



Department of Economics and Finance

Major in Management

Financial Markets

**Taking on New Risks and Difficulties in Global Finance for Long-Term
Sustainability**

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Introduction

In an era of fast globalization and technology advancements, risk management has expanded beyond traditional boundaries, necessitating a multifaceted approach that covers a wide range of economic, environmental, social, and technological concerns. This thesis investigates the dynamic landscape of risk management, combining both traditional and modern approaches to address the numerous hazards that enterprises, governments, and individuals confront today. The primary goal of this study is to trace the evolution of risk management from its fundamental principles to its current function as an essential component of strategic planning and decision-making.

Risk management was formerly limited to avoiding financial losses within insurance frameworks, but it has since broadened to include global challenges such as climate change, sustainability, and the consequences of pandemics like COVID-19. This broader view needs a comprehensive approach that considers not only economic repercussions, but also the interactions of environmental, social, and governance (ESG) aspects.

The thesis is structured to provide a complete assessment of risk management across multiple contexts, divided into 4 chapters:

Chapter 1 provides an overview by tracing the history of risk management, categorizing risk kinds, and examining their consequences in various industries such as banking and economics. It emphasizes risk as a multidimensional term with implications for organizational strategies and operational resilience in addition to financial results. Chapter 2 explores the incorporation of climate change and Environmental, Social, and Governance (ESG) considerations into risk management practices. It claims that modern risk management must go beyond traditional limits to encompass these essential components that affect long-term sustainability and ethical corporate governance. The chapter assesses how ESG elements are increasingly being integrated into strategic decision-making processes, transforming investment landscapes and business policies in response to global sustainability problems.

Chapter 3 examines the global effects of COVID-19 on fiscal and financial stability, emphasizing how the epidemic operated as a double shock, affecting both supply and demand across the global economy. This chapter evaluates the success of various

international measures, including fiscal and monetary policies targeted at stabilizing economies and minimizing global financial shocks.

Finally, Chapter 4 investigates how globalization and technology improvements have created new hazards, necessitating more robust and adaptive risk management frameworks to assure continuity and resilience in global supply chains.

This introduction sets the setting for a detailed examination of the developing nature of risk management, with the goal of providing a better understanding of its strategic importance in today's complicated global context.

1. Navigating Uncertainty: The Evolution and Application of Risk Management

1.1 Foundations and Frameworks of Risk Management

The term 'risk' has become an integral part of modern language, reflecting its importance in many aspects of life, including health, finance, societal concerns, and business operations. The establishment of various institutions can be viewed as humanity's attempt to navigate uncertainty and develop measures protective actions. Hillson (2006) observes that, just as risk is acknowledged as a constant and unavoidable component of all human activities, there is an equal emphasis on managing these risks wherever possible. Pavodani and Tugnoli (2005) identify several factors that have contributed to risk management's current prominence. To remain competitive in an increasingly volatile market, organizations must adopt some level of risk awareness, such as stricter legal and regulatory requirements for sophisticated risk management practices. Furthermore, technological advancements, while improving operational efficiency, have introduced new types of serious threats, as well as increasing the impact and frequency of existing ones. Risk management thus enters the field as a suitable tool for both mitigating negative effects on the organization and identifying potential opportunities.

In finance, risky options are associated with monetary gains or losses, each with specific probabilities, which are evaluated based on their expected outcomes and risk level (Olson and Desheng, 2008). The mean-variance analysis of portfolio risk and management, introduced by Markowitz in 1952, such as standard deviation, beta, and Value at Risk (VaR) (Babcock, 1972, as cited in Olson and Desheng, 2008), captures the conventional view of risk in finance. More broadly, the idea of risk is frequently analyzed through the lenses of both systematic (non-diversifiable) and unsystematic (diversifiable) risks (Gehr 1979). Economic decisions are frequently made in environments characterized by uncertainty and multiple risks. As a result, individuals are normally assumed to be risk-averse, especially when confronted with significant risks (Friedman and Savage, 1948). Risk is broadly divided into two categories in economics: background (uncontrollable) and endogenous (controllable). Risks may be more precisely categorized as follows:

- *Financial and Non-Financial Risks*: Risk can result in outcomes unrelated to financial losses or financial losses itself, according to Vaughan (1997). From this perspective, financial risk is entirely linked to the relationship between an organization or individual and a potentially damaged or lost asset or income. Vaughan delineates three fundamental constituents of financial risk: the entity or organization that is exposed to the risk, the asset or income that is susceptible to depreciation, and the likelihood that induces the potential loss.
- *Dynamic and Static Risks*: As well as internal organizational decisions, this division implies that risks result from shifts in the economic environment, which are impacted by external variables such as the economy, competition, industry dynamics, and consumer behavior (Forestieri, 2003). At first, dynamic risks are perceived as advantageous because they resolve misallocations of resources. However, their impact is widespread, and their predictability is lower in comparison to static risks, which originate from internal factors rather than external ones and are consistent and predictable.
- *Systematic and Diversifiable Risks*: Systematic risks originating from broad macroeconomic factors, such as interest rates, inflation, and general economic trends, are frequently represented by a singular factor known as market risk, according to Vaughan (1997). In the absence of these macroeconomic factors, risks are deemed diversifiable.
- *Pure and Speculative Risks*: Due to the speculative nature of speculative risks—which may result in profit or loss—they are not insurable (Pavodani and Tugnoli, 2005). Speculative risks represent potential gains or losses. Pure risks, on the contrary, merely introduce the potential for loss or the absence of loss; this is illustrated by the ownership of property or assets that are susceptible to damage or complete elimination.
- *Fundamental and Particular Risks*. Fundamental risks, which are characterized by their origins and consequences, arise from natural phenomena, economic, social, and political events that have far-reaching

effects on substantial populations. These risks are considered societal obligations rather than individual ones (Vaughan, 1997). Conversely, specific hazards pertain to individuals and their occurrences and are therefore considered the individual's accountability.

- *Core and Non-Core Risks:* Core risks are internally manageable, non-transferable, and fundamental to the operations of an organization. They have the potential to generate returns or income. On the contrary, operational activities give rise to non-core risks, which may be mitigated via strategic decisions or insurance alternatives.
- *Operational and Strategic Risks:* This distinction underscores the dangers linked to routine activities as opposed to those that necessitate comprehensive, strategic deliberation. Strategic risks necessitate leadership-level management that emphasizes the alignment of policies and procedures, whereas operational risks are handled at a more immediate level and have an impact on daily operations.

