

Post-Pandemic Trends in Corporate Risk Management: A Bibliometric Review in the Context of the Aviation Industry

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Abstract

The COVID-19 pandemic has profoundly transformed global economic and managerial dynamics, leading to significant changes in corporate risk perceptions and management strategies. The uncertainties experienced during the pandemic highlighted factors such as business continuity, supply chain vulnerabilities, and financial instability, necessitating more comprehensive and flexible enterprise risk management (ERM) approaches. During this period, companies enhanced their capacities especially in occupational health and safety, while striving to integrate traditional risk management strategies with digitalization, sustainability, and crisis scenarios. This study aims to comprehensively examine the current state of the literature on enterprise risk management published after COVID-19 through a bibliometric analysis. Publications from various sectors were evaluated, with particular emphasis on the aviation industry as an illustrative example to highlight transformation processes during the pandemic. In this context, the aviation sector emerges as one of the key themes of the study, strengthening both its originality and scope. By analyzing academic publications released between 2020 and 2025, this study identifies prominent themes and publication trends for the post-pandemic period, thereby aiming to guide future research in the field of enterprise risk management.

1. Introduction

The COVID-19 pandemic has had profound effects on global health, the economy, and social life, exposing significant shortcomings in the management of uncertainty. Businesses were confronted with unforeseen risks such as supply chain disruptions, financial volatility, and operational setbacks, all of which once again emphasized the critical importance of risk management strategies (Oktaysoy, Topçuoğlu, & Kaygın, 2022). It became evident that mechanisms ensuring resilience during crises must be established in advance, and that proactive risk management approaches are essential for corporate sustainability (Küçük Yılmaz & Kafalı, 2017). While many businesses that were unprepared for the pandemic suffered substantial financial losses, firms that effectively implemented enterprise risk management (ERM) were more successful in managing the crisis.

ERM offers a holistic approach that encompasses not only financial risks, but also operational, strategic, and environmental risks. During the COVID-19 period, key components of ERM included business continuity planning, the development of crisis scenarios, and digitalization. Companies had to quickly adapt to remote working systems, enhance digital security measures, and develop alternative

In the post-pandemic period, it has become clear that ERM needs to be more comprehensive and sustainable. Next-generation risk management strategies aim to enhance companies' long-term resilience by addressing not only the financial effects of crises but also their social and environmental dimensions. The experiences gained during the pandemic underscore the need for continuously evolving risk management approaches to ensure businesses are better prepared for future crises (Eurocontrol, 2020). Therefore, companies are increasingly compelled to adopt more data-driven, flexible, and innovative risk management models to strengthen their capabilities in navigating uncertainty.

2. COVID 19 and Global Impact

Initially emerging in Wuhan, China, and rapidly spreading worldwide, COVID-19 was declared a Public Health Emergency of International Concern by the World Health Organization (WHO) on January 30, 2020, and later classified as a pandemic on March 11, 2020. This process profoundly affected numerous industries—especially the air transport sector—triggering fundamental changes in economic and operational dynamics (Zhuang, 2020).

The air transport sector, by facilitating rapid travel and enabling the intercontinental movement of passengers and cargo, contributed significantly to the global spread of COVID-19 (Akça, 2020). Airports function not only as transfer hubs between air and ground transportation, but also as centers of life, commerce, and trade. This role increases regional human mobility and contact density, thereby influencing the dynamics of viral transmission (Kasarda, 2019).

One of the primary subjects addressed in this study is the impact of the COVID-19 pandemic on the air transport industry. The measures implemented during the pandemic, along with government policies and economic factors, have initiated structural transformations in the sector and laid the groundwork for long-term changes.

During health crises, countries develop national aviation strategies and facilitation programs to regulate aviation activities. Guided by WHO forecasts, recommendations, and advisories, states also hold the authority to restrict or completely suspend flights to protect public health. During this period, organizations such as the International Civil Aviation Organization (ICAO), International Air Transport Association (IATA), Airports Council International (ACI), European Aviation Crisis Coordination Cell (EACCC), European Union Aviation Safety Agency (EASA), Centers for Disease Control and Prevention (CDC), and the Federal Aviation Administration (FAA) played key roles in facilitating ongoing information sharing, coordination, and cooperation both internally and among member states (CAAC, 2025).

In the context of civil aviation, the Collaborative Arrangement for the Prevention and Management of Public Health Events in Civil Aviation (CAPSCA) works to prevent the spread of pandemics and protect global public health (Eurocontrol, 2020). International aviation authorities such as IATA and ICAO also publish up-to-date datasets monitoring national regulations and restrictions related to COVID-19 in the aviation sector (Akça, 2020).

Various public health regulations were implemented within aviation activities during the COVID-19 period. Procedures were established to ensure the safety of passengers and flight crews, accompanied by specific operational instructions. Detailed protocols were developed covering aircraft disinfection and the handling of potentially high-risk passengers (Akça, 2020). Airport operators conducted extensive disinfection of terminals and operational areas to protect passengers, flight crews, and other personnel (CAAC, 2025). Measures included thermal screening of passengers, use of protective masks and gloves by staff, routing aircraft carrying suspected or confirmed cases to designated areas, continuous ventilation of terminals, and enhanced hygiene protocols. Additionally, protocols for security and healthcare personnel were comprehensively structured (EASA, 2020).

In Türkiye, the Directorate General of Civil Aviation issued a Flight Operations Safety Bulletin on March 24, 2020, concerning COVID-19. This bulletin aimed to protect public health, minimize transmission risk, and safeguard the health of aviation personnel, offering a set of regulations, recommendations, and guidelines. The bulletin applied to all air transport operators, terminal operators, ground handling service providers, and representatives, supervisors, and management units, explaining in detail the procedures necessary for maintaining aviation activities during the COVID-19 pandemic. These procedures were prepared based

on the guidance of WHO, the Ministry of Health, the Public Health Directorate, ICAO, and IATA (SHGM, 2022).

