

## Review Article / İnceleme Makalesi

### The impacts of the great depression on the safety development in civil aviation: Business cycles approach / Büyük buhranın sivil havacılıkta emniyet gelişimine etkileri: İş döngüleri yaklaşımı

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**Received**  
November 19, 2024

**Revised**  
May 26, 2025

**Accepted**  
June 3, 2025

#### **Keywords**

Aviation Safety,  
Business Cycles,  
Civil Aviation,  
Historical Development

#### **Anahtar Kelimeler**

Havacılık Emniyeti,  
İş Dalgaları,  
Sivil Havacılık,  
Tarihsel Gelişim,

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#### **ABSTRACT**

Economics has realised significant advancements with criticisms from Marxist and Neo-Marxist thinkers. One of these criticisms pertains to business cycles and waves. This analysis focuses on the development of aviation safety in light of these waves and cycles. Simultaneously, the primary research method involves a systematic articulation of economic waves and their impacts on the understanding of safety in civil aviation. Thus, this research encompasses three patterns: civil aviation safety, economic conjunctures and wave theory, and a historical approach. This study aims to explain how the Great Depression Safety Wave formed between the periods of the First and Second World Wars. The findings indicate that there was a marked increase in the understanding of safety during the First and Second World Wars. Conversely, due to the Great Depression and its ramifications beyond the economic realm, there emerged a wave between the First World War and the Second World War, impacting historical evolution and the trajectory of safety throughout history.

#### **ÖZET**

İktisat, Marksist ve Neo-Marksist düşünürlerin eleştirileriyle büyük sıçramalar gerçekleştirdi. Bu eleştirilerden biri de iş çevrimleri ve dalgalarıdır. Bu analizde, bu dalgalar ve çevrimler dikkate alınarak havacılık emniyetinin gelişimine yoğunlaşmıştır. Buna paralel olarak, ana araştırma yöntemi ekonomik dalgaların ve sivil havacılıkta emniyet anlayışına etkilerinin sistematik bir şekilde eklenmesidir. Bu şekilde, bu araştırmanın üç deseni vardır: Bunlar, sivil havacılık emniyeti, ekonomik konjonktürler ve dalgalar teorisi ve tarihsel yaklaşımıdır. Bu araştırma, Büyük Buhran Emniyet Dalgasının, Birinci Dünya Savaşı ile İkinci Dünya Savaşı Dönemleri arasında nasıl oluştuğunu açıklamayı amaçlamaktadır. Bulgular, Birinci ve İkinci Dünya Savaşlarında, emniyet anlayışında, keskin bir artış olduğunu doğrulamaktadır. Öte yandan, Büyük Buhran ve bunun ekonomik alanın ötesindeki etkileri nedeniyle, dünyada tarihsel evrim ve tarihteki emniyet seyri dışında Birinci Dünya Savaşı ile İkinci Dünya Savaşı arasında bir dalga yaşanacaktır.

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## 1. Introduction

Safety is a legal readiness, the early and first step of every civil aviation action. On the other hand, three important revolutionary steps of civil aviation epistemology and practices can be counted as technological, political and economic stages [1] that are formed and subjected to conjunctural and framework waves. For example, Schumpeterian capitalist history gives economics a clear picture of the importance of these cyclic, revolutionary and distinctive waves that form around the main concept of creative destruction. According to Diamond [2], the central message of Schumpeter is this concept, which emphasizes a dynamic, competitive and benchmark for all capitalist motivations and survival. From primitive societies to the Industrial Revolution, this internal inducement of capitalism showed its face in the form of technological development acceleration, which comes to today [3]. The development of capitalism is a problem of economic fluctuations, structural adjustment and the functioning of factor markets [4]. Therefore, it is beyond the personal or communal feeling of being left behind in economic and social circumstances. It includes different competition stages in the light of the Ricardian economic explanation (1817), so it has political roots depending on the theory of relative advantages. The first of the research questions begins to develop here, if there is only one way in the development of civil aviation that is an evolution of safety uniquely, naturally and gradually and vaults of civil aviation can be explained with three dimensions, what is the scientific course of safety in these three revolutionary development types?

Secondly, it needs a structural analysis of civil aviation in parallel with current economic cycles. But, it can be seen that there are a lot of conjunctural waves or business cycle approaches regarding economics. To develop an economic analysis of the civil aviation industry, five of them, which are the Juglar and Kitchin business cycles and Kuznets, Konradieff and Schumpeterian conjunctural waves that have similarities and differences regarding technology, politics and economics and finance, will be enough. But then, efficient and effective analysis of safety can be realized economically and operationally if it is concentrated on the emphasis of the Schumpeterian “safety entrepreneur” [5]. The second question raised here is whether there is an existence of safety entrepreneurs in the civil aviation industry and what are their duties and responsibilities in the civil aviation context, morally, technically and, of course, managerially, regarding other production factors.

Generally, a business cycle or conjunctural wave is a product of different attractions, changes and relationships between different actors in economic, political and technological contexts. According to heterodox interpretations of the economy, leaps and collapses in the current situation of economies are the main causes of conjuncture, and naturally, companies should be affected by them. Were there industrial-specific events that gave the last shape to the business cycles and waves in civil aviation, and what are their special impacts on the historical development of civil aviation, so safety?