As previously said, the term "risk" pervades our everyday vocabulary. Scholars offer numerous interpretations of risk, making it difficult to define. A generally agreed definition of risk is the likelihood of an event happening and its consequent negative effect on organizational objectives and assets (Bernard, Gayraud, Rousseau, 2010, p. 63). This notion can be regarded in three dimensions: probability, threat, and opportunity, each of which influences organizational decision-making and strategic planning (Drennan and McConnell, 2007, 3). Foresight promotes the exploitation of opportunities while also mitigating potential negative outcomes (Drennan and McConnell, 2007, 3). Establishing a delicate balance between innovation and precaution is critical for making political decisions that define "tolerable" risks. Despite the intricacy of risk, certain traits are consistent, as illustrated in the table below.

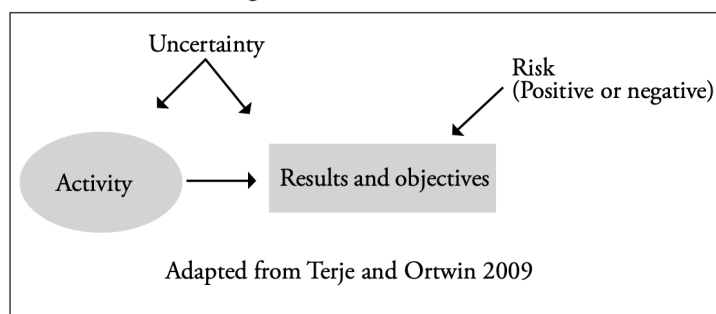
	Definition	Source
Risk	<p>The risk is equal to the expected loss;</p> <p>The risk equal to the expected disutility;</p> <p>Risk is the probability of an unfavorable outcome;</p> <p>Risk is a measure of the likelihood and severity of adverse effects;</p> <p>The risk is the fact that a decision is taken under conditions of knowing probabilities;</p> <p>Risk is the combination of the probability of an event and its consequences;</p> <p>Risk is defined as a set of scenarios, each with a probability and a consequence;</p> <p>Risk is equal to the two-dimensional combination of events/consequences and associated uncertainties (will the events happen? will be the consequences);</p> <p>Risk refers to the uncertainty of results, actions and events;</p> <p>Risk is an uncertain consequence of an event or activity with respect to human value;</p>	<p>Willis, 2007</p> <p>Campbell, 2005</p> <p>Graham et Weiner, 1995</p> <p>Lowrance, 1976</p> <p>Knight, 1921</p> <p>International Organization for Standardization ISO, 2002</p> <p>Kaplan et Garrick, 1981; Kaplan, 1991</p> <p>Aven, 2007</p> <p>Cabinet Office 2002</p> <p>The International Risk Governance Council IRGC, 2005</p>

Source: Spikin, 2013

The idea of risk has grown with the discipline to include a broad spectrum of factors that affect an entity's ability to accomplish its strategic and financial goals. Considering the enlarged scope, two updated definitions have just been released by organizations that offer risk management systems. The definitions are the following:

- Risk is the effect (either positive or negative) of uncertainty on an organization's ability to meet its objectives (ISO, 2018).
- Risk is defined as the probability of events occurring and affecting the achievement of strategy and business objectives (COSO, 2020).

Figure 1. Definition of risk



In response to the evolving concept of risk, both risk classifications and the scope of risk analysis have changed significantly over time, incorporating operational and legal issues as well as complex, global concerns, the vast majority of which are non-monetary in nature. Table 1.1 illustrates the frameworks for risk classification. It is important to recognize that the initial version of this approach failed to account for overlapping risks such as technological or cyber-related dangers, environmental, social, and governance (ESG) hazards, and health problems. These hazards influence a wide range of organizational processes and areas, and they frequently contribute to pre-existing risk categories.

Table 1.1 Typology of risks faced by a financial institution

Risk category	Description
Market risk	Equity risk, interest rate risk (trading risk and gap risk), currency risk, commodity risk
Credit risk	Transaction risk, portfolio concentration; issue risk, issuer risk, counterparty risk
Liquidity risk	Funding liquidity risk, trading liquidity risk
Operational risk	Inadequate systems, management failure, faulty controls, fraud, human errors
Legal and regulatory risk	Customer action, tax changes
Human factor risk	Category of operational risk related to losses that may result from (accidental) human errors

Source: own elaboration based on (Crouhy et al., 2001)

1.2 Applications and Evolution of Risk Strategies

Risk management has just lately gained popularity and acceptance within the academic world, as well as among enterprises and professions. While the concept of risk management has always been embedded in humanity and its institutions, it took several years for the value of an integrated approach to be generally acknowledged, highlighting its benefits for managers and policymakers. Many experts see this trend as the highest point of "the art of risk management," highlighting its progression into a comprehensive system known today as Enterprise Risk Management (ERM), Organizational Risk Management (ORM), or Corporate Risk Management, among other titles. The move to Enterprise Risk Management (ERM) constitutes a significant step forward, encouraging the deployment of proactive and ongoing risk management in accordance with strategic

goals. This methodology emphasizes understanding the potential repercussions of various options, with the goal of increasing rates of achievement and lowering instances of failure by incorporating risk management into all organizational procedures. (2009; Van Staveren). Using this strategy helps risk management to improve the likelihood of success while lowering the possibility of failure and the uncertainty of reaching the main goals of the company (AIRMIC, ALARM, IRM, 2002). In this regard, risk management techniques influence every operational and strategic choice at all organizational levels. Consequently, the main goal of risk management is to predict how every choice could affect the future performance of the company (Hopkin, 2002).

This extensive research of risk management began in the 1990s and was formalized in 2004 by the Committee of Sponsoring Organizations of the Treadway Commission (COSO), a well-known institution in the industry. "Risk management is an organizational process which is executed by the board of directors, general management, management, and all staff members," the business stated. Though the five basic elements—control environment, risk assessment, control activities, information and communication, and monitoring activities—remain same from their inception—the Framework was revised in 2013 with the addition of principles and points of focus to improve its practicality and modern character. This mostly aims to provide reasonable confidence in the accomplishment of the goals of the company (Cordel, 2013, 25). COSO's Enterprise Risk Management—Integrated Framework (the ERM Framework) provides principles-based guidelines for conducting a more strategic, dynamic, and iterative risk assessment, which can assist entities in identifying and assessing risks as a foundation for managing them against the entity's risk tolerances.

Van Staveran (2009) claims that risk management can be broken up into a five-phase cycle. Setting goals, identifying potential risks, assessing those risks, considering various options, and selecting appropriate risk mitigation strategies, followed by the implementation and evaluation phase. The UK standard incorporates ISO-approved definitions of hazards and risk-related language (Figure 1). The first stage in this risk management strategy is to determine an organization's exposure to uncertainty. This necessitates a thorough awareness of the organization, the market it serves, and the larger legal, social, political, and cultural circumstances. It also entails having an extensive

understanding of the organization's strategic and operational objectives, identifying essential success factors, and evaluating dangers and opportunities that may jeopardize the fulfillment of these objectives (UK Standard, 2002).

