Business Models and Their Impact on Climate Change: A Comprehensive Review of Recent Literature

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Abstract. *The energy sector has become increasingly significant in recent years, playing a crucial role in economic developments at both national and global levels, particularly in the transition toward a zero-carbon economy. This study focuses on a comprehensive literature review examining business models and their impact on climate change from multiple perspectives and scenarios. The analysis is based on a robust selection of academic sources retrieved from scholarly databases, filtered through keywords related to climate change modeling and analysis. Key areas of exploration include the influence of climate change on inflation, business strategies for long-term production assets in the face of climate risks, the role of artificial intelligence in climate adaptation, the impact of climate change on stock markets, and its effects on bank lending. The central research question addressed in this paper is whether climate change has a tangible impact on business models and whether these models should adapt their strategies accordingly. The future trajectory of the economy in the context of climate change is a pressing topic with implications for both local and global economies. Consequently, this literature review encompasses various themes that, directly or indirectly, examine the relationship between climate change and economic dynamics.*

Keywords: Literature review, Business models, Climate change, Inflation, Artificial Intelligence, Stock Exchange, Bank Loans.

Introduction

Climate change is an ongoing and dynamic phenomenon. Currently, the steady rise in global average temperatures, along with the increasing frequency and severity of extreme weather events—such as heat waves, droughts, and cold spells—are evident trends. Projections indicate that global temperatures could rise by 4°C by the 22nd century (Stern, 2007), posing significant threats to both the environment and life.

Moreover, climate change has become a critical factor influencing modern economic development. As an external force, it impacts the economic system through various transmission channels, heightening economic risks (Kemfert et al., 2019; SARB, 2020). Research suggests that fluctuations in temperature, precipitation, and natural disasters can disrupt agricultural productivity and industrial output, ultimately reducing production levels in these sectors. Consequently, this decline may contribute to rising inflation rates (Acevedo et al., 2020; Dell et al., 2012).

Aside from that, it is essential to ensure that financial information and business disclosures remain relevant and reliable to mitigate the risk of material misstatements resulting from climate change impacts. Beyond evaluating companies' efforts toward climate change mitigation, it is equally important to assess how climate change affects organizations and their production processes, particularly in industries that are highly vulnerable to its effects (Melloni, 2020).

Recent research by Liu et al. (2024) has demonstrated that sustainable development constitutes a global imperative; however, its realization is contingent upon a fundamental transformation of the production sector. The Sustainable Development Goals (SDGs), established by the United Nations (UN), serve as a comprehensive framework guiding international efforts

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toward a more sustainable and resilient future. Within this context, the European Union has committed to ambitious objectives, including achieving carbon neutrality by 2050 and reducing greenhouse gas emissions while maintaining economic growth (Li, Khurshid, et al., 2023).

The goal of sustainable development is to safeguard public health by advancing cleaner and more sustainable technologies that are both cost-effective and environmentally friendly. Additionally, enforcing global environmental policies and implementing carbon taxes serve as key mechanisms for limiting carbon emissions.

Economic growth in every nation is closely tied to energy consumption, as most sectors rely on it for operation. Similarly, urbanization has accelerated due to the migration from rural to urban areas, leading to the expansion of urban infrastructure, including housing and transportation. According to the urban environmental transformation hypothesis, increasing urban prosperity drives the growth of manufacturing industries, which in turn contribute to rising pollution levels. Furthermore, Khurshid et al. (2021) demonstrated that the interdependence between urbanization and industrialization leads to higher energy consumption and emissions, exacerbating environmental degradation.

Thus, businesses play a dual role in climate change, both contributing to it through emissions (Weinhofer & Busch, 2013) and facing its escalating risks (Linnenluecke et al., 2015). While mitigation efforts have long been the main priority, the need for businesses to adapt is gaining greater recognition among policymakers, practitioners, and scholars as climate-related challenges become more severe (Danese et al., 2024).

Moreover, in recent years, research efforts have intensified to optimize the economic, environmental, and social benefits of Industry 4.0 (I4.0) by incorporating advanced techniques and intelligent methods within the framework of sustainable production (Duan et al, 2024).

Hurricanes, floods, wildfires, and droughts are just a few examples of events that have caused significant damage to essential infrastructure, disrupted economies, and imposed substantial costs on both society and the environment (Kumar et al., 2021). In light of these growing threats, it is crucial for businesses to assess the impact of climate change on their operations and develop resilience strategies.