This research mainly aims to scrutinize safety in light of technological, economic, and political developments in or around civil aviation. It realizes this purpose by benefiting from Marxist and Neo-Marxist theories and literature, current and famous waves and cycle approaches such as Schumpeter, Konradieff, Kitchin, Juglar and Kuznets considering the concept of safety as a revolutionizing object in cultural patterns and forms of civil aviation, a motivating instinct in the capitalist cycles and waves of the civil aviation economy and an accepted tacit or open communication style in dynamic civil aviation sociology and heritage. Methodologically, safety is neither an option nor a technical indicator in civil aviation, although it needs engineering understanding and scientific creativity if it is concentrated on its development stages.

In light of these arguments, safety will be elaborated on in this research rigorously with historical development. On the other side, the Great Depression of 1929 [60, 61] serves as a great contextual playground and experimental basis for this research, with its redefining and clear impacts on the development of safety understanding. Therefore, the examination of safety development during the Great Depression of 1929 can be a research problem and should be elaborated through an articulation method.



In the first section of this paper, there is a historical development of civil aviation as a literature review that is divided into different subparts, a short timetable of waves and cycles regarding civil aviation, and the place of safety in economic, technological and political development stages of civil aviation will be reconsidered. In the methodological part of this theoretical research, mean-and-end chains, articulations and intentions are explained, and findings, discussions and conclusion take their part at the end of the paper.

## **2. Literature Review**

### **2.1. The safety concept**

The place of the concept of safety is so clear in civil aviation. Nonetheless, there are differences in definition regarding three-dimensionality. One of these definitions accepts safety as a thing, which can be only explained by technical details theoretically at first sight; on the other hand, its power gives a last shape to the economy and policy. Apostol et al. [6] and Ranasinghe et al. [7] underline the importance of risk in the design stages of aerospace engineering and the design of aircraft. These ideas support the assumptions in the first definition. The second definition of safety considers it as a policy item at different levels, which needs technical support and economic resource supply. The emphasis of Luxhoj [8] on the National Airspace System of the United States near the Safety Management Systems as a need and requirement of the airline companies in the depiction of Teske and Adjekum [9] and Wolf [10] supports this second description. For the third one, safety is an economic motive framed with technical understanding and policy development. The innovations and inventions of Airbus and Boeing can shed more light on this topic. These three kinds of safety take their roots from risk consciousness after, before, and while processes or periods of accidents and incidents; therefore, the psychology of humankind originates from these. In this regard, the risk can be classified as follows [11]; i) Real risk to an individual, which may be determined based on future circumstances after their full development; ii) Statistical risk, which may be determined by the available data on the incidents and accidents in question; iii) Predicted risk, which may be predicted analytically from the models structured from relevant historical studies; and; iv) Perceived risk, which may intuitively be felt and thus perceived by individuals.

### **2.2. The Marxist way to explain technology**

Marxist historical analysis accepts historical development as a whole of conflicts between and within different classes that are sovereign over different production factors such as capital, labor, knowledge and land. These conflicts can be observed in cultural forms and patterns, traditions, social norms and political and social organizations [12]. Their existence can be formed by the nature of violence or peace [13] and by the values of the classes [14]. Clarke [15] supports that the activities of production and their surroundings are the focus points of these conflicts. Conversely, although Neo-Marxists utilize the Marxist methodology in their work, their tellings and subjects are wider than orthodox Marxism because of the living age. For example, Wallerstein's works "The Modern World-System I, II, III, 1974; 1980; 1989" [55-57] give historical lessons and a bridge between old and new and explain capitalist changes with specific time patterns and conjunctures. These conjunctural and wave changes are defined by the same methodology in the works of Schumpeter, Konradieff, Kitchin, Juglar and Kuznets, who defend that the capitalist system or capitalist motivation shows cyclic similarities depending on time; for this reason, it is not easily overcome. According to them, each crisis is a need and a bottleneck of capitalism, and capitalists should survive under them with one main revolutionary and dynamic instinct: creativity.

It is a known reality that main economic variables such as GDP growth, employment, interest rates, and consumption follow cyclic waves over time [16] or in the time of globalization [17]. Moreover, economies can be characterized by institutional change concerning labour markets, regulatory arrangements and the organisation of firms, which alters the process of decision-making, decision actors, and interest groups, and changes the balance



between market and government [18]. The existence of cyclic movements in the economy affirms that market behaviour is not deterministic; it has a rhythm [19]. Current economics defend that economic behaviour has its own idiosyncratic and complex chaotic identity depending on the nature of business [20]. Moreover, Juglar [21] defines cyclic variations in the corporate activities of businesses in which there are oscillations of investments into fixed capital and levels of employment of the fixed capital in the range of 7-11 years. Secondly, Kitchin [22] determines boom-bust cycles for 40 months in commodity prices. Thirdly, Kuznets [23] associates demographic processes such as immigrant policies (inflow/outflow) and construction policies, paralleled by them with new cycles of 15-25 years. For a fourth one, Konradieff [24] underlines the importance of innovation in the technological revolutions of overwhelming industries and commercialism with his waves of 40-60 years. Yet, in light of these arguments, Schumpeter [25] could realise his important technological explanations under the umbrella concept of innovation and technological development in capitalism.