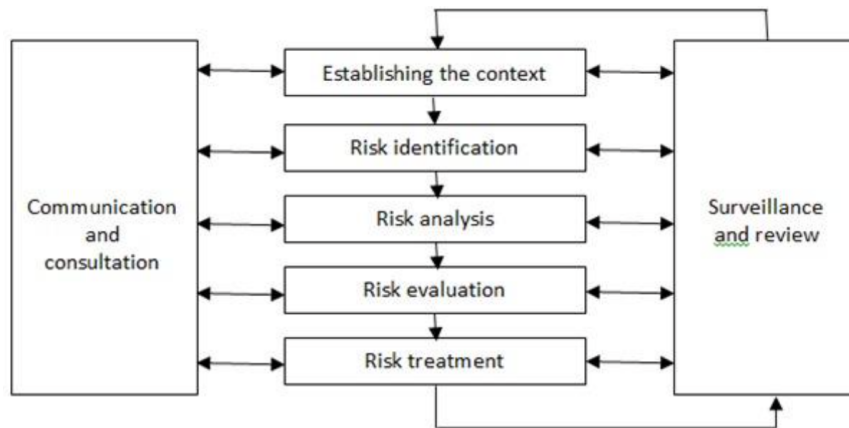


Figure 1: The risk analysis and assessment process (ISO 31000, Risk Management, 2009)

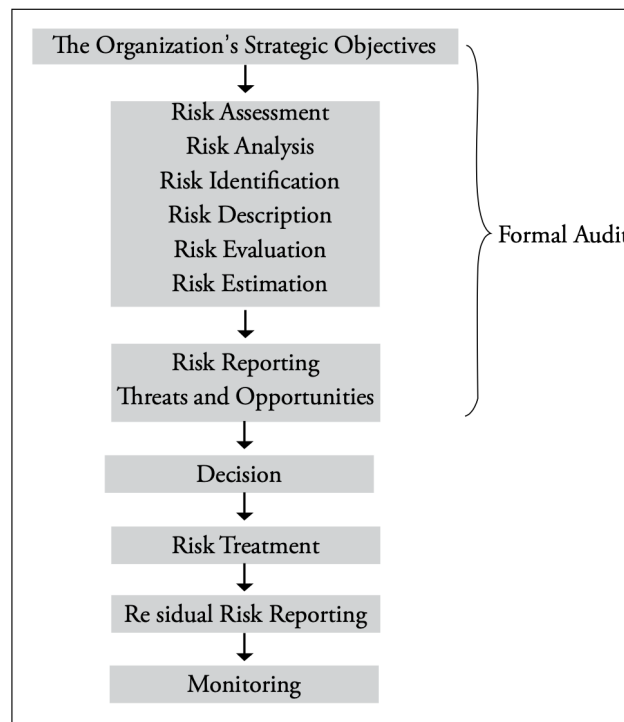
Considering this, the United Kingdom standard from 2002 suggests taking a careful approach to risk identification to guarantee that all major operations inside the organization are identified, and that all hazards connected with those operations are recognized and documented:

- *Strategic*: These comprise, among other things, the long-term objectives of an entity whose influence could be affected by elements including political hazards, capital availability, legislative changes and regulation, reputation, and environmental changes.
- *Operational*: As a business works toward its strategic objectives, these are problems it deals with daily.
- *Financial*: This relates to the skillful management of the financial resources of the company as well as the influence of outside factors including loan availability and foreign exchange rates.

- *Knowledge management* is the competent management and control of the knowledge assets of an organization, including generation, protection, and diffusion of knowledge.
- *Compliance* involves adherence to laws and standards covering health and safety, the environment, trade, consumer rights, data protection, employment practices, and other regulatory demands.

Vaughan (1997) underlined that a key element of risk management is the application of processes meant to reduce the likelihood or financial consequences of losses. Drennan and McConnell (2007) advise that once present and prospective hazards have been found and assessed, it is imperative to determine the best line of action to reduce these hazards and enhance prospects. After thorough consideration of their costs and advantages, this procedure involves choosing a workable solution from a set of possible ones. As such, the process starts with a thorough review of the hazards the company faces. Then a risk management plan is followed, specifically meant to reduce every personal risk.

The risk management process



UK Standard 2002

In his work, Vaughan (1997) delineates two fundamental approaches to risk management in organizations: risk financing and risk control. Risk control strategies aim to mitigate potential hazards through the implementation of methods such as risk avoidance, loss prevention, and control initiatives. Risk avoidance entails inducing a loss of interest in particular activities, recognizing situations in which risk management strategies are incapable of reducing the risk to an economically acceptable degree. In contrast, risk reduction strategies employ loss control and prevention measures with the objective of diminishing both the likelihood and prospective severity of a loss occurrence.

Drennan and McConnell (2007) propose the notion of "tolerating risk" which entails the acknowledgment and maintenance of risk while maintaining continuous vigilance in response to evolving conditions. Additionally, they engage in a discourse regarding "terminating risk," a process that involves entirely eradicating or circumventing a risk through the modification of service provision or the cessation of a problematic service. Achieving "zero risk" is deemed impracticable and impractical due to the uncertain trajectory of forthcoming organizational developments and the limited resources at hand (Habegger, 2008). However, complete risk aversion may not always be advantageous, given that risks may give rise to unacknowledged prospects, and risk-taking can stimulate innovation, economic expansion, and societal advancement. Therefore, organizations are required to develop the capacity to recognize and assess the optimal management strategy for every risk they encounter, forming a rigorous procedure for identifying and assessing risks with a focus on both threats and opportunities.

When including Environmental, Social, and Governance (ESG) elements into modern practices—which will be covered in the next chapter—this sophisticated knowledge of risk management is especially important.

2. Integrating ESG Factors and Climate Change into Modern Risk Management Practices

2.1 ESG integration in Modern Risk Management

The abbreviation ESG refers to the factors used to motivate investments or investment funds: Environment, Social, and Governance. Businesses and institutions are being held accountable for their environmental and societal effect, making ESG behavior an increasingly crucial component of their operations. ESG metrics were created to assess and evaluate a company's performance in these areas, with the goal of enhancing sustainability practices and lowering risk associated with ESG transition, climate change, and sustainability challenges. The Environmental pillar (E) has forcefully entered the scene in this century riding the waves of fears concerning the planet's capacity to sustain the economic growth as thus far known. It certifies whether the funds relate to industries in the portfolio that declare attention on specific fronts such as the greenhouse gas (GHG) emissions, wastewater disposal, pollution, and renewable energy, among others. The Social Pillar (S) is the oldest among the three elements, which examines employment practices, especially the percentage of women employed and promoted managers, human rights, and workforce equality. Finally, the Governance (G) pillar, understood as the management system of the company, focuses on the company's corporate governance structure. Its origins are more recent, in response to the need to clearly define and make transparent the rules disciplining the activities of the corporate administration, the relationship among the government bodies, their independence. It weighs the board diversity (the percentage of women in the board), the CEO duality (that is, the percent of companies in which the roles between CEO and president are separated), as well as the percentages of independent board members and of companies, which can have an impact on its long-term strategy and value. These three pillars have shifted public perception and, by contributing to the synthesis that identifies sustainable thinking, have begun to permeate the culture of businesses. They must be able to convey details regarding the "sustainability" of the business.