At the beginning of 2020, COVID-19 posed a significant threat to the air transportation industry. In the following months, this threat escalated into a prolonged and severe crisis (Organization, 2020). Government-imposed restrictions and lockdowns significantly reduced the demand for air travel.

In this context, thermal cameras were used in airports to assess the health conditions of incoming passengers. Those with elevated body temperatures were evaluated by medical personnel, and, in suspected cases, entry into the country was restricted or denied. In some countries, travelers were required to carry health certificates confirming they were not infected with COVID-19 (Akça, 2020).

The civil aviation sector, in addition to its cultural benefits, is one of the critical transportation infrastructures that supports the global economy. Although the foundations of the aviation sector began to be laid in the early 20th century with the first use of aircraft for military purposes, the sector could not develop rapidly due to technological limitations and a lack of demand (Ito & Darin, L.; 2005). Therefore, global crises of the time, such as the influenza pandemic and the Great Depression, did not have a significant impact on the aviation sector. However, during World War II, the strategic importance of air transport was recognized, and since then, the sector has entered a continuous development process. Despite this, some events have hindered or reversed the development of the sector. For example, global economic shocks such as the 1973 Oil Crisis, the Gulf War, and the Asian Economic Crisis significantly affected the aviation industry. More recently, the September 11 attacks are recorded as one of the most important global crises with a direct impact on the aviation sector (Hopancı, Akdeniz, & Şahin, 2021).

In March 2020, as a result of the restrictions implemented, there was a significant decline in air traffic in our country, and this brought the aviation sector to the brink of a standstill. The decrease in passenger numbers naturally reflected in flight data as well (SHGM, 2022).

Figure 1 shows the number of passengers and aircraft traffic using airlines in Türkiye between 2015 and 2025. With the onset of the COVID-19 pandemic, countries implemented various protective measures. Due to its global structure, air transport is one of the sectors where the most intensive procedures were applied. The year 2020, when the pandemic began, was the most critical period in terms of the number of passengers using airlines and air traffic. During this period, air transport experienced the most critical phase in its history with the introduction of travel bans. In the following years, as normalization steps were taken, these figures started to show an upward trend (Pegasus, 3rd Quarter Investor Presentation, 2020).

With air transport reaching the brink of a standstill, airline companies also had to face significant losses. Airlines are organizations that primarily aim for profit by providing passenger, cargo, and mail transport services with aircraft, marketing these services, and selling them (Küçük Yılmaz, Air Transport, 2016). The challenging conditions caused by the pandemic and the decline in demand for the aviation sector directly affected airline companies. With the decrease in flights, many airlines around the world could not operate their aircraft, and these aircraft were left grounded. In Europe, in particular, more than 6,000 aircraft were out of operation in April and May (EUROCONTROL, 2020). This situation created a significant economic blow to airline companies,

leading to serious challenges, especially in terms of personnel costs and financial balances (Hopancı, Akdeniz, & Şahin, 2021).

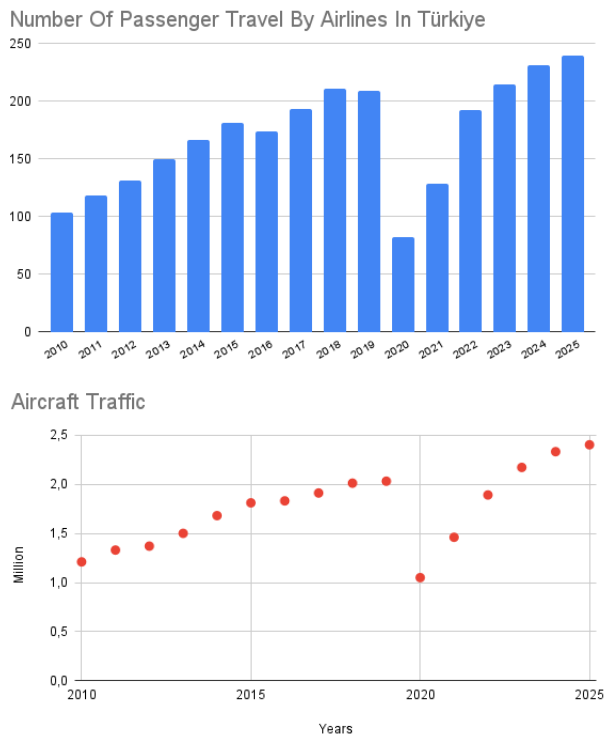


Figure 1. DHMI (2023). Air Traffic Expectations.

The grounding of airline aircraft without being operational added an extra cost item, which was an additional burden for airlines already struggling with economic difficulties. In addition to the decline in passenger transport, the increased need for international medical material shipments directed airlines towards cargo and freight transportation. As a result, some airlines experienced growth in the cargo market during the pandemic (EUROCONTROL, Aviation Intelligence Portal, 2020).

Some airlines in our country have adopted different measures to maintain their existing positions. In this context, they have taken various measures such as optimizing personnel costs by benefiting from the short-term work allowance provided by the government, ensuring that staff transition to remote work systems to save on fixed costs, reducing expense budgets, postponing non-critical investments and projects, and revising aircraft maintenance schedules according to the current usage plans (Pegasus, 2020). The unpaid leave policy applied under the short-term work allowance reflected a significant reduction in personnel costs (Pegasus, 3rd Quarter Investor Presentation, 2020).