### 2.3. Introduction to safety technology

Habermas, the Marxist thinker, defines technology as a project of the human species as a whole. For him, technology is a universal human activity and needs a technocratic consciousness of which features are counted by Oraldi [26]: Technocratic consciousness is “‘less ideological’ than all previous ideologies” although it is the most “‘irresistible and far-reaching”, it not only hides class interest but, through the suppression of the distinction between the practical and technical dimension, it compromises “the human race’s emancipatory interest as such”. Like all ideologies, it serves to detach the foundations of society from thought and reflection – but even more than other ideologies it is invulnerable to reflection because it does not put forward an image of the “good life.” On the other side, for Heidegger, technology is not only a problem as it causes ecological destruction, nuclear danger, consumerism but also, a solution of them regarding technological understanding of being [27] in an epoch dominated by technology [28]. Therefore, the contributions of technology to a democratic crisis can be very large, as observed in the example of the internet’s impacts on virtual communities [29] or the potency caused by the creation and holding of the technology. For these causes, according to Feenberg [30], technology is not a romantic thing and democratizing technology means expanding technological design to include alternative interests and values. So, in a universal description, technology is a thing to the interpretation of nature in terms of age and space [31], it is expected absolutely that it will be impacted by not only the main reasonings and patterns of thinking but also interests and values [32] of the epochs when and where it belongs.

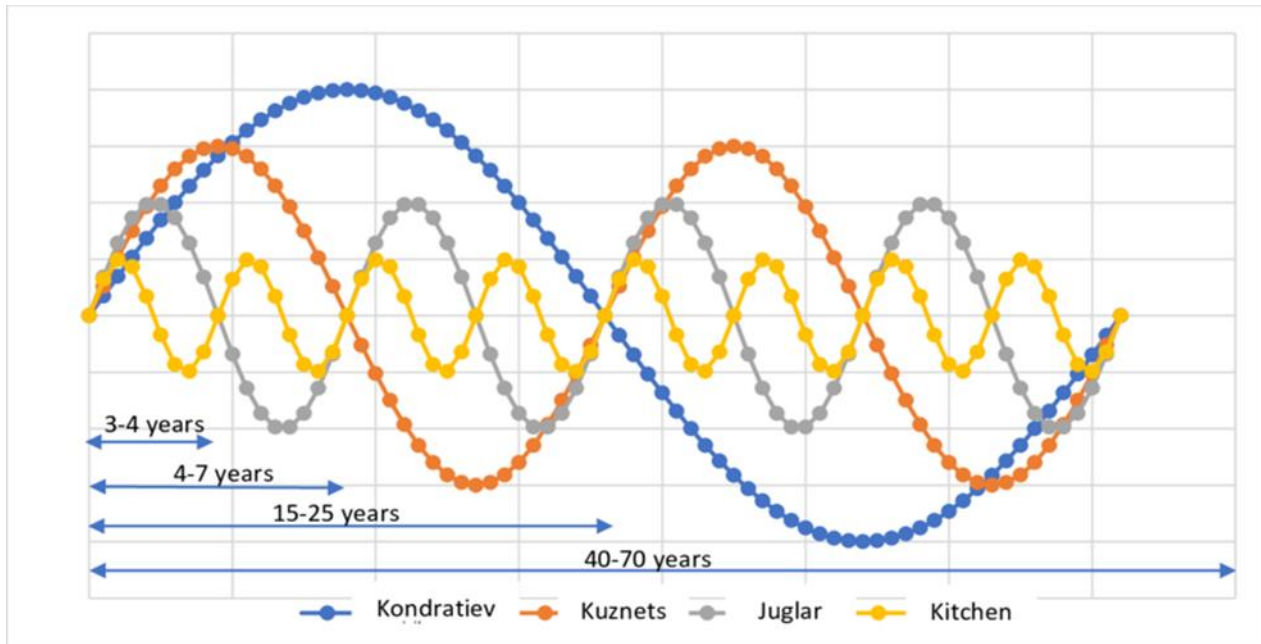
Safety is a technological public need and requirement, and for this reason, it is open to development and reform [33]. Besides these, safety develops mainly the understanding of the risk associated with an action, and turns it into an operation. In the transportation industry, the safety of aviation and the acceptability of the risks associated with air travel are fundamental to its broad public use as a reliable and effective method of transportation [34]. Without a strict safety understanding, it is not possible to set up resilient civil aviation; therefore, safety has a legal basis with national and international civil aviation regulators [35]. Therefore, it should be an unforgettable reality that safety is a problem of organizational climate, organizational culture and organization, near the individual efforts [36] in micro, macro and international levels.