The sustainability of companies and investment practices has been given great weight recently. Policymakers, investors, and organizations are actively working to build

sustainable business practices and promote greener growth. Their motivation stems from the desire to create long-term value in an ethical and responsible manner, especially given the increasing complexities and challenges inherent in today's global business landscape. As firms adjust to changing needs, they improve their performance management frameworks to ensure data consistency. Within this paradigm, finance has been identified as a critical enabler of the transition to a greener economy, resulting in an increase in sustainable finance and investments.

2.2 The Implications and Risks of Sustainable Economic Structures

However, the move to a more ecologically friendly and sustainable economic structure comprises inherent dangers. Despite being a fundamental condition for long-term growth, it places pressure on current economic systems and needs changes in finance and investment models, which may involve unknown financial and non-financial risks or raise exposure to well-known financial market concerns. As sustainability reporting becomes more fundamental to corporate operations and evolves quicker than traditional financial reporting, businesses must place a high priority on analyzing risks related to their industry's sustainability concerns. The Sustainability Accounting Standards Board (SASB) recognized five major areas: environmental impact, social capital, employee well-being, company innovation and model, and leadership and governance practices. Companies may need to reconsider their sustainability reporting targets, keep a close watch on how well existing control systems are performing considering altering investor and management expectations, and assess risks that could impede progress toward these goals. If management decides not to examine or overlooks these risks, they are effectively disregarding them without any plan or assessment of whether they are within the organization's acceptable risk boundaries.

Karagozoglu (2021, 2022) defines non-financial risks as "*any novel risks other than the financial risks of market, credit, and liquidity*" caused by ESG, climate change, and geopolitical threats. ESG risks can arise directly from the transition to a more sustainable economic system or from physical risks caused by changing global environmental conditions (i.e., climate risk) and can be quantified by the financial losses caused by a

firm's failure to adhere to such principles. In the financial sector, the incorporation of ESG indicators into the investing process alters asset allocation by reducing the available investment alternatives. On the firm side, financing costs for "brown" projects can be higher, affecting investment profitability. While changes associated with a transition to a lower-carbon economy pose substantial hazards, they also bring significant opportunities for organizations, which differ depending on the region, market, and industry in which they operate. An essential pillar for the sustainability, competitiveness, and innovation of business and the economy, Corporate Social Responsibility is defined by the European Commission (2011) as "the responsibility of enterprises for their impacts on society (...) to integrate social, environmental, ethical, and human rights (...) in close collaboration with their stakeholders".

Many studies focus on the impact of ESG indicators on CSP (Corporate Social Performance) in terms of total risk, systemic (unsystematic) risk, and firm-specific (systemic) risk. Unsystematic risk, which is produced by a firm's unique features, can be quantified using actual and predicted idiosyncratic volatility. Systemic risk, on the other hand, refers to a company's vulnerability to market changes, as evidenced by a stock's return movements that are consistent with the broader market. A firm's Beta, calculated using the standard CAPM model, measures this risk. As a result, corporate social responsibility allows organizations to successfully manage their specific risks. It's thus important for businesses to understand that when incorporating sustainability reporting into every aspect of their operations, including strategic planning and governance, a universal approach may not be suitable. This is because sustainability indicators are often less tangible and more qualitative compared to the quantitative measures used in financial reporting, which are governed by standards like the U.S. Generally Accepted Accounting Principles (GAAP), International Financial Reporting Standards (IFRS), or other country-specific accounting norms. For effective risk assessment, it's a prerequisite for an organization to have clearly defined goals. This clarity allows for the identification and analysis of specific risks. Formulating precise sustainability reporting goals will likely involve careful consideration of legal reporting obligations, industry best practices, and the requirements of both internal and external stakeholders. Companies might benefit from adopting a similar approach to that used in financial reporting, such as setting goals

related to the processing of information, like ensuring completeness, accuracy, validity, and controlled access (CAVR), for sustainability-related information.

The 2004 COSO framework identified risks that are now considered under the umbrella of ESG, but it defined them within a relatively narrow scope by contemporary standards. For instance, environmental risks were characterized as natural environmental factors with the potential to harm infrastructure, disrupt raw material access, or diminish human capital due to weather-related events like earthquakes, fires, floods, or pollution. Social risks were associated with shifts in demographics and societal norms, including issues like child labor, evolving family dynamics, and changes in work-life balance preferences, all of which could impact product demand and consumer behavior. Health and safety risks focused on the well-being of employees within the workplace, covering concerns such as hazardous equipment or work settings, occupational stress, and risks of physical injuries like strains or falls. The PEST (Political, Economic, Sociological, and Technological) analytical framework, traditionally used to evaluate primarily non-operational and non-financial risks, has experienced a notable evolution to include a broader grouping of risk factors. Originally centered on external risks, it has now expanded to cover internal organizational risks too. Over the past few years, the structure has evolved to integrate legal and environmental elements. This evolution has transformed PEST into PESTLE, with Environmental, Social, and Governance (ESG) risks now forming a critical component of this more comprehensive analysis.

Table 1.4 PESTLE risk classification system

Category of risk	Description/examples
Political	Tax policy, employment laws, corruption, trade restrictions and reform, tariffs and political stability
Economic	Economic growth/decline, interest rates, inflation rate, labour costs, working hours, unemployment (local and national), credit availability, cost of living, disposable income of consumers
Social / sociological	Cultural norms and expectations, health consciousness, population growth, age distribution, career attitudes, emphasis on safety, workforce trends
Technological	Technology changes that impact products or services, new technologies, barriers to entry in given markets, production and distribution, level of innovation, cybersecurity
Legal	Changes to legislation that may impact employment, access to materials, quotas, resources, imports/exports, taxation, copy right protection, consumer protection laws, etc.
Environmental and ethical	Separated from the above categories and emphasized ethical and environmental factors, originally mainly of economic or social nature, such as availability of resources, environmental regulations and policies, corporate social responsibility as well as climate change hazards

Source: own elaboration based on Hopkin (2018)

As ESG risks are receiving more attention in risk assessment and management frameworks, they're being viewed as a distinct category, much like how PEST analysis evolved into PESTLE analysis. The impact of ESG risks, whether potential or realized, can be felt both directly and indirectly throughout a business's operations and financial performance. They exert influence through various channels, including regulatory frameworks, technological advancements, market shifts, and the quality and availability of resources, which in turn affect service providers and the institution itself. These risks can alter consumer behavior as well as the immediate performance of the institution and shape its future economic viability. The external impact of ESG risks and the internal secondary effects are intricately linked, often amplifying each other, influencing public perception and trust. Ultimately, the intricate web of these interactions can lead to a decline in the institution's profitability and liquidity.