Airport operators have also been affected by this process. Airports are complex facilities designed to accommodate the landing and takeoff of aircraft, as well as to meet the maintenance and other operational requirements of these vehicles, and to facilitate the transfer of passengers and cargo (Durmaz, 2018). In Türkiye, airports are operated both publicly by the General Directorate of State Airports Authority (DHMI) and by the private sector. Airports play a crucial role in economic development by serving as critical intermediate stations for cargo and passenger transport, and by hosting airline companies, thereby contributing significantly to the economic development of cities, regions, and countries

(DHMI, 2022). Airport operators are supported by two types of economic resources: aviation revenues (fees collected from airlines, ground services fees, etc.) and non-aviation revenues (real estate rental income, parking revenues, etc.) (Hopancı, Akdeniz, & Şahin, 2021).

During the pandemic, airports not only had to endure economic difficulties due to the above-mentioned reasons, but some had to close runways and taxiways to accommodate grounded aircraft. Some airports were temporarily closed for use (ACI, 2020).

As can be understood from the information provided above, the COVID-19 pandemic has caused mostly negative impacts on every stakeholder within the aviation sector. However, for some areas, particularly in cargo transportation, it had a positive effect. Moreover, it has allowed for the emergence of new areas and a more in-depth examination of existing ones.

3. Corporate Risk Management Perspective and its Importance

In traditional societies, belief and the concept of fate played a dominant role in determining individuals' actions, and the term "risk" was associated with "bravery and heroism." However, in modern times, the concept of risk began to come to the forefront, especially after the 1970s. During these periods, the term risk was used in various academic fields such as labor economics, social psychology, medicine, finance, law, business life, ecology, etc. (COSO, 2017). From the 1980s to the late 1990s, international financial markets underwent a major transformation, and the emergence of increasingly complex and evolving transactions led to increased uncertainty in the markets. Greater uncertainty means greater risk, and as differences in the fields in which firms operate and the varying needs of sectors were added to the equation, diversity in addressing financial needs became inevitable (Koç & Çelik, 2017).

By the late 1990s, it was observed that the number of risks organizations needed to manage had increased, and over time, the scope of risk management continued to expand. This expansion of the scope of risk was a primary factor in the emergence of risk management. By the early 2000s, risk management was conceptualized as corporate risk management, becoming a tool used by all organizations to manage risk. Thus, it can be said that during this period, the scope of risk reached its broadest form. Indeed, in addition to financial and loss risks, risks such as strategic, managerial, reputational, and operational risks were also included in the scope (Arslan, 2008).

All companies investing in markets were initially forced to accept certain risks to achieve profitability. However, companies prefer corporate risk management as a method for measuring the alignment between the cost of their investments and the returns on the risks they assume. This is because corporate risk management provides a process that enables a broad understanding of the relationship between risk and its returns, the interaction of various risk sources, and the probability and impact of these sources (Küçük Yılmaz, 2017).

Corporate risk management is a systematic approach conducted to identify, measure, prioritize, control, manage, and monitor risks across the organization in alignment with corporate goals. Therefore, risks must be managed considering the organization's risk appetite. From this perspective, corporate risk management ensures a reasonable level of

assurance in achieving goals related to strategy, operations, reporting, and compliance (Arifler & Haşit, 2024).

Recent studies have shown that organizations are eager to incorporate corporate risk management practices into their corporate priorities. Furthermore, while in previous years, risk management consisted mainly of insurance operations such as fixed assets and liabilities in government agencies and businesses with a classical structure, it has been observed that over time, many organizations have turned their focus toward other types of risks, such as operational and strategic risks, and have actively started analyzing and managing them (Küçük Yılmaz, 2017).

The needs for corporate risk management in an organization and the benefits that properly implemented practices provide to the business can be summarized as follows: First, risk management, which significantly ensures the continuity of the organization's operations, keeps the probability and impact of potential losses below the critical threshold that threatens the continuation of operations. At the same time, it plays an important role in ensuring that business operations continue with minimal delays after a loss (Ganishti, Wennadi, & Santoso, 2025).

A well-established risk management system can significantly reduce both the quantitative and qualitative risks a business may face. In this way, business managers can focus their attention and energy on the organization's priority problems rather than solving immediate issues, providing a clearer outlook for the future (Tanrıverdi & Küçük Yılmaz, A., 2018).

Through corporate risk management, the effects of potential losses in businesses are kept under control, reducing costs and helping increase business profits. By taking much lower-cost measures against potential losses that can lead to significant losses for the business, the effects on operating costs can be minimized.

Risk management helps the business reduce any possible decreases in its revenues or cash flows to acceptable levels. In other words, risk management ensures that the losses caused by unwanted and unexpected risks in the annual profits or revenues of the business are kept at specific levels, enabling long-term planning for the business. In this way, the business's income level becomes stable (Ganishti, Wennadi, & Santoso, 2025).

Effective risk management plays a significant role in the stable growth of businesses. Without it, businesses will be significantly affected by risks and experience substantial deviations from their stable growth and in achieving corporate goals.

One of the important purposes of corporate risk management is to minimize the harm that may come to employees, commercial suppliers, customers, and other stakeholders. In other words, it aims to ensure the creation of a positive image of the business in the public eye. Thus, resources that would otherwise be spent on other goals, under the awareness of social responsibility, can be allocated to risk management activities.

Corporate risk management is an important tool for ensuring compliance with legal and administrative regulations. Businesses are subject to numerous legal regulations depending on the sectors in which they operate. Organizations that violate these regulations must avoid risks that could jeopardize their legal existence. Therefore, top management in organizations must have an infrastructure that allows them to control their activities in this area at the desired level through

an effective risk management system (Fan, Wu, & Yang, 2025).