### 3. Methodology

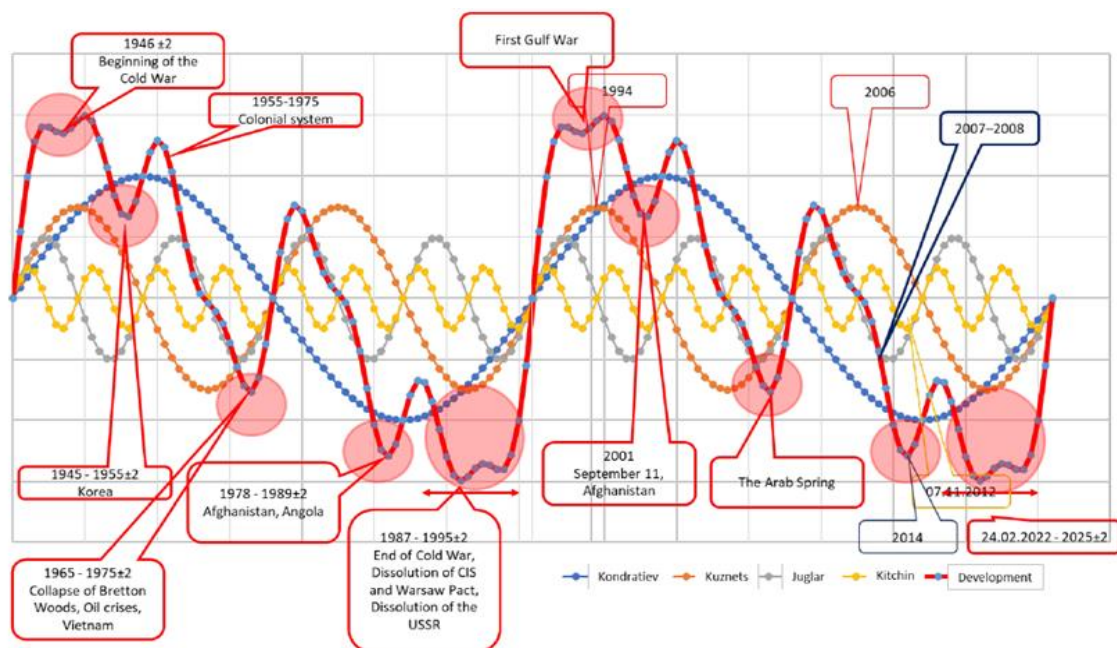
There are important leaps and collapses in the history of civil aviation with economic, technological and political transformation of the world that have also had deep impacts on the safety understanding of civil aviation. Moreover, the selection of important economic, technological and political events is also problematic regarding safety. Throughout this analysis, the articulation of new concepts and aircraft understanding in the safety paradigm, and the dynamic and revolutionary movements in a safety context, because of these developments in technological, political and economic dimensions, will be examined as conjunctural changes and waves. When the analysis



realises this, it will focus on the development of this peak (up-swing) and deep (down-swing) times in light of the tools given by Juglar, Kitchin, Kuznets, Konradieff and Schumpeter in Figure 1 and Figure 2.



**Figure 1.** Wave and cycle illustrations [37]



**Figure 2.** Cycles and Waves' illustrations regarding the world economy between 1945 and 2025 [38]

The illustrations show that the events and deep causes analysis are so important in the development of waves and cycles. In civil aviation history, generally, accidents and incidents are referred to as crisis time without a root-cause analysis regarding technological, political and economic incongruences at national, regional and international levels. For example, Concorde-type supersonic aircraft suffered from unbalanced decisions among regulatory (political and economic) bodies such as international airport authorities for a long time because of the



aviation-related externalities of its high technological structures, like noise [39] and emissions [40] and [41]. Secondly, although aircraft manufacturers have electrical and hybrid-type aircraft production technologies, international regulatory bodies such as the European Union have anxieties about these technologies regarding infrastructural needs and requirements of the aviation industry chain and airports <sup>1</sup>.

These cycles and waves sign historical accumulation under different titles, so relatively small events or momentous catastrophes can be the beginning of a crisis after these accumulations such as the Tenerife Accident of 1977 that shows the negligence in air traffic governance in the reality of meteorological events and as 11th September Terrorist Attacks that prove that the importance of international political consensus in aviation security matters. As far as it is possible, one should be careful to interpret the positivity or negativity of an event in the civil aviation industry because a technological up-swing can cause a down-swing in political or economic dimensions or vice versa.

Besides these, the articulation finds a place in the postmodern explanation of facts and realities as a method. Humankind began to lose its descriptive force in science and knowledge accumulation, and these facts and realities in even an ordinary life require more complex explanations. Lyotard [58] explains this reality as a Postmodern condition. Because there is a restricted zone between the thinkable and the unthinkable in modernism, which gives birth to the postmodern condition for reasoning. Foucault [59] also defends and utilises different articulation processes and objects in conceptualizing objects such as madness and potency beyond the familiar human sciences such as psychology, sociology or anthropology. For him, the detailed articulation of knowledge or knowledge pieces explains that the whole and main focal point of this wisdom is the anthropology of knowledge. On the other hand, in the case of this paper, safety is considered as a postmodern condition at the crossroads of politics, technologic and economic ratiocinations and is tried to explain with a kind of knowledge articulation in its historical development process. Conversely, there are some knowledge restrictions regarding literature, especially on the development of civil aviation during the years of the Great Depression.

In light of these arguments, it will be focused on the important timespan between the First World War and the Second World War, and the safety understanding of civil aviation will be analysed, benefiting from three dimensions, emphasizing the importance of the Great Depression of 1929.