Fig. 1.1 Identification and materialization of ESG risks in banks. (Source: KPMG (2021), p. 18)

Although ESG concerns are growing increasingly prevalent, they do not outweigh all other risk categories in financial markets. Technological and economic risks, for example, continue to have a significant impact on the long-term profitability of businesses. However, it is important to remember that ESG risks, which operate as cross-cutting variables, exhibit both direct and indirect effects on a wide range of other risk categories, significantly influencing the overall risk environment.

Climate change, meaning alterations in climate patterns, stands out as the most pressing environmental issue of our day, demonstrating the interconnectedness of different risk categories. Its extensive consequences are visible in three distinct areas: physical, transition, and liability issues. Physical risks are natural occurrences whose immediate causes are often beyond human control but have far-reaching economic consequences—disrupting businesses, triggering bankruptcies, reducing the value of municipal bonds, and compounding insurance losses. Such disasters not only generate immediate economic distress, but they also lower long-term GDP by diverting money away from development projects and toward the restoration of lost capacities. To reduce these catastrophic risks, rigorous assessment of prospective losses is essential, as is the development of precise, responsive regulations. Transition risks, on the other hand, occur because of the worldwide shift toward a low-carbon economy, encompassing the financial costs of upgrading current infrastructures or transferring them to greener alternatives. Along with this are liability concerns, which come from the potential legal consequences and fines

associated with noncompliance with environmental legislation. Despite a clearly emerging climate change risk reporting framework supported by several voluntary, accounting, and regulatory standards, climate change lacks the coordination and enforcement required to effectively measure and communicate these risks. This regime has several challenges, including inefficiency due to the dispersion of current norms, limited enforcement, and the inherent ambiguity involved in calculating climate change risks. These issues are not limited to climate-related hazards, but rather reflect the broader environment of financial markets, where prior global financial crises were typically caused by compounded risks such as credit risk, liquidity risk, market risk, and foreign currency risk.

3. The Global Impact of COVID-19 on Fiscal and Financial Stability

3.1 The Immediate Economic Impact of COVID-19

Historically, financial crises have been driven by internal market dynamics, such as the transition from hedged to speculative financing methods, as seen in the 1998 and 2008 crises. Textbooks usually analyze economic shocks as either aggregate demand shocks (investment slumps, export booms) or aggregate supply shocks (oil price fluctuations, productivity changes), stemming mainly from aberrant private sector behavior, or natural disasters. However, the Corona virus crisis was simultaneously an aggregate supply and aggregate demand shock, which disrupted supply chains and altered household and business behavior. Aggregate supply contracted massively, first due to supply chain disruption, then forced business closure, while aggregate demand collapsed due to employment-related income loss, restrictions limiting household consumption, and heightened uncertainty about the future. This caused widespread financial instability and had a negative impact on the economy. The virus's depth, breadth, and speed of spread have resulted in inconceivable loss of life, widespread unemployment, and unprecedented government investment, all of which will result in immense public debt. Unlike most recessions, which affect a single nation or a small group of interconnected economies, COVID-19 had a global impact, causing economies around the world to collapse, calling into question financial systems' prior capacity to manage crises through risk-sharing. This needs a rapid political response around the world, with fiscal packages put together to save their different economies, highlighting the need for a unified regulatory strategy to effectively identify and explain these risks.

In their function as lenders of last resort, the International Monetary Fund (IMF) and the World Bank (WB) help nations with less resources and more liquidity problems so ensuring that the global financial system stays steady. Most of the time, however, they serve as last-resort lenders when crises strike areas. Nevertheless, at the start of the COVID-19 epidemic several countries faced financial losses. The required rises in budget deficits, the greater demand for public sector borrowing, and the more debt vulnerability resulted in these losses. The World Bank (WB) and the International Monetary Fund

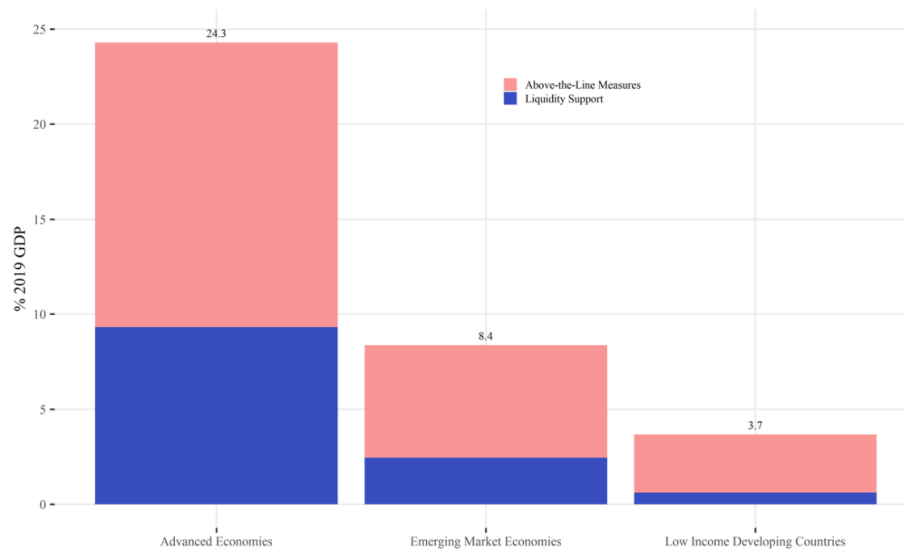
(IMF) have pledged \$1.16 trillion USD to assist developing countries in dealing with the COVID-19 pandemic.

Even in comparison to the Global Financial Crisis, central banks taken together lowered official interest rates to historic lows; many dropped to around zero, and others official interest rates even negative. Beyond that, some central banks engaged in Quantitative Easing (extending the liquidity of the financial system via central bank purchases of government bonds, sometimes known as "money printing"). As the US Federal Reserve, the Bank of England, and the European Central Bank all did, some even extended QE operations to purchase private sector corporate bonds in addition to government bonds. Yet, the significant financial expansion that has taken place has longer term consequences. Particularly, it creates major future macroeconomic concerns including a quick correction to asset prices inflated by very cheap money and the start of greater later goods and services inflation when economic activity accelerates up.