The requirements for risk management change daily based on the organization's characteristics, structure, and the sector in which it operates. In today's globalized world, business executives are reluctant to take positions in senior management due to the increasing risks and responsibilities they face. The reason for this is that, while risk management is the responsibility of department managers in each business unit, the monitoring task in a corporate organization rests with the organization's top management. The managers of various business units within the organization are responsible for identifying and measuring existing and potential risks based on their activities and reporting them to the board of directors. In this way, they are tasked with reflecting the organization's financial outcomes, in line with the institution's strategic plans, to their stakeholders in terms of transparency and accountability.

4. Materials and Methods

The COVID-19 pandemic has fundamentally changed businesses' risk perception and corporate risk management approaches at a global level. Since the onset of the pandemic, the uncertainty environment has deeply affected many sectors, demonstrating that risk management should be addressed within a holistic framework that includes not only financial sustainability but also operational resilience. In this context, corporate risk management has become a critical factor in enhancing companies' resilience to crises during and after the pandemic.

This study aims to examine academic publications in the field of corporate risk management post-COVID-19 using bibliometric analysis to reveal the current state of the literature. A comprehensive study addressing the relationship between COVID-19 and corporate risk management through bibliometric analysis has not been found in the existing literature. In this regard, the study aims to analyze academic works published between 2020 and 2025 to identify post-pandemic publication trends, emerging themes, and research gaps. The findings are thought to provide direction for future studies in the field of corporate risk management, contributing to making businesses more resilient to crises.

In this study, the data collection tool used is Google Scholar, a search engine that provides access to a wide range of academic publications, including articles published in peer-reviewed journals, conference proceedings, books, and other scientific sources. The works analyzed in this study were examined using bibliometric analysis, a qualitative research method with a multidimensional perspective. The concept of bibliometrics was introduced by Pritchard in 1969. Pritchard's need to redefine the concept of statistical bibliography allowed for the emergence of a new qualitative research method. Pritchard defines bibliometrics as a mathematical and statistical method used to determine the characteristics of books and other sources (Lawani, 1981). Bibliometric analysis is considered a fundamental interdisciplinary tool that allows for a broader perspective on enhancing the development level of scientific research (Samiee & Chabowski, 2012). Huang and others stated that bibliometric data is an effective method for identifying and evaluating countries, universities, research institutions, journals, specific research topics, and the characteristics of various disciplines (Huang, Ya-Li; Ho, Yuh-Shan; Chuang, Kun-Yang, 2006). Citation indexes are used as

data sources in bibliometric research (Savrun & Mutlu, 2019). This study is limited to works published in the Google Scholar database.

The findings obtained in this study provide significant insights into understanding academic trends in corporate risk management after the pandemic and offer a framework for future research.

5. Result and Discussion

In this study, academic publications in the field of corporate risk management after the COVID-19 pandemic were examined using bibliometric analysis. The study analyzed works published between 2020 and 2025, attempting to determine academic trends in this field during the post-pandemic period.

The study includes sources published in both Turkish and foreign languages, without any language restrictions. Thus, the academic contributions on the subject in the global literature were evaluated from a comprehensive perspective. Furthermore, the types of studies examined were limited to articles. In this context, the study aimed to determine which types of works are most prominent in the academic literature and which aspects of the subject have been addressed more frequently.

In the study, data were searched using keywords. Searches were conducted with the following keywords: “COVID-19” and “Corporate Risk Management,” “Enterprise Risk Management” and “Pandemic,” “Post pandemic” and “Risk Management,” and “Business Continuity” and “COVID-19.” The data obtained were tabulated using Google Forms, and the findings are presented below.

The findings provide significant insights into understanding academic trends in corporate risk management after the pandemic and offer a framework for future research.

An examination using the keyword “COVID-19” and “Corporate Risk Management” resulted in a total of 159 articles published between 2020 and 2025. The distribution of article numbers by year is provided in Figure 2 below.

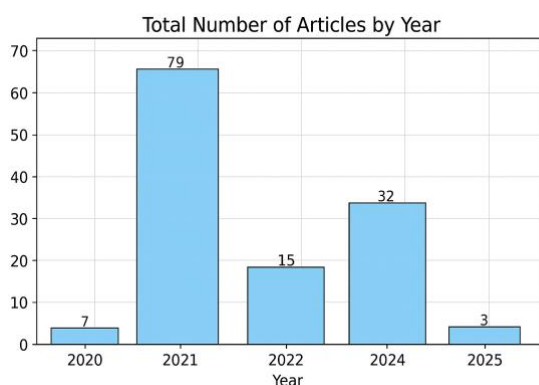


Figure 2. Data from the Analysis Covering the Years 2020 to 2025 Using the Keywords “COVID-19” and “Corporate Risk Management”

An examination using the keyword “Enterprise Risk Management” and “Pandemic” resulted in a total of 707 articles published between 2020 and 2025. The distribution of article numbers by year is provided in Figure 3 below.

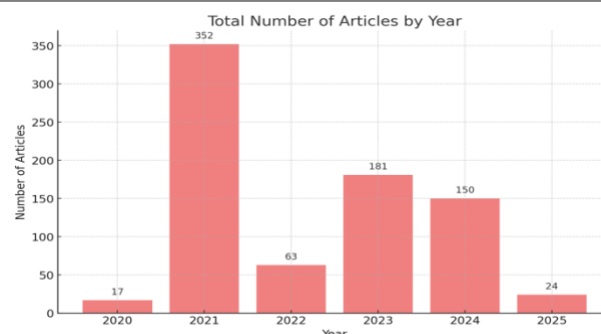


Figure 3. Data from the Review Conducted Between 2020 and 2025 Using the Keywords “Enterprise Risk Management” and “Pandemic”

An examination using the keyword “Post pandemic” and “Risk Management” resulted in a total of 1,649 articles published between 2020 and 2025. The distribution of article numbers by year is provided in Figure 4 below.