Furthermore, the financial markets and economic systems are becoming increasingly vulnerable to climate change-related events, driving the growth of climate finance research. The examination of risk transmission from natural disasters to economic and financial systems has become a key area of focus for both current and future studies. These research efforts have further evolved to explore the relationship between climate change and finance from diverse perspectives. For instance, Roncoroni et al. (2021) highlight that banks and investment funds play a crucial role in the low-carbon transition through their exposure to the same asset classes, underscoring the increased risks associated with this transition.

Building on the aforementioned arguments, this article aims to review the literature on the relationship between climate change and business model development. The primary focus is on the impact of climate change on macroeconomic fundamentals, particularly inflation. The analysis then shifts to examining the effects of physical climate change on long-lived assets, providing a microeconomic perspective. Expanding on this asset-based approach, the study further explores the role of technological advancements and artificial intelligence. Finally, the investigation considers the influence of climate change on the stock market, representing a non-banking financial institution perspective, and on bank lending, offering insights from a banking-related standpoint.

The remainder of this paper is structured as follows. Section Two focuses on data and methodology, outlining the principal approaches used in organizing the study. Section Three presents the core findings and discussions, while Section Four provides the conclusion.

Data and methodology

To achieve the objective of assessing the impact of business models on climate, we conduct a comprehensive literature review, drawing on academic research spanning from the early 2000s to the present. Relevant research articles were retrieved from scholarly databases such as JStor, EBSCO Publishing, ScienceDirect, Scopus, ProQuest, and SpringerLink through keyword searches related to the broader dynamics of climate change.

Results and discussion

Climate change's influence on inflation

Researchers have examined the effects of climate change on overall inflation. Primarily acting as a negative supply shock, climate change lowers output and increases inflation by reducing the effective labor force and hindering the accumulation of productive capital.

Bawa et al. (2016) used the cointegration boundary test method to analyze inflation in Nigeria from 1981 to 2015, concluding that average rainfall is a crucial factor influencing inflation in the country. In addition, Cashin et al. (2017) explored the macroeconomic effects of El Niño weather shocks on inflation. Kunawotor et al. (2022), employing a two-step dynamic system Generalized Method of Moments estimation with robust standard errors, found that climate change—especially extreme weather events—impacted overall inflation between 1990 and 2017. Their results revealed that only severe weather events caused significant price increases in Africa, with agricultural production being the primary channel through which extreme weather events influenced inflation.

Given the varying effects of different climate change factors on inflation, some researchers have focused on how temperature changes influence inflation. Faccia et al. (2021) investigated the impact of extreme temperatures on inflation indices in 48 developed and emerging economies from 1951 to 1980, concluding that higher temperatures play a significant role in driving price increases. Similarly, Mukherjee and Ouattara (2021), analyzing data from both developed and developing countries between 1961 and 2014, found that temperature shocks create inflationary pressures, resulting in a dynamic response to climate change that can persist for several years.

Indeed, some researchers have concluded that certain types of climate change either lower inflation or have no significant effect on it. For instance, Kabundi et al. (2022) found that floods generally have a suppressing effect on inflation. Similarly, Serhan Cevik and João Tovar Jalles (2023) found that extreme temperatures are linked to lower inflation rates.

The current literature mostly examines the impact of climate change on overall inflation. Several studies indicate that climate-related factors, such as rising temperatures, droughts, floods, and hurricanes, often contribute to price increases. However, other research suggests that floods and extreme temperatures can also lead to a reduction in inflation rates. It is important to highlight that there is a relative gap in the literature regarding how climate change influences prices over time, and limited research has been conducted on the transmission mechanisms through which climate change affects inflation rates.

The study concludes the following: First, climate change significantly influences inflation. Current climate conditions lead to an increase in inflation; in other words, as climate conditions worsen, prices rise in the short term. However, climate change with a one-period delay has a negative effect on inflation, meaning that the more intense the climate risk in the previous period, the larger the decrease in the inflation rate that follows.

Second, a comparative study reveals that low-income countries are more prone to price increases due to climate change than high-income countries. This suggests that inflation in low-income nations is more vulnerable to being driven up by climate change. The primary reason for this is that low-income countries have weaker economic structures and lack effective systems to address climate change. When climate events occur, they do not possess sufficient resources for response and recovery, making them more susceptible to the effects of climate change shocks (Mukherjee & Ouattara, 2021).