## 4. Findings

The period between the First World War and the Second World War is important and has a wave structure that can be described regarding economic, technological and political dimensions. Besides these, scaling the findings can be considered as an important tool.

### 4.1. Pre-WWI developments

The first corporate governance structures were seen in France and Europe, accepting aviation as a sports and safety and proficiency-related activity and encouraging it through skill development in the Fédération Aéronautique Internationale (FAI) of France in 1905 and the 1910 Paris International Air Navigation Conference. The air borders of a country were subject to strict national rules and regulations in 1911 with the Aerial Navigation Act in Great Britain [42]. Bilateral agreements began to come into force in Europe before the First World War. The civil aviation industry suffered from the absence of international harmony in the years of the First World War, politically, legally and economically. A multilateral conference was held with the aerial community of South and North America in 1916<sup>2</sup>.

<sup>1</sup> [https://defence-industry-space.ec.europa.eu/eu-aeronautics-industry/alliance-zero-emission-aviation\\_en](https://defence-industry-space.ec.europa.eu/eu-aeronautics-industry/alliance-zero-emission-aviation_en) , Access time: 03.06.2024.

<sup>2</sup> [https://applications.icao.int/postalhistory/1910\\_the\\_paris\\_convention.htm#:~:text=The%201910%20Paris%20International%20Air,was%20a%20great%20historical%20importance](https://applications.icao.int/postalhistory/1910_the_paris_convention.htm#:~:text=The%201910%20Paris%20International%20Air,was%20a%20great%20historical%20importance) , Access Time: 04.06.2024.



#### **4.2. The development from the First World War to the Second World War**

The years of The First World War had tremendous positive impacts on aircraft technologies in the development of aircraft engines and aircraft design in capacity, volume and production speed, on the other side, ground infrastructures and systems were demolished on the European side, but on the United States [1] However, a holistic safety understanding was an unanswered problem for civil aviation. But, if it is concentrated on the Paris Convention of 1919, the civil aviation community seemed to exceed the first important teaching and barrier of safety, therefore security, because of the sovereignty principle of nations over their geographies and freedoms of air [43] and maybe, this was the important first sign of internationalism in civil aviation politically. Again, Stannard [44] underlines the importance of the Paris Convention of 1919, emphasising the impartiality of the Soviet Republic and the United States. It is understood that safety is beyond aviation corporations; it has become a national and state-based policy. Even after the First World War, the trust of ordinary people in civil aviation increased year by year, as shown in Goldstrom [45], depending on the developments in this safety understanding that accepts safety as a competitive element within European countries, between European countries and the United States.