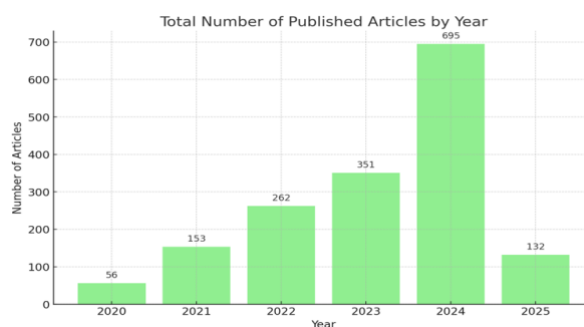


Figure 4. Data from the Analysis Covering the Years 2020 to 2025 Using the Keywords “Post-Pandemic” and “Risk Management”

An examination using the keyword “Business Continuity” and “COVID-19” resulted in a total of 2,945 articles published between 2020 and 2025. The distribution of article numbers by year is provided in Figure 5 below.

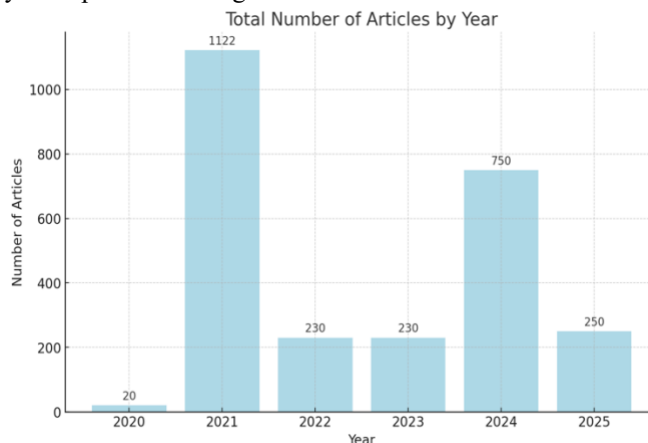


Figure 5. Data from the Analysis Covering the Years 2020 to 2025 Using the Keywords “Business Continuity” and “COVID-19”

In the study, the change in the number of publications over the years is first shown. In the next phase, an evaluation is made on an annual basis. For each year, the subject headings of the current publication trends are examined, and a percentage ratio is provided. Each figure will be explained in detail below.

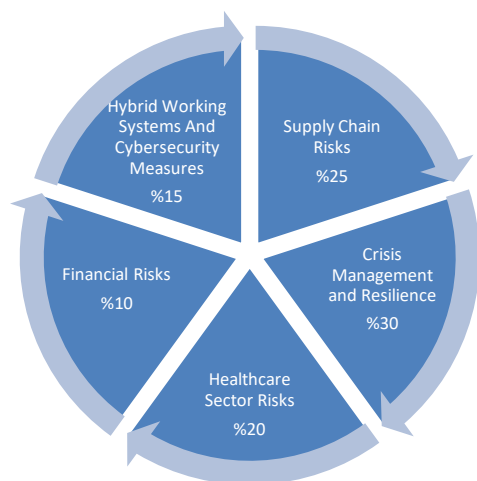


Figure 6. Corporate Risk Management Trend for 2020.

The year 2020 was marked by efforts to manage uncertainties and develop rapid response mechanisms to sudden crises for companies (Pegasus, Q3 Investor Presentation, 2020). In this context, a total of 207 articles related to corporate risk management and COVID-19 were identified for the year 2020. Of these, 62 focused on crisis management and business continuity, 52 on supply chain-related risks, 41 on risks faced by the healthcare sector, 31 on hybrid working systems and cybersecurity measures, and 21 on financial risks.

During the COVID-19 period, the primary priority for businesses was to maintain ongoing operations and remain resilient against the crisis. Companies revised their emergency plans during this time, highlighting the growing importance of flexibility and rapid adaptation. For example, many airports accelerated their digital transformation initiatives to cope with new health regulations and passenger flow restrictions (Airport Council International, 2021). Legal travel restrictions caused major disruptions in global supply chains, especially impacting aircraft manufacturers such as Boeing, which faced significant delays and challenges in their supply networks (Global Supply Chain Review, 2020).

In addition, cybersecurity risks increased as hybrid work models became widespread, requiring companies to implement new security measures (Cybersecurity Review, 2021). The healthcare sector drew attention to capacity management, patient care, vaccine development, and medical equipment supply (WHO, 2020). The International Air Transport Association (IATA) also reported that airlines had to rapidly adapt their operational and risk management strategies in response to these unprecedented challenges (IATA, 2020).

Overall, these examples from the aviation industry highlight the importance of flexibility, resilience, and comprehensive risk management during the pandemic period.

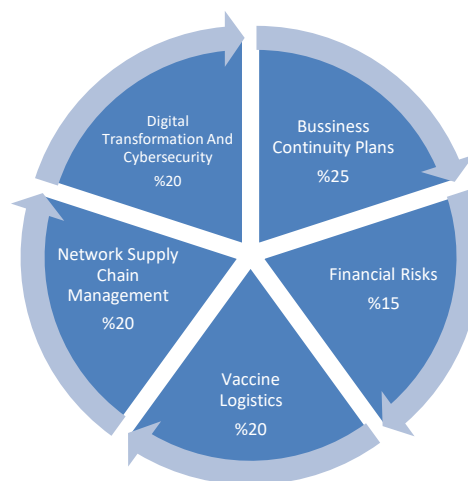


Figure 7. Corporate Risk Management Trend for 2021.