Third, mechanism tests show that climate change influences the inflation rate by affecting interest rates and food prices. This indicates that when climate change disrupts the economy, central banks often loosen monetary policies and reduce interest rates to encourage economic growth and employment. As a result, significant credit expansion can lead to higher inflation. Furthermore, climate change initially impacts agricultural production, reducing food supply and driving up food prices, which eventually leads to a general increase in prices (Chaoping et al., 2025).

The findings regarding the impact on inflation have broadened the discussion to a larger academic research topic, specifically the effectiveness of carbon emission modeling, and the impact on the greater economy. With ongoing economic development, addressing climate change, reducing carbon emissions, and fostering the transition to a low-carbon society have become shared priorities for all nations (Zhao et al, 2017). While this study does not aim to provide an exhaustive analysis of this area, previous research has identified certain biases in the assessment of carbon emission targets (Ding et al., 2020). Traditionally, energy efficiency and carbon emission efficiency are evaluated based on economic output relative to energy consumption and carbon emissions, respectively—measures that are the inverse of energy and carbon emission intensities.

How are the long-term production assets covered against the climate change risks through business strategies

The effects of physical climate change on long-lived assets are largely understood, but the decisions surrounding these assets, as well as the data and models needed for precise business assessments and measurements, are still highly uncertain (Nature Climate Change, 2019; Chua et al., 2022). Climate change is no longer simply an environmental issue with limited uncertainty for businesses. Rather, business owners and accountants are now expected to focus on incorporating relevant and material climate change impacts into their reporting, especially regarding physical, natural, and human capital stocks (von Dulong et al., 2023).

Long-lived physical assets are especially vulnerable to direct risks from climate change, such as increased rainfall variability, which can result in both water stress and heightened inland flood risks. Additionally, the growing frequency and intensity of extreme weather events, including cyclones, storms, and bushfires, pose significant threats. Rising sea levels increase the risk of flooding for coastal and low-lying assets, while extreme heat leads to reduced workforce productivity, negative health impacts, and exceeds the design thresholds of machinery, infrastructure, and transportation systems.

These risks are further amplified in the food sector, which heavily depends on long-lived assets (TCFD, 2021a). Each physical risk increases the likelihood of damage to these assets, leading to higher repair and adaptation costs (Barker et al., 2021). Additionally, there is a risk of production downtime and failure to meet contractual obligations and expectations of economic partners. Transition risks to long-lived physical assets include: higher regulatory and compliance costs; reduced liquidity and challenges in securing competitive capital for non-adapted assets/operations; difficulty obtaining affordable insurance; divestment pressure and diminished return on capital investments; significant impacts on government and stakeholder relations; and an increased risk of litigation (IGCC, 2020).

A phased approach is needed to share and support the use of appropriate models and tools. Data-sharing platforms, repositories, and incentive programs from regulators or quasi-regulators should be explored. In practice, these shared data and model platforms must be evaluated in terms of their associated benefits and competitive risks. Professional organizations could consider raising awareness early and facilitating collaboration among companies that are not yet deeply involved in climate reporting, bringing them together with key sector stakeholders, including universities that can provide education and training on the necessary models and tools.

Although accounting standards have provided valuable guidance on adjusting the carrying value of assets in situations of uncertainty and taking materiality into account, additional research is required to explore the effects of climate-related risks. It is also important to explore the creation of relevant and reliable shared databases at the regional level. Showcasing these initiatives through comprehensive case studies in other industries with long-lived assets, such as manufacturing or mining, would also be beneficial (Tingey-Holyoak et al., 2024)

The role of artificial intelligence in improving climate resilience in businesses

Over the past few decades, innovation has been recognized as an effective approach to addressing environmental challenges (Khurshid et al., 2022). Consequently, many organizations have shifted away from reactive measures and short-term strategies aimed at mitigating environmental deficiencies, instead adopting proactive and innovative environmental approaches (Fraj et al., 2015).