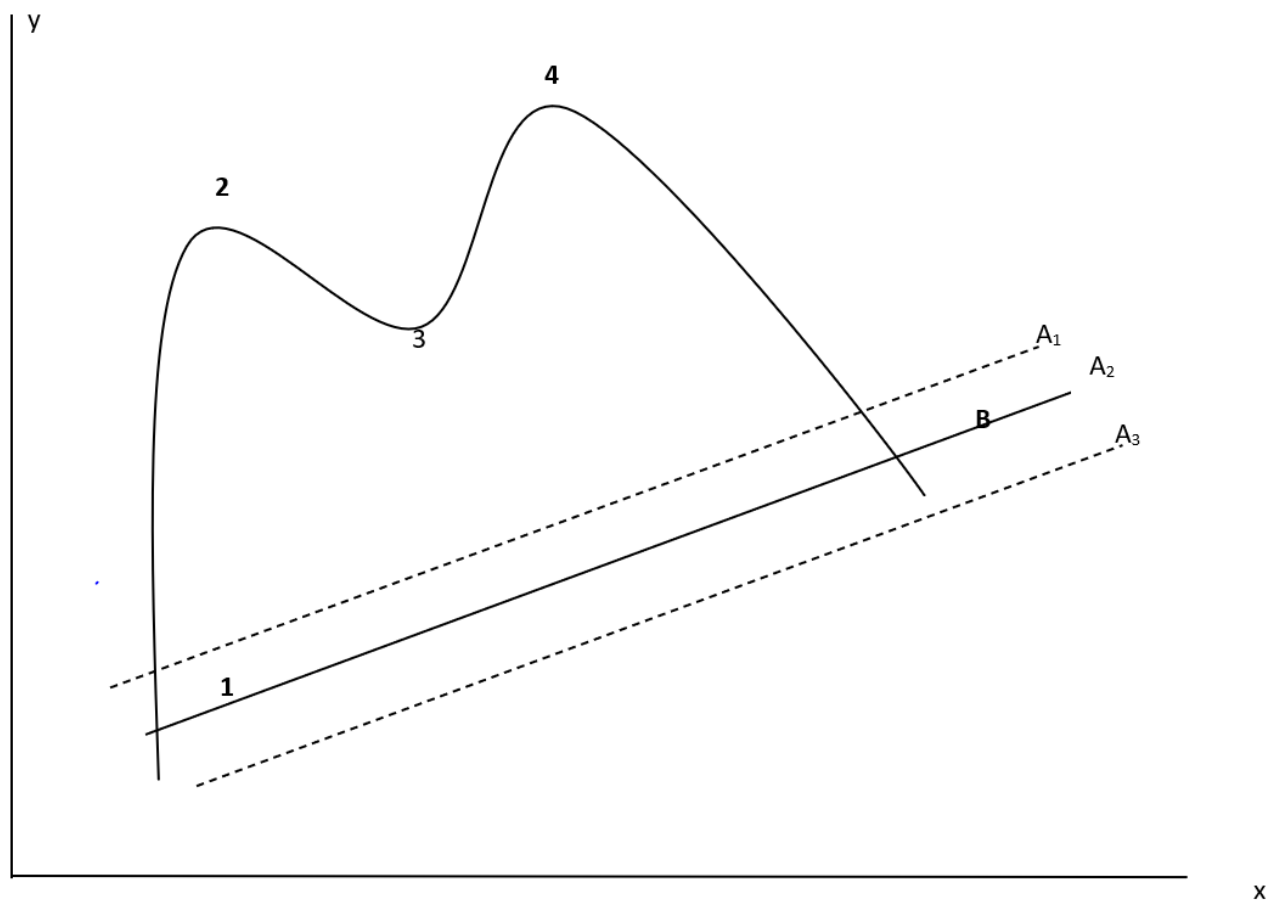
Before the Air Corps Act of 1926 or Air Commerce Act of 1926 which aimed to utilize a free market of aircraft manufacturers in the United States, technological development made felt its force doubling its speed and volume on both shores of the Atlantic Ocean alongside the vulgar competitive attitudes of aircraft manufacturers regarding associationalism in the United States [42]. Also, this event was important regarding the commercialization of civil aviation, which suffered from ambiguities under the impacts of a hodgepodge of small, inefficient carriers and unconnected routes [46]. Besides these, the legislation tasked the Secretary of Commerce with fostering air commerce, issuing and enforcing air traffic rules, licensing pilots, certifying aircraft, establishing airways, and operating and maintaining aids to air navigation [47]. In early 1928, the Assistant Secretaries for Aeronautics in the Departments of War, Navy, and Commerce in the United States asked the National Advisory Committee for Aeronautics (N.A.C.A.) to develop a common approach for the analysis and reporting of aircraft accidents. In response to this request, the N.A.C.A. organized the Special Committee on the Nomenclature, Subdivision, and Classification of Aircraft Accidents [48]. After the formation of the Bureau of Air Commerce in 1935, with the new developments in aircraft technologies, new and large airports were developed, and primitive-long-distance air traffic management systems were developed [45]. Even before the Second World War, the concept of learning from deficiencies was promulgated in aviation. Safety was viewed as an industry-wide problem, rather than one for any single operator, manufacturer or State. The concept was further developed in wartime aviation [49]. On the other side, bilateral agreements are a weapon of countries that have developed aviation industries, such as the United States, because of their importance in creating new routes, destinations and capacities regarding passenger transportation. Kraus [50] analysed an example of this kind of agreement between China and the United States, emphasising the importance of military conflicts in the Asia-Pacific Region. The finding of Oster and Strong [51], which points out the requirement of government regulation in a context where there are changes regarding technology and global integration, is important for the safety concept. On the other side, Human Factors in aviation transformed into a scientific phenomenon during the Second World War [52].

#### **4.3. The impacts of the Great Depression**

The impacts of the Great Depression were felt by the industry. Between fiscal years 1932 and 1935, the organisation's budget was cut in half and research and development activities came to a virtual stop with the order of President Roosevelt in the USA. Aviation safety began to deteriorate in the same period. In 1935, the nation's air carrier passenger fatality rate was 4.78 per 1 million passengers; the following year, it jumped to 10.1. [47]. Although there is a financial crisis regarding the economies and finances of aviation companies and a decline in safety understanding, the industry has not seemed to lose its reputation and spread in the minds of people [53]. In



the European side of aviation, it was observed a large development was observed regarding the exploiter policies of Hitler in military aviation for the raw material resources of Europe [54]; these extreme policies also mirrored the civil aviation comprehension of the European countries. In the years of war preparation and depression, civil aviation continued its development in European states and the United States, politically and technologically. Nevertheless, it was observed that the occurrence of negativities was under the impact of economic variables, especially in the United States, where there was extensive aircraft manufacturing and the existence of substitutions regarding other transportation modes. Safety development in the world of civil aviation context regarding business wave cycles is shown in Figure 3.



**Figure 3.** Shows the distribution of the events in a specific five-period criteria

There are two axes in the safety development stages of the civil aviation industry. As the X-axis shows time, the y-axis shows increased safety understanding in civil aviation. B curve the changes in civil aviation, on the other side A2 line is a reminder of the continual increasing process in comprehension of civil aviation regarding the development of safety in light of the arguments in technological, political and economic dimensions (It can be added here, social attitudes can be added to interpret to this line). A1 ve A3 lines show the possibilities of deviations from the A2 line (Sudden and unexpected events can change the industry structure). Point 1 illustrates the Wright brothers' flight on 17th December 1903 in the United States as the first aircraft when it was assumed at the beginning of civil aviation activities. Point 2 shows the First World War period between the years of 1914-18, Point 3 depicts the Great Depression process, and Point 4 points to the Second World War period of 1939-45.