With the imposition of long-term lockdowns, digital transformation processes accelerated and remote working models emerged. This brought about increased concerns regarding data security and cyberattack risks, necessitating the implementation of new cybersecurity measures. Financial imbalances occurred in many businesses due to COVID-19, and industries such as aviation experienced significant revenue losses. For example, major airlines like Lufthansa and British Airways struggled with reduced passenger volumes, while Singapore Changi Airport implemented biometric check-in solutions as part of its digital transformation (Changi Airport Group, 2021). The logistics of vaccine distribution also posed significant challenges; companies such as DHL, Emirates SkyCargo, and Qatar Airways played a critical role in transporting COVID-19 vaccines globally (IATA, 2021). In Turkey, Turkish Airlines gradually resumed operations and achieved record volumes in air cargo, becoming a vital player in pandemic logistics (Turkish Airlines, 2021). Istanbul Airport was also recognized for its rapid adaptation to digitalization and hygiene protocols. According to DHMİ data, the number of domestic passengers increased in 2021, indicating a recovery in local aviation activity (DHMİ, 2022).

Consequently, there was a notable increase in pandemic-related compensation claims in the insurance sector, and the scope of insurance policies became a topic of debate. In 2021, the uncertainties that caused a shock effect in 2020 began to transform into more systematically managed risk factors, and companies were observed to shift their focus toward developing long-term solutions. In this context, a total of 1,764 articles related to corporate risk management and COVID-19 were published in 2021. Among them, 441 articles focused on plans aimed at ensuring business continuity. Topics such as digital transformation, supply chain research, and vaccine logistics were also studied with similar intensity. Additionally, 264 articles focused on insurance and financial risks.

The year 2021 marked a period in which, beyond simply reacting to emerging crises, there was a shift toward proactive risk management strategies in response to the ongoing pandemic. Following the uncertainties experienced by businesses in 2020, there was an increased emphasis on crisis scenarios, remote working policies, and investments aimed at enhancing operational agility. During this time, digitalization accelerated significantly, and remote working became a permanent feature across many industries. It is known that businesses invested in data security during this period. The distribution of COVID-19 vaccines presented a major

challenge for global logistics. Many sectors, particularly the healthcare industry, had to plan their business processes in accordance with vaccine supply logistics.

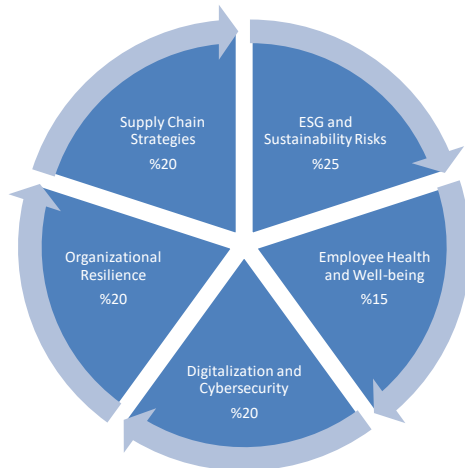


Figure 8. Corporate Risk Management Trend for 2022.

The year 2022 stands out as a period during which the post-pandemic recovery accelerated, while global uncertainties persisted. In this context, a total of 764 articles related to corporate risk management and COVID-19 were published in 2022. Among these, 191 articles focused on ESG (Environmental, Social, and Governance) and sustainability-related risks. Topics such as digitalization and data security, supply chain strategies, and corporate resilience were explored in similar proportions, each appearing in approximately 150 to 153 publications. Furthermore, 115 articles focused on employee health and well-being.

During the COVID-19 period, the primary priority for businesses was to maintain ongoing operations and remain resilient against the crisis. Companies revised their emergency plans during this time, highlighting the growing importance of flexibility and rapid adaptation. Travel restrictions imposed through legal regulations led to major disruptions in global supply chains. In the healthcare sector, attention was drawn to issues such as capacity management, patient care conditions, vaccine development processes, and the supply of medical equipment.

For example, in the aviation industry, airlines like Turkish Airlines adapted quickly by revising health protocols and adjusting flight schedules to maintain operations despite global travel bans and restrictions (Turkish Airlines, 2021). Similarly, global carriers such as Lufthansa implemented comprehensive crisis management strategies to ensure passenger safety and business continuity during the initial shock of the pandemic (Lufthansa Group, 2020).

Moreover, the pandemic's impact on supply chains was exemplified by the disruption in aircraft part supplies and maintenance services, which affected operational capacities worldwide (IATA, 2020). In Turkey, DHMI (State Airports Authority) reported significant drops in passenger numbers, forcing airports to enhance their crisis preparedness and adjust risk management approaches accordingly (DHMI, 2020).

These examples illustrate how the aviation sector, as a critical part of global transportation infrastructure, faced unique risks during the COVID-19 crisis, underscoring the necessity for flexible and resilient corporate risk management strategies.

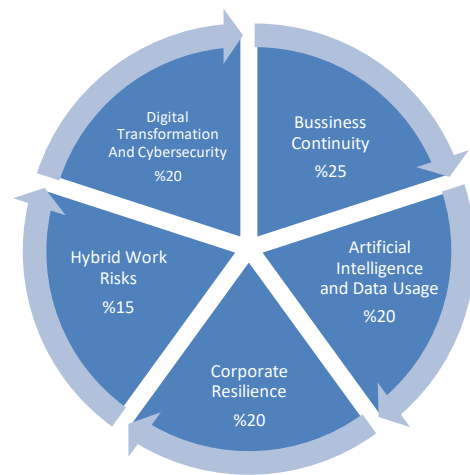


Figure 9. Corporate Risk Management Trend for 2023.

The year 2023 marked a period of post-pandemic restructuring, during which newly emerging regulations—particularly in the contexts of digitalization and sustainability—became central to risk management processes. In this context, a total of 925 articles related to corporate risk management and COVID-19 were identified in 2023. Of these, 231 focused on regulations and compliance issues. Topics such as corporate resilience, cybersecurity and data privacy, and the use of artificial intelligence and big data were examined in approximately 180 to 185 articles each. Additionally, 139 articles focused on risks associated with hybrid work models.