Artificial intelligence (AI) involves the replication of human intelligence in machines, enabling them to learn from data, make decisions, and carry out tasks independently (Alzubaidi et al., 2021). Deep learning, a subset of AI, uses artificial neural networks with multiple layers to identify complex patterns and relationships in data (Hao et al., 2016; Lecun et al., 2015). It has shown exceptional results in areas like image recognition, natural language processing, and more recently, climate research. The application of AI and deep learning techniques in risk management offers a promising tool for boosting business resilience to climate change (Papadopoulos and Balta, 2022; Rocha Rodrigues et al., 2018).

AI-driven risk modeling and predictive analytics assist organizations in anticipating and managing climate-related risks, including disruptions to supply chains, market instability, and regulatory changes. Moreover, given the unpredictability and variability of climate, AI-powered decision support systems can help optimize resource distribution and enhance operational efficiency. Advanced forecasting models, fueled by AI and deep learning, play a crucial role in improving climate resilience. Deep learning algorithms can analyze climate data and trends to provide accurate forecasts of future climate events, such as floods, droughts, cyclones, and other extreme weather conditions (Scher and Messori, 2018).

Similarly, deep learning algorithms can be used to predict the occurrence of Atmospheric Rivers (ARs), which are linked to heavy rainfall and flooding events in many mid-latitude regions. Accurate forecasts of ARs can greatly assist in flood and water resource management, enabling businesses and communities to take proactive actions and minimize potential damages.

While the integration of AI and deep learning holds great potential for improving business resilience, it also presents certain challenges. Implementing AI-driven solutions requires high-quality data, effective algorithms, and expertise from skilled personnel (Araos et al., 2017; Ford, 2018). Collaboration among climate scientists, AI specialists, and business stakeholders is vital for developing tailored solutions and utilizing AI-generated insights for decision-making. As climate change continues to pose significant risks to businesses, the demand for innovative approaches that combine climate research with AI-powered solutions is growing. AI and deep learning offer valuable tools for identifying vulnerabilities, minimizing risks, and enhancing business resilience (Ben Ayed and Hanana, 2021; Papadopoulos and Balta, 2022).

Climate change presents substantial risks to businesses that extend beyond the immediate impact of weather on infrastructure and operations. While some forward-thinking companies are beginning to assess additional climate-related risks—such as shareholder and consumer expectations, regulatory compliance, and the implications of greenhouse gas restrictions—many still underestimate the physical threats posed by climate change. This oversight is partly due to the long-term nature of climate shifts and the uncertainty of future projections.

However, growing pressure from shareholders and regulatory bodies is driving the need for greater transparency in climate risk disclosure, emphasizing the importance of identifying and addressing potential vulnerabilities. The integration of big data analytics into climate science and decision-making offers a promising approach to understanding climate dynamics and evaluating the financial risks associated with climate change. Digital technologies, leveraged by climate interpreters, play a crucial role in converting climate-related data into actionable insights, helping businesses implement adaptive and mitigation strategies.

Traditional numerical weather prediction (NWP) models face limitations in accuracy and long-term forecasting. However, machine learning (ML) techniques, particularly deep learning (DL) models, offer significant potential for more precise weather and climate predictions. The proposed DL architecture, Autoencoder, has shown promising results in forecasting atmospheric rivers (ARs) based on previous time frames. By integrating these advanced modeling techniques with the Internet of Things (IoT) and disaster management systems, risk mitigation efforts—such as flood warning systems and water resource management—can be significantly improved (Singh et al., 2023).

Climate change's influence on the Stock Exchange

Climate change is increasingly acknowledged as a significant threat to financial markets globally (Zhou and Ma, 2025). Previous studies estimate that up to \$24 trillion in global financial assets could be at risk if the average surface temperature rises by 2.5°C above pre-industrial levels by 2100. These risks underscore the critical need to enhance understanding of climate risk within asset volatility monitoring frameworks.

Natural disasters act as external, non-financial shocks to the economy. Beyond affecting key macroeconomic indicators, they directly impact domestic financial markets and can create ripple effects across financial systems in neighboring or distant countries due to the interconnected nature of global markets and businesses. Additionally, these events may influence the scale-invariance and fractal characteristics frequently observed in financial market data (Liu et al., 2007; Buonocore et al., 2016).