3.2 Long-Term Fiscal Strategies and Global Response

Various fiscal plans were implemented and varied by country, focusing on preventative and palliative health measures, but especially on extensive macroeconomic policy responses in the form of fiscal and monetary support for struggling businesses, and governed by elements such as liquidity, ability to issue additional debt, and access to organizations, like the IMF and World Bank. The major issue for governments before enacting economic measures was to establish a “return to normal”. Rich nations could so respond by organizing more ambitious projects than those of developing low-income nations. Figure 1 shows these disparities.

Figure 1
Fiscal Measures in Response to COVID-19



NOTE: The database summarizes key fiscal measures governments have announced or taken in response to the pandemic starting in January 2020 to September 2021. "Above-the Line" measures include additional spending, tax measures, and deferral of tax payments. "Liquidity Support" generally involves the creation of assets such as equity injections, loans, and asset purchases. This is as a percentage of 2019 GDP.

SOURCE: Database of Fiscal Policy Responses to COVID-19.

The economic reaction to COVID-19 in industrialized countries, particularly in Europe, has focused on monetary policy from central banks and the addition of credit mechanisms. To better understand the recovery dynamics following the COVID-19 pandemic, Dynan et al. (2020) has described two potential exit phases for advanced economies:

- Phase 1: Reducing the Infection Rate - This phase entailed intensive measures to reduce infection rates, which have been implemented since the beginning.
- Phase 2: Maintaining a Low Infection Rate – This phase was characterized by severe uncertainty and focused on maintaining low infection rates to prevent recurrence.

According to the graph above, in 2019, rich economies spent more than 24 percent of their GDP on fiscal measures, while low-income and emerging economies spent around 9 percent and 4 percent, respectively. Two main types of fiscal policies exist, each affecting the public expenditure. The IMF claims that "*above-the-line*" measures have an impact on government debt, fiscal balance, and rising short-term borrowing requirements.

These initiatives ask for increased spending, tax breaks, and postponement of tax payments. On the contrary, "*liquidity support*" strategies need the creation of assets such as loans, stock injections, and asset purchases. Government guarantees fall into this group as well; they frequently have no direct impact on debt or deficits. Still, they hold the government accountable for any losses. Some of the fiscal reforms implemented by the various governments were financed with debt, compromising fiscal sustainability. Countries usually issue debt in either native currency or USD. Issuing debt in USD may allow developing market economies to attract diversified funding sources and eliminate financial frictions (vehicle currency), but it also exposes them to exchange rate risk, which creates uncertainty about the actual costs of servicing and repaying debt.

As previously stated, COVID-19 affected the global economy in three ways: directly hurting production (supply), disrupting supply chains and marketplaces (supply), and exerting a financial impact on enterprises and markets (mostly demand). The supply side experienced the most significant initial effects of COVID-19. Factory closures in China and elsewhere resulted in a contraction in the macroeconomic supply of goods and services, shifting the global economy from point 'a' to point 'b', which is characterized by lower output and higher prices, often known as 'stagflation'. A demand-side response to the contraction, such as Central Banks lowering interest rates to boost demand, would have exacerbated inflation while having little effect on output and employment, especially if the supply curve is price-insensitive in the short term due to difficulties in locating alternative sources of parts and materials. As supply-side shocks forced the closure of industries and workplaces, consumers lowered their spending, pushing demand curves inward, lowering GDP, increasing unemployment, and moderating price increases. Some of the missed demand was temporary, and as the virus subsided, consumers would 'make up' on their spending, particularly on holidays. However, some demand was permanently lost, resulting in a long-term decline in world economic growth.

To lessen the consequences of the COVID-19 issue, major economies all around have adopted a varied set of fiscal and monetary remedies:

- Central banks in Poland, UK, US, Chile, Brazil, and Mexico have implemented interest rate reductions.
- Quantitative Easing Programs launched in Europe, UK, US, Poland, Brazil, and Chile.
- Long-Term Refinancing Operations completed throughout Europe and Poland.
- Additional Liquidity Programs
- Mortgage Holidays: COVID-19 has caused a three-month delay in mortgage payments for citizens
- Temporary regulatory reliefs for capital and operational easements in Europe, Poland, the UK, the US, and Brazil.
- Financial relief measures include state-backed guarantees, public liquidity lines, direct cash injections, and salary subsidies.

With 150 initiatives spread across 84 nations, Gentilini et al. (2020) claim that non-contributory transfers have been the main fiscal policy response to the COVID-19 epidemic. Additional major steps taken to handle the epidemic have been:

- Increased Health Spending: All countries have observed unanticipated rises in spending on COVID-19 therapies and social care because of containment efforts.
- Tax Exemptions and Deferrals: Recognizing the liquidity issues experienced by firms, particularly Small and Medium-sized Enterprise (SMEs), most nations have allowed for tax deferral, with emphasis on social contributions. Notably, this strategy has been critical in maintaining employment.
- Unemployment Insurance Enhancements: In areas where unemployment insurance was previously unavailable, such as the United States and Canada, it has been implemented, with European countries giving more flexibility in its terms.
- Concessional Loans and Public Guarantees: Monetary policy ensures market liquidity, while zero-interest concessional loans and public guarantee schemes make money more accessible. Public guarantee plans are especially useful to large firms, but concessional loans from public banks are more accessible to SMEs without corporate support.

The table below provides a detailed quantitative breakdown of the degree of government reaction and outside financial aid to emerging markets and developing countries in Asia and Latin America. These data are helpful for understanding the financial commitments and techniques employed around the world to mitigate the economic impact of the epidemic.

Table 5
Summary Table

Country	Fiscal Measures (% 2019 GDP)	Debt Matured in 2020-2021 (Billions USD)	Δ Gross Debt (% 2019 GDP)	IMF and WB Rescue Packages (% Total Fiscal Measures)	Δ Total Fiscal Balance (% 2019 GDP)
Argentina	6.8	82.1	-1.7	1.7	-0.6
Bangladesh	2.5	18.5	12.7	17.4	1.3
Bolivia	15.0	0.0	20.7	5.3	-1.6
Brazil	14.2	413.3	-8.0		2.1
Cambodia	4.6		8.9	1.6	-8.4
China	7.9	1547.0	31.9		-1.2
Colombia	8.6	13.0	10.5	61.3	-3.2
Dominican Republic	2.9	3.7	13.4	25.0	-0.9
Ecuador	0.6	1.7	9.7	1062.2	1.3
Honduras	4.4	1.9	11.6	43.6	-3.2
India	10.3	297.1	18.1	0.3	-3.6
Indonesia	9.7	57.9	14.8	0.7	-2.7
Laos	0.1	0.6	32.0	163.1	-2.1
Malaysia	9.0	48.1	13.3		-3.6
Mexico	1.9	229.9	5.5	202.2	-1.5
Mongolia	17.6	0.1	14.2	7.1	-6.8
Myanmar	1.2	7.1	20.3	97.5	-3.5
Nepal			14.6		0.7
Nicaragua	2.2	0.0	13.2	75.6	-1.6
Pakistan	2.6	73.8	3.3	19.3	1.2
Peru	18.6	0.5	7.9	26.8	-1.2
Philippines	4.8	54.6	23.1	3.3	-5.1
Sri Lanka	1.1	18.9	18.4	43.1	-4.4
Thailand	17.4	226.0	13.7		-6.6
Venezuela		0.6	-9.6		6.7
Vietnam	6.7	15.0	3.6		-4.2
Average	7.1	129.6	12.2	26.8	-2.0

SOURCE: IMF's World Economic Outlook (April 2022), IMF's Fiscal Monitor (April 2022), IMF's Database of Fiscal Policy Responses to COVID-19, IMF's COVID-19 Financial Assistance and Debt Service Relief, and WB's COVID-19 Projects. The average for the fourth column excludes Ecuador, Laos, and Mexico.