In 2023, corporate risk management evolved into a multidimensional framework, showing significant development particularly around compliance, digital security, and technology adoption. Regulatory compliance and data protection became top priorities, while the risks and opportunities presented by artificial intelligence were brought to the forefront. More “systemic” approaches such as corporate resilience served as the cornerstone of this transformation. The hybrid work models that became permanent after the pandemic introduced new types of risks—not only in terms of human resources policies but also concerning information security, occupational health, and communication efficiency.

In the aviation industry, 2023 was a year of accelerated recovery and increased focus on digitalization and sustainability. Globally, many airlines strengthened ESG compliance to improve operations and reduce environmental impact. For example, Airbus and Lufthansa in Europe expanded the use of sustainable aviation fuels (SAF) to meet carbon reduction targets (ICAO, 2023). In Türkiye, Turkish Airlines accelerated digital transformation projects and developed AI-powered systems to increase operational efficiency (Turkish Airlines, 2023).

Remote and hybrid work models became permanent in the aviation sector as well. While administrative and support staff continued working remotely, increased cybersecurity risks led airlines to invest significantly in digital protection. Both in Türkiye and globally, aviation companies implemented new cybersecurity protocols to safeguard employee data and ensure business continuity (Pegasus, 2023). Moreover, the hybrid working model's impact on occupational health and communication efficiency led to new risk assessments across the industry.

In summary, corporate risk management in 2023 was shaped around digital transformation, sustainability, and new working

models in the aviation industry. The sector experienced substantial progress both operationally and strategically.

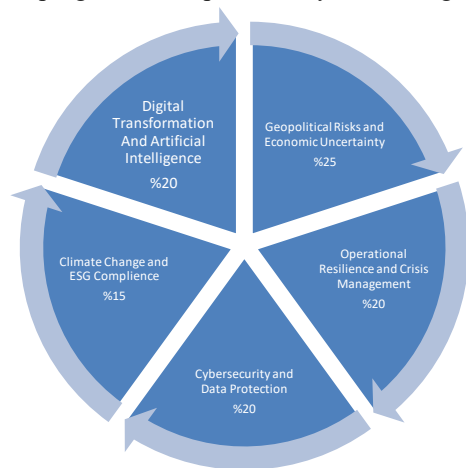


Figure 10. Corporate Risk Management Trend for 2024.

The year 2024 has emerged as a period characterized by forward-looking risk management strategies and intensified digital transformation efforts. In this context, a total of 1,542 articles related to corporate risk management and COVID-19 were published during 2024. Among them, 386 focused on geopolitical risks and economic uncertainties. Topics such as digital transformation and artificial intelligence, cybersecurity and data protection, and corporate resilience were each examined in approximately 300 to 310 articles. Additionally, 231 articles focused on climate change and ESG compliance.

In 2024, organizations began to reshape their risk management strategies in response to an increasingly uncertain global environment. Rising geopolitical tensions, armed conflicts, trade restrictions, and economic volatility posed threats to the operational stability of companies, necessitating a more cautious and proactive approach to risk management. At the same time, rapid advancements in artificial intelligence and digital transformation led to fundamental changes in the way businesses operate. While organizations aim to leverage these technologies for greater efficiency, they also face unavoidable new risks, such as ethical concerns, challenges related to adaptation, and the potential loss of control.

In 2024, rising geopolitical conflicts, war zones, and economic instability had a direct impact on the aviation sector. In particular, ongoing conflicts in the Middle East and Eastern Europe led to restricted airspaces and route adjustments, increasing operating costs and elevating risk levels (IATA, 2024). According to IATA reports, some airlines suspended operations in specific regions due to safety concerns. Advancements in digital transformation and artificial intelligence led airline companies to adopt smart technologies to optimize operations. AI-supported route planning, predictive maintenance, and AI-based customer service tools became more widespread (Airbus, 2024).

Cybersecurity and data protection gained further prominence in this period. As digital infrastructure became more integrated into aviation systems, airports and airlines invested in advanced cybersecurity protocols. Several major airports in Europe experienced data breaches that disrupted operations and raised concerns about system vulnerabilities (EASA, 2024).

In terms of corporate resilience, post-pandemic recovery efforts were supported by flexible supply chain strategies and

scenario-based operational planning models tailored to traffic fluctuations. Airlines increasingly adopted real-time data analytics to respond swiftly to operational disruptions (Turkish Airlines, 2024).

Within the scope of climate change and ESG compliance, sustainability became a more critical topic for the aviation industry. In 2024, airlines like Turkish Airlines and Pegasus launched pilot projects involving Sustainable Aviation Fuels (SAF), aiming to reduce carbon emissions (Pegasus Airlines, 2024). Aircraft manufacturers also accelerated their R&D efforts toward more environmentally friendly, low-emission aircraft models (Boeing, 2024).

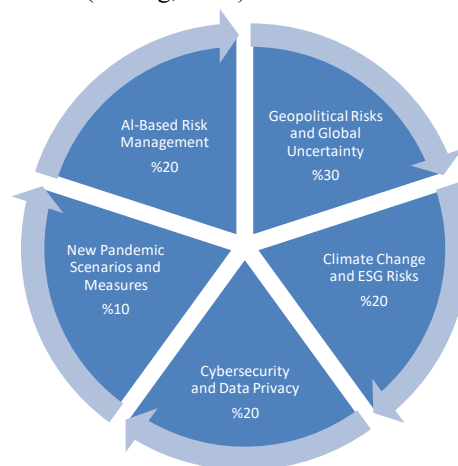


Figure 11. Corporate Risk Management Trend for 2025.

In 2025, a total of 258 articles related to corporate risk management and COVID-19 were identified. Among these, 77 articles focused on geopolitical risks and global uncertainties. Topics such as digital transformation and artificial intelligence, cybersecurity and data protection, and corporate resilience were each investigated in approximately 300 to 310 articles. Additionally, 231 articles centered on climate change and ESG compliance.