Although this field is relatively new to researchers, an increasing body of literature examines the impact of natural disasters on global capital markets. Worthington and Valadkhani (2004) use autoregressive moving average (ARMA) models to assess how natural disasters affect the Australian equity market, analyzing data from 42 natural hazards. Worthington and Valadkhani (2005) employ intervention analysis on daily returns across ten market sectors to investigate the effects of natural, industrial, and terrorist disasters on the Australian capital market. Lee et. al, (2007) explore heteroskedasticity biases using correlation coefficients to examine contagion effects across 26 international stock indexes and exchange rates following the major earthquake in Southeast Asia on December 26, 2004.

In the same line of research, Wang et al. (2013) employ GARCH models to assess the effects of natural disasters on wealth and risk, focusing on the insurance sector and composite stock market index returns in Japan and the US. Similarly, Fakhry et. al (2018) examine both the immediate and long-term consequences of the 2011 Great East Japan Earthquake on Japan's equity, debt, and foreign exchange markets, as well as gold prices. Utilizing a system generalized method of moments (GMM) framework, Panwar et al. (2019) explore the connection between economic growth and four types of natural disasters—floods, droughts, storms, and earthquakes. Additionally, Lanfear et.al (2019) identify significant abnormal fluctuations in stock returns coinciding with U.S. landfall hurricanes from 1990 to 2017. More recently, an emerging body of research has shifted focus toward analyzing the effects of natural disasters on capital markets through a behavioral finance lens, as demonstrated in studies such as Kong et al. (2020).

Given the relative efficiency of stock markets, the effects of natural hazards should be reflected in short-term stock returns. These abnormal returns serve as an indicator of expected changes in future profitability resulting from the disaster. Consequently, numerous financial and behavioral studies have utilized event study methodologies to examine the impact of rare disasters on global financial markets. Findings suggest that negative sentiment, driven by anxiety and a pessimistic outlook, influences investors' decision-making processes, ultimately affecting asset pricing, as noted in Kaplanski and Levy (2010). More recently, event study methodologies have also been applied to analyze the effects of natural disasters on international financial markets (Bordeau-Brien and Kryzanowski, 2017).

Evidence suggests that climatological and biological hazards have the most significant impact on international financial market returns, with geophysical events following closely behind. However, while climatological disasters typically have a predominantly negative effect on financial markets, biological hazards tend to elicit more positive responses across selected financial indices. Conversely, meteorological and hydrological disasters have a less pronounced effect on global market indices. Moreover, the varying positive and negative responses to different types of natural hazards could provide investors with diversification benefits when focusing on specific categories of these events (Pagnottoni et al., 2022).

From a different perspective, considering the inverse relationship, recent research by Muchenje (2025) indicates that increased stock liquidity is significantly associated with lower carbon emissions. The author suggests that external monitoring, investment in carbon abatement, and green innovation are plausible mechanisms through which stock liquidity contributes to reducing carbon emissions. Furthermore, the study demonstrates that the responsiveness of corporate climate performance to enhanced stock liquidity becomes more pronounced following the Paris Agreement.

The influence of climate change on bank loans

There is growing evidence of the negative impact of climate risk on both the economy and its growth. For instance, the Economist Intelligence Unit (2015) reports that the Value at Risk of manageable assets due to climate risk amounts to $4.2 trillion. Additionally, a recent survey by

Krueger et al. (2020) highlights that investors are increasingly worried about the financial consequences of climate risk. In January 2020, Larry Fink, CEO of BlackRock, one of the world's largest asset managers, stated in his annual letter to CEOs that BlackRock "will now make climate change central to its investment considerations."

Since climate risk is difficult to hedge, how do investors assess and price this risk? Bank loans offer a valuable context to explore this question. Alongside the growth of socially responsible investing, there has been a significant rise in environmentally conscious lending (Cogan, 2008; Chava, 2014; Fard et al., 2020). Evidence indicates that banks are becoming more responsive to environmental. In fact, more than thirty major global banks have pledged to cease financing coal-related projects or coal power companies.

It is widely recognized in banking literature that banks, as delegated monitors, have access to information that may not be available to external parties. This gives them a unique ability to assess borrowers' risks and their capacity to repay loans. Therefore, if investors view climate change as a significant risk factor, we hypothesize that banks are likely to factor climate risk into their lending decisions, particularly when lending to firms located in areas more vulnerable to climate-related risks.