## 5. Conclusion

According to the findings, the period, which was subjected to this research, is one of the intensive periods of civil aviation politically, economically and technologically. The research shows that the conformity of these three dimensions is important regarding aviation safety. If there is a gap in only one of these dimensions, a safety problem is an indispensable reality. On the other hand, wave and cycle understanding of Marxist and Neomaxist is very important in economics to describe the triggering events in history. Accordingly, the great depression changed the reasoning of economics regarding state policies, the birth of Keynesian economics, and the patterns of consumption, saving and spending of economic actors. Depending on the changes in business cycle understanding, it can be concluded that safety problems occurred in the following years of the Great Depression, especially in the United States. These findings contribute to answering the historical journey of the safety concept regarding economic, political and technological dimensions.

The main acceptances, which indicate that technological and political changes have an impact on safety development, are also corrected. The aviation safety experienced a boom during the periods of World War 1 and World War 2 periods in parallel with business cycles. Civil aviation has an idiosyncratic structure and character; for this reason, the realities should be interpreted rigorously. A similar analysis can be designed for other political, technological and economic events, such as the position of global aviation security on the 11th of September or the impacts of COVID-19 on civil aviation. Nevertheless, a 3-dimensional approach should be used for a total description.

**Conflicts of Interest:** The author declares no conflict of interest.

## References

- [1] Taneja, N. K. (1990). Introduction to Civil Aviation. *Journal of Aviation/Aerospace Education & Research*, 1(1). DOI: <https://doi.org/10.58940/2329-258X.1002>
- [2] Diamond Jr, A. M. (2006). Schumpeter's creative destruction: A review of the evidence. *Journal of Private Enterprise*, 22(1), 120.
- [3] Nicholas, T. (2003). Why Schumpeter was right: innovation, market power, and creative destruction in 1920s America. *The Journal of Economic History*, 63(4), 1023-1058.
- [4] Caballero, R. J. (2010). Creative destruction. In *Economic growth* (pp. 24-29). London: Palgrave Macmillan UK.
- [5] Reinert, H., & Reinert, E. S. (2006). Creative destruction in economics: Nietzsche, Sombart, Schumpeter. *Friedrich Nietzsche (1844–1900). Economy and Society*, 55-85.
- [6] Apostol, E. I., Țițu, A. M., Tertoreanu, P., and Moisesescu, I. (2022). Specific Aspects Of Quality And Safety Management In The Aerospace Field. In *Proceedings of the International Management Conference* (Vol. 16, No. 1, pp. 4-11). Faculty of Management, Academy of Economic Studies, Bucharest, Romania.
- [7] Ranasinghe, K., Sabatini, R., Gardi, A., Bijjahalli, S., Kapoor, R., Fahey, T., and Thangavel, K. (2022). Advances in Integrated System Health Management for mission-essential and safety-critical aerospace applications. *Progress in Aerospace Sciences*, 128, 100758.
- [8] Luxhøj, J. T. (2013). Predictive safety analytics for complex aerospace systems. *Procedia Computer Science*, 20, 331-336.
- [9] Teske, B. E., & Adjekum, D. K. (2022). Understanding the relationship between High-Reliability Theory (HRT) of mindful organising and Safety Management Systems (SMS) within the aerospace industry: A cross-sectional quantitative assessment. *Journal Of Safety Science And Resilience*, 3(2), 105-114.
- [10] Wolf, H. (2012, March). The emerging role of safety management systems in aerospace. In *2012 IEEE Aerospace Conference* (pp. 1-11). IEEE.
- [11] Janic, M. (2000). An assessment of risk and safety in civil aviation. *Journal of Air Transport Management*, 6(1), 43-50.