The year 2025 can be characterized as a period in which global uncertainties and geopolitical risks gained prominence in corporate risk management trends, reflecting increased organizational vulnerability to external factors. The growing emphasis on AI-based risk management systems demonstrates the importance of more proactive and predictive models, fueled by rapid technological advancements. With increasing digitalization, cybersecurity and data privacy have become central concerns—not only for operational continuity but also for reputational risk.

The rising significance of climate change and ESG-related risks reflects the strategic priority that sustainability has become for both investors and regulatory authorities. Furthermore, preparedness for potential future pandemics has become a critical consideration, underlining the need to build more resilient systems in the post-COVID-19 era. These trends indicate that risk management is no longer confined to financial threats but is now approached within a multi-layered framework encompassing social, environmental, and technological dimensions (THY, 2024).

In parallel, the aviation sector also experienced significant developments during 2025. Geopolitical tensions in the Middle East and conflicts in the Asia-Pacific region led to temporary airspace closures, forcing airlines to revise flight routes and increasing operational costs (IATA, 2020).

Artificial intelligence applications became widespread in areas such as flight safety, maintenance processes, and passenger experience. Airlines like Turkish Airlines (THY) and others adopted these technologies to enhance operational flexibility and efficiency (THY, 2024).

In Europe, cyberattacks on several major airports caused data breaches and flight disruptions, leading to increased investment in cybersecurity infrastructure (EASA, 2024).

In terms of environmental sustainability, airlines such as Lufthansa, Air France, and Turkish Airlines expanded the use of Sustainable Aviation Fuel (SAF) and implemented digital systems for carbon tracking, reinforcing compliance with ESG standards (Turkish Airlines, 2024).

Furthermore, to strengthen pandemic preparedness, new health and safety protocols were introduced at airport facilities, reshaping post-COVID-19 travel norms.

6. Conclusion

The COVID-19 pandemic marked a period that disrupted numerous economic, social, and sectoral balances on a global scale, necessitating a comprehensive reassessment of risk management approaches. Reports published during this period indicate that the aviation industry, in particular, was exposed to multilayered risks such as demand contraction, flight bans, revenue loss, and operational uncertainty. The unexpected magnitude of the crisis highlighted the inadequacy of traditional risk management models and underscored the need for more flexible and predictive systems.

Short-term financial strategies implemented during the crisis—such as cost reduction, utilization of government support, and postponement of investments—played a critical role in helping many airlines survive. However, one of the most important lessons learned from the crisis was that organizations must be prepared not only for financial risks but also for social, environmental, and technological risks. The pandemic clearly revealed the vital importance of a comprehensive and integrated corporate risk management approach (OECD, 2021).

In a time when digitalization and data-driven management systems are reshaping risk perceptions, organizations are increasingly required to focus on emerging risk areas such as cybersecurity, data privacy, business continuity, and remote working. In this regard, next-generation approaches like AI-supported decision-making systems and scenario-based planning have enabled organizations to position themselves more effectively against uncertainty (THY, 2024).

Furthermore, the integration of ESG (Environmental, Social, and Governance) criteria into corporate risk management is expected to become a significant source of competitive advantage for organizations in the future. Issues such as climate change, employee well-being, societal expectations, and the transparency of governance structures have emerged as key risk factors not only in terms of sustainability but also for corporate reputation and long-term value creation (PwC, 2021).

The experiences of the aviation sector present a model that can be adapted across industries. The management of uncertainty should not be limited to crisis periods; rather, it must enhance institutional flexibility and adaptability even under normal conditions. Therefore, corporate risk management must become an integral part of strategic decision-making processes (Economic, 2022).

One of the original aspects of this study is that it is not limited to a conceptual literature analysis but also integrates bibliometric findings with current sector-specific examples from the aviation industry. In this context, the pandemic-era strategies of airlines such as Pegasus, Turkish Airlines, Lufthansa, Emirates, and Singapore Airlines were analyzed in detail. As a result, the study transcends the role of a pure literature review and is enriched with practical applications.

In conclusion, the COVID-19 pandemic has served as a turning point that accelerated the transformation of risk perception and management strategies. The lessons learned from this period provide a roadmap for institutions to become more resilient, sustainable, and agile in the face of future crisis scenarios. The newly developed methods and integrated systems not only enable the management of risks but also allow for the transformation of those risks into strategic opportunities.

Methodologically, the study also draws on content analysis to reflect sectoral trends. The themes identified through bibliometric analysis were compared and interpreted alongside real-world developments in the aviation sector. In this way, the study gains a semi-applied qualitative dimension that complements its bibliometric base.

Furthermore, the study offers a valuable starting point for future research. When supported by additional methods such as surveys, interviews, or case studies, its academic depth and practical value can be significantly enhanced. In particular, aviation sector executives can benefit from such multi-layered approaches when developing pre- and post-crisis strategies.

In this regard, the scientific contribution of the study to the aviation field lies in its ability to broaden the risk management perspective beyond financial concerns and include digital, environmental, and organizational dimensions, providing a multi-dimensional framework for corporate resilience.

This study fills a significant gap in the literature by examining how corporate risk management strategies in the aviation industry evolved in the aftermath of the COVID-19 pandemic and what measures companies adopted in terms of sustainability, resilience, and financial robustness during crisis periods. It particularly emphasizes that crisis management should not be confined to financial measures, and that digitalization, ESG criteria, and integrated risk management approaches must be incorporated into the process. In this respect, the study aims to contribute to the existing literature both theoretically and practically. Additionally, it seeks to provide a valuable perspective on post-2020 risk management trends, offering guidance for both practitioners and researchers.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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