sustainability more tangible in social impact terms, that means, how insurance products can be used to minimize impacts in vulnerable areas, and also identify some studies about how customer behavior is engaging in ESG criteria in the insurance industry.
- Help society to be more aware of the impacts of climate change and the importance of knowing, assimilating and adopting the SDGs and other material elements of sustainability and ESG criteria.

In summary, findings contribute to the body of literature on sustainable finance providing a new and complete overview about how ESG criteria implementation are approached in the insurance industry, mapping research streams, analyzing the interrelation between the ESG pillar and the insurance traditional dimensions and identifying the current focus and gaps and new research lines in this domain.

6.2. Limitations and Further Research Areas

This article has some limitations. From the methodological point of view, this study only includes published articles in English from Web of Science and Scopus and the search has been made with limited keywords. From the results perspective, the study concludes that the number of papers addressing the insurance sustainability is still scarce, and that there is a gap between the academic world and the practitioner one. This gap presents a very enriching research opportunity that can open up many interesting analysis and studies that will expand academic resources, and it will also help to provide more rigor and consistency in the progress that is taking place in the insurance industry.

Some specific suggestions for further research areas are: empirical analysis in how insurance companies are implementing the ESG criteria and what would be the correlation between ESG factors and performance; research about what social and governance actions, into the ESG criteria, are developed in insurance companies; analyze what products the companies are launching within the ESG concept and what it is their weight in their portfolios; and from the customer perspective, it should be interesting an empirical study about preferences and purchasing habits of insurance products consumers.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

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Intangible Capital, 2024 (www.intangiblecapital.org)



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