Data show that countries set aside roughly 7.1 percent of their GDP for these initiatives. This major outlay led to a notable rise in world debt, as the gross debt as a proportion of 2019 GDP rose by 12.2 percentage points between 2019 and 2021. The summary table offers a detailed analysis of these policies, stressing the direct consequences of such fiscal policies on the debt profiles of various nations as well as the support given by significant international financial institutions including the World Bank and the International

Monetary Fund. Not only was this fiscal increase necessary for quick crisis management, but it also significantly helped to solve more general economic issues including the stabilization of emerging market financial situation. The table shows a startling rise in debt; the entire maturing debt amount for 2020 and 2021 exceeds three trillion dollars—a figure more than twice the amount guaranteed by the World Bank and the International Monetary Fund. The statistics emphasizes the difficulties nations have in trying to handle their rising debt load while also addressing the health crisis. Especially, the fiscal reaction differed greatly amongst nations; some, like Laos, had a considerable rise in gross debt up to 32 percent, while others controlled more modest increases. The epidemic caused economic upheavals that profoundly affected the worldwide supply chain network transcending mere fiscal measures. Global specialization added to the complexity and interconnection of contemporary supply chains, therefore posing serious threats to corporate operations all around. The first economic shockwave from the coronavirus epidemic upset important supply chains starting from China, which was quickly followed by broad travel restrictions severely affecting airlines, cruises, and the travel industry generally. Government-mandated lockdowns and physical separation policies caused entertainment venues, restaurants, and leisure facilities to close as well as major interruptions in office-based activity across many service sectors as the virus spread. These limitations have far-reaching consequences and produce negative spillovers into many other sectors. Many supply chain managers responding to these difficulties are now concentrating more closely on improving the resilience and agility of their operations. The epidemic has underlined how vulnerable long-standing supply networks are to world events, therefore stressing the immediate need of implementing more sustainable practice. Apart from pandemics, other global elements like trade policy and climate change have also become major challenges to supply chains since trade barriers have clearly increased and risk events in recent years show. This changing terrain calls for a systematic reaction to protect supply chains against future disturbances, so guaranteeing continuity and sustainability in a fast-changing society.

4. Advanced Strategies for Global Risk Mitigation and Resilient Supply Chains

4.1 Global Supply Chain Vulnerabilities and Risk Mitigation Strategies

As discussed in the previous chapter, the COVID-19 epidemic underlined the need of sustainable solutions and the vulnerability of large supply networks to world disturbances. Globalization has changed the supply chain environment by facilitating trade, communication, and cultural interaction, while at the same time introducing new risks to business operations. From the first sourcing of resources to the last delivery to consumers, the supply chain covers the whole manufacturing and distribution process. Raw resources are turned into completed goods by a network of manufacturers, distributors, suppliers, and stores who then supply end users. The economic turbulence precipitated by the COVID-19 issue originally impacted supply chains originating from China. In addition to the epidemic, supply networks are gravely threatened by climate change and trade policy; in recent years, trade barriers and risk events have increased.

Reducing exposure by means of supplier optimization, process simplification, and general operating footprint reduction will help to properly mitigate these risks. The attainment of these objectives is heavily reliant on technological progress, such as automation, artificial intelligence (AI), and analytics, which fortify supply chains against structural threats. Over the past two decades, there has been a rising emphasis on supply chain optimization to reduce delays and manage demand changes efficiently. Most supply chains, however, have always given cost efficiency top priority over resilience or adaptability, so exposing them to environmental, social, and governance (ESG) issues. As covered in the second chapter, ignoring developing ESG concerns could compromise the cost of products, consumer impression, and brand of a company.

While the growing integration and dependency of global supply chains has greatly enhanced efficiency, it also increases their vulnerability to many disruptions including economic downturns, geopolitical conflicts, and natural disasters. This increased interdependence means that events in one area of the world can quickly affect partners downstream as well as upstream. For example, worker strikes at a manufacturing plant in one nation might cause disruptions to global consumer and merchant activities, hence

amplifying the effect of such disruptions. This interdependence emphasizes the need of implementing efficient risk-reducing policies to manage these possible disturbances. Modern supply chains confront a wide range of threats from both internal and external sources. Natural disasters like earthquakes and hurricanes, as well as geopolitical instability, changes in trade regulations, and cyber-attacks, are all examples of external dangers. Internally, operational inefficiencies, poor quality control, and a lack of knowledge regarding lower-tier suppliers can pose significant risks. In today's corporate environment, the ability to withstand and recover from such interruptions is critical.

4.2 Building Resilience in Supply Chain Management

Resilience in supply chain management entails predicting, preparing for, responding to, and recovering from interruptions while sustaining essential operations. It also necessitates responding to changing conditions. In today's interconnected world, where information flows quickly through global supply chain networks, resilience is becoming increasingly important. Supply chain disruptions can potentially impact every facet of an organization's functioning, extending from distribution and customer support to procurement and production. A proactive strategy to resilience is required, stressing not just disruption prevention but also continuity maintenance and impact reduction for all stakeholders. Businesses are reevaluating their management practices as they acknowledge the strategic importance of supply chain resilience, balancing the needs for flexibility, redundancy, and risk mitigation with continued demands for efficiency and cost savings.

As mentioned previously, organizations that want to properly control these hazards must approach risk management pro-actively, which includes spotting prospective causes of disturbance, evaluating their likely influence, and putting mitigating plans into effect. Using predictive modeling can help to identify possible hazards and create suitable response plans as supply chains get more complicated. Understanding these components completely can help companies create strong supply chain resilience and guarantee operational continuity against disturbances. Resilience of supply chains has evolved into a major focus for risk reduction and preserving operational continuity among the complex and dynamic obstacles of worldwide supply chain interruptions. Implementing numerous

important components strategically helps to create a supply chain strong enough to withstand interruptions and capability of preserving its essential purposes.