The way in which financial markets price climate risk has become an increasing focus in asset pricing literature, with substantial evidence indicating that climate risk is indeed priced into various financial assets and real estate. For example, in the equity market, Bolton and Kacperczyk (2021) identify a consistent carbon premium across U.S. stock returns. Bansal et al. (2016, 2017) create an asset pricing model that integrates climate change as a long-term risk and demonstrate that this model not only aligns with projected temperature trends but also with observed stock market returns.

Several studies have also examined the impact of climate risk on credit markets. Painter (2020), for example, finds that U.S. counties with greater exposure to climate risk incur higher underwriting fees and initial yields when issuing long-term municipal bonds, compared to counties that are less susceptible to climate change.

Those examples clearly illustrates that climate risk negatively impacts firms' cost of capital. Considering that bank loans serve as a vital—if not the primary—source of external financing, and given that banks are well-informed financial entities with a unique ability to monitor borrowers and assess risks, as well as their demonstrated sensitivity to climate-related risks, banks factor climate risks into their lending decisions.

The primary reason for the underpricing of climate risk is the lack of adequate disclosure requirements, which prevents markets from fully assessing this risk. Although there is widespread awareness of climate risk's adverse economic impact, many investors view the current climate risk disclosures provided by firms as insufficient, unclear, and lacking in detail. In fact, 79% of surveyed investors consider climate risk reporting to be as important as financial reporting and believe it should be mandatory and standardized, much like financial disclosures (Ilhan et al., 2020).

Additionally, a significant portion of banks—representing nearly 80% of global lending volume—has committed to factoring environmental considerations into their lending decisions. Many have pledged to restrict or discontinue financing for coal-related projects while increasing support for firms and initiatives focused on green and renewable energy. Strengthening climate risk disclosure requirements would not only enable banks to better assess this risk among their borrowers but also allow market participants to integrate climate risk more effectively into investment decisions, ultimately leading to more accurate and efficient risk pricing in financial markets (Javadi and Masum, 2021).

Conclusions

This study aims to examine and analyze the impact of climate change on the global economy and business models within the context of the transition to a zero-carbon economy. The analysis is based on five scholarly references that address the subject from various perspectives within the specialized literature.

Given the evolving nature of the discussion on this topic, the initial focus of this study is on the impact of climate change on macroeconomic fundamentals, with particular emphasis on inflation. The analysis then transitions to assessing the effects of physical climate change on long-lived assets, offering a microeconomic perspective. Building upon this asset-based approach, the study further explores the role of technological advancements and artificial intelligence. Finally, the research examines the influence of climate change on the stock market from the perspective of non-banking financial institutions and on bank lending from a banking-sector standpoint.

Specific accounting for long-lived assets affected by climate change remains relatively uncommon, despite the effective application of risk and uncertainty models in other emerging fields.

Climate change can substantially raise inflation rates in the short term, though its long-term impact appears limited. Its effect on price levels is more pronounced in low-income countries compared to developed nations. Further studies indicate that central bank interest rate policies and food prices act as mediating factors in the relationship between climate change and inflation. Climate risk influences the economy, leading the central bank to reduce interest rates to boost economic activity, which subsequently fuels inflation. Moreover, climate change disrupts food production, driving up food prices and further contributing to inflation. Furthermore, central banks should refrain from making substantial short-term interest rate cuts and implement strategies to control rising food prices as part of their response to climate change.

Integrating Artificial Intelligence into risk management could serve as a valuable tool for enhancing business resilience to climate change. By providing reliable and accurate predictions of extreme weather and climate events well ahead of time, deep learning algorithms can help minimize the risks associated with business infrastructure. Atmospheric Rivers (ARs), extreme weather events, pose significant socioeconomic risks by causing floods and droughts across various mid-latitude regions on different continents.

Stock market responses to natural hazard shocks vary depending on the type of event and its location. Climatological and biological disasters tend to provoke the most significant reactions in international financial markets. Additionally, the stock indices examined show a stronger response to shocks that occur in European countries.

Firms located in areas with greater exposure to climate change face significantly higher spreads on their bank loans, particularly for long-term loans issued to poorly rated firms. The overall evidence indicates that lenders are progressively recognizing climate change as an important risk factor.

The limitations of this study stem from the broad scope of the research topic. Each area explored in this literature review represents a distinct field of study, and as such, the objective was not to provide an exhaustive analysis, nor to conduct a citation count or document frequency analysis. Future research could examine these topics individually, offering a more in-depth analysis with a stronger emphasis on their implications for policy formulation.

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