- [12] Saroj, P., and Dhanju, S. S. (2019). Conflict, Society, and Marxism. A Critical Analysis. *Research Journal of English Language and Literature*, 7(4), 315-319.
- [13] Schaff, A. (1973). Marxist theory on revolution and violence. *Journal of the History of Ideas*, 34(2), 263-270.
- [14] Hollander, P. (1982). Research on Marxist societies: the relationship between theory and practice. *Annual Review of Sociology*, 8(1), 319-351.
- [15] Clarke, S. (1990). The Marxist theory of overaccumulation and crisis. *Science & Society*, 54(4), 442-467.
- [16] de Groot, B., & Franses, P. H. (2008). Stability through cycles. *Technological Forecasting And Social Change*, 75(3), 301-311.
- [17] Ledenyov, D. O., and Ledenyov, V. O. (2013). On the accurate characterisation of business cycles in nonlinear dynamic financial and economic systems. *arXiv preprint arXiv:1304.4807*.
- [18] Bernard, L., Gevorkyan, A. V., Palley, T., and Semmler, W. (2014). Long-Wave Economic Cycles: The Contributions of Kondratieff, Kuznets, Schumpeter, Kalecki, Goodwin, Kaldor, and Minsky. 'Kondratieff Waves' Yearbook, 120.
- [19] Jadevicius, A., and Huston, S. (2014). A "family of cycles"—major and auxiliary business cycles. *Journal of Property Investment & Finance*, 32(3), 306-323.
- [20] Burciu, A., and Kicsi, R. (2014). CYCLICITY & CHAOTICS IN POST-CRISIS CONTEXT. *Annales Universitatis Apulensis: Series Oeconomica*, 16(1), 33.
- [21] C. Juglar, *Des Crises Commerciales Et Leur Retour Périodique En France, en Angleterre, et aux états-Unis*, Guillaumin et compagnie, Paris, 1862.
- [22] J. Kitchin, *Cycles and trends in economic factors*, *Rev. Econ. Stat.* 5 (1923) 10–16.
- [23] S.S. Kuznets, *Secular Movements in Production and Prices, Their Nature and Their Bearing upon Cyclical Fluctuations*, Houghton Mifflin, The Riverside Press, Boston, 1930
- [24] N.D. Kondratieff (1935), *The long waves in economic life*, *Rev. Econ. Stat.* 17. 105–115.
- [25] J.A. Schumpeter, *Business Cycles: A Theoretical, Historical and Statistical Analysis of the Capitalist Process*, McGraw-Hill, New York, 1939.
- [26] Oraldi, A. (2023). Technology and Society in Habermas' Early Social Theory: Towards a Critical Theory of Technology Beyond Instrumentalism. *Krisis| Journal for Contemporary Philosophy*, 43(1), 66-84.
- [27] Dreyfus, H. L. (1997). Heidegger on gaining a free relation to technology. *Technology and values*, 4, 1-54.
- [28] Tassone, G. (2002). The possible wonders of technology. Beyond Habermas towards Marcuse: a critical framework for technological progress. In *Historical Materialism and Social Evolution* (pp. 190-212). London: Palgrave Macmillan UK.
- [29] Amiradakis, M. J. (2019). Habermas, mass communication technology and the future of the public sphere. *South African Journal of Philosophy*, 38(2), 149-165.
- [30] Feenberg, Andrew. "Incommensurable paradigms: Values and the environment." In *Pragmatic Sustainability*, pp. 269-283. Routledge, 2016.
- [31] Kavoulakos, K. (1998). Nature, science and technology in Habermas. *Democracy And Nature*, 4, 112-145.
- [32] Stockman, N. (1978). Habermas, Marcuse and the Aufhebung of science and technology. *Philosophy of the Social Sciences*, 8(1), 15-35.
- [33] Zaar, S., Van den Bossche, P., & Gijssels, W. (2024). Meaningful Experiences for Leadership Development in Higher Education: Moments that Matter for Shaping Knowledge, Skills, and Identity. *Leader Identity Development*, 95.
- [34] Woodman, S., Bearman, C., & Hayes, P. (2024). Aviation safety and accident survivability: Where is the need for aviation rescue firefighting services greatest? *Safety Science*, 173, 106465.
- [35] Steen, R., Norman, J. E., Bergström, J., and Damm, G. F. (2024). Dark knights: Exploring resilience and hidden workarounds in commercial aviation through mixed methods. *Safety Science*, 175, 106498.
- [36] Gill, G. K., and Shergill, G. S. (2004). Perceptions of safety management and safety culture in the aviation industry in New Zealand. *Journal of Air Transport Management*, 10(4), 231-237.
- [37] Yotsov Ivo (2023), *Economic Cycles As A Tool For Analysis Of The Global Political Situation*, <https://ejournal.vfu.bg/pdfs/Иво%20Йоцов,%20Икономическите%20цикли%20като%20инструмент.pdf>, Access Time: 05.06.2023.
- [38] Yotsov Ivo (2023), *Economic Cycles As A Tool For Analysis Of The Global Political Situation*, <https://ejournal.vfu.bg/pdfs/Иво%20Йоцов,%20Икономическите%20цикли%20като%20инструмент.pdf>, Access Time: 05.06.2023.



- [39] Muss, J. A. (1977). Aircraft Noise: Federal Pre-Emption of Local Control, Concorde and Other Recent Cases. *J. Air L. & Com.*, 43, 753.
- [40] Anderson, J. (1978). Decision Analysis in Environmental Decisionmaking: Improving the Concorde Balance. *Colum. J. Envtl. L.*, 5, 156.
- [41] Fahey, D. W., Keim, E. R., Boering, K. A., Brock, C. A., Wilson, J. C., Jonsson, H. H., ... and Chan, K. R. (1995). Emission measurements of the Concorde supersonic aircraft in the lower stratosphere. *Science*, 270(5233), 70-74.
- [42] Libby, J. E. (1992). The Politics of Aviation [Review of Peaceful Air Warfare: The United States, Britain, and the Politics of International Aviation.; The Wings of Democracy: The Influence of Air Power on the Roosevelt Administration, 1933-1941. The Politics of Aircraft: Building an American Military Industry, by A. P. Dobson, J. S. Underwood, & J. V. Meulen. *Reviews in American History*, 20(4), 549–554. <https://doi.org/10.2307/2702874>.
- [43] Bruce, J. (2021). The Development of International Civil Aviation Regulations, 1899-1944.
- [44] Stannard, H. (1945). Civil Aviation: A Historical Survey. *International Affairs (Royal Institute of International Affairs 1944-)*, 21(4), 497-511.
- [45] Goldstrom, J. (1927). Safety in Aviation