Important elements of supply chain resilience include geographic diversification of supply chain nodes and widening of supplier bases. Relying excessively on a single supplier or a restricted location for sourcing supplies could potentially amplify the consequences of disruptions. By spreading their suppliers throughout different countries and places, organizations can reduce their sensitivity to localized disturbances so that a difficulty in one area does not completely cease manufacture or distribution. Moreover, diversification encourages supplier competitiveness, which hopefully might result in lower costs, better quality, and creative output. Through strong supplier collaboration and open communication, companies can create contingency plans that let them react quickly to disruptions—that is, change to other suppliers as needed.

Technological advancements have made real-time information exchange possible with tools like supply chain management systems. From transportation to manufacturing state-of-affairs to inventory, these technologies provide insights into many aspects of the supply chain. In a hyper-connected world, an organization's ability to withstand and recover from shocks depends mostly on geographical and supplier diversification, inventory control, demand forecasting, information sharing and communication strategies—the basic components of supply chain resilience. By means of thoughtful utilization of these elements, businesses could build a robust supply chain that not only reduces the impact of disruptions but also thrives among challenges.

4.3 Adaptive Strategies and Technological Integration for Modern Supply Chains

In today's dynamic and linked global economy, supply chains must be resilient, flexible, and adaptable to efficiently navigate unpredictability and maintain strong networks. Adaptive strategies help organizations respond to altering consumer preferences, handle disruptive occurrences, and adjust to market dynamics. Regular risk assessments and proactive actions are required to reduce potential disruptions and identify significant choke points and nodes in the supply chain network.

Agility is required for swiftly and successfully dealing with unexpected barriers, market volatility, or changes in consumer preferences. Agile supply chains are distinguished by their adaptability, responsiveness, and capacity to pivot quickly. They benefit from streamlined decision-making processes, strong relationships, and sophisticated technological integration. In the event of a breakdown, these networks can instantly adjust production schedules, reroute shipments, or modify sourcing policies. Scenario planning, as a core strategic tool, enables businesses to envisage and prepare for numerous potential disruptions by specifying precise actions that must be followed in such situations.

Furthermore, flexibility and redundancy in supply chains, such as various suppliers, transportation choices, and manufacturing facilities, ensure that alternative sources can compensate for any disruptions. Strategic planning, scenario analysis, and cross-functional teamwork all help to support this adaptability. Technology plays a critical part in today's supply chains, with early warning systems and real-time monitoring reducing interruptions. These systems, which use data from sensors and GPS, allow for speedy responses by recognizing interruptions as they occur.

Additionally, transparency and openness are essential. A complete grasp of product flow, inventory levels, and manufacturing processes is required. Real-time data enables supply chain managers to spot bottlenecks, forecast shortages, and proactively manage possible disruptions. Technological technologies such as IoT devices and supply chain management software provide visibility, while data analytics provide actionable insights for decision making. Effective communication with partners fosters alignment and allows for coordinated responses to unforeseen situations.

The success of these adaptive methods is dependent on cultivating a culture of continual learning and development. Growth-oriented businesses are dedicated to learning from both triumphs and mistakes. Post-event evaluations enable companies to determine what worked well and what may be improved during interruptions. This feedback loop is critical for improving decision-making procedures, policies, and overall strategy. Organizations become more robust over time because of the complete knowledge foundation that emerges from these discoveries. Ongoing training programs guarantee

that personnel are equipped to negotiate the complexity of ever-changing supply networks.

The concept of supply chain resilience has arisen as a strategic imperative in today's interconnected, globalized society, which is marked by rapid technological breakthroughs and considerable obstacles. A variety of regulatory, legislative, and geopolitical concerns have a significant impact on global supply chain resilience. Governments and international organizations, such as the World Trade Organization (WTO) and the International Organization for Standardization (ISO), play critical roles in shaping the frameworks that govern trade and regulatory standards, which are required to maintain supply chain stability and security.

Companies must negotiate diverse geopolitical settings while adhering to existing trade norms to minimize risks and remain operational. This entails devising backup plans such as diversifying sourcing locations and acquiring alternative suppliers to reduce the consequences of tariffs, penalties, and trade wars. Standards such as ISO 28002 assist firms in aligning with globally recognized best practices for risk management and resilience, thereby improving their ability to withstand disruption. Collaboration between governments and industry is critical for developing standards and best practices to improve supply chain resilience. This cooperative strategy allows stakeholders to reduce vulnerabilities and strengthen supply networks. Adaptive strategies are critical to this process because they enable businesses to respond quickly to changing conditions while maintaining operational continuity in the face of uncertainty.

Furthermore, in today's ethically concerned business world, organizations must manage their supply chains responsibly to ensure compliance with labor, environmental, and human rights norms. Effective supply chain transparency strategies help to monitor compliance and ethical behavior, lowering the risk of legal penalties and reputational harm. Despite persistent obstacles such as the rising complexity of global supply chains, data privacy concerns, and the need to balance sustainability with resource restrictions, resilience is a dynamic, ongoing process. Organizations may create long-lasting supply chains by embracing innovation, modifying tactics, and using technological solutions.

Conclusion

The rapid changes brought about by globalization and considerable technological breakthroughs are the subject of this thesis, which explores the important evolution and expanding scope of risk management. It delves at the ways in which risk management has progressed from a limited focus on preventing financial losses within insurance frameworks to a crucial strategic component that is essential to the resilience of businesses and governments. A risk management plan that is both integrated and flexible is required to address the complex nature of the modern risk landscape, which encompasses a wide variety of economic, environmental, social, and technological concerns.

This research, which is broken down into four lengthy chapters, illustrates how traditional and contemporary methods of risk management are gradually incorporated into one another. Initially, it examines the fundamental principles of risk management, explaining how it has evolved into a critical strategic instrument that integrates environmental, social, and governance (ESG) considerations in both commercial and government settings.

The subsequent sections analyze the direct and indirect impacts of worldwide crises, including the ongoing COVID-19 pandemic, on financial stability and fiscal policy. They underscore the paradoxical nature of crises, which can both impede and stimulate strategic innovation. The thesis emphasizes the significance of robust and resilient supply chain systems for the purpose of maintaining continuity and effective risk management in a marketplace that is internationally integrated.

To not only lessen the likelihood of future dangers but also make the most of opportunities for long-term success, the findings call for a proactive and forward-thinking approach to risk management that takes into account environmental, social, and governance (ESG) concerns in addition to technical advancements. This all-encompassing strategy aims to provide both present and future leaders with the knowledge and tools necessary to deal with the complexities of a global environment that is in a state of perpetual change.

Finally, the thesis contributes to the larger conversation on strategic and sustainable risk management by urging businesses and governments to adopt frameworks that are more all-encompassing, flexible, and proactive. If such concepts were put into action, it would ensure that risk management continues to be an essential component of global strategy planning, one that is able to successfully address challenges and make the most of possibilities in the twenty-first century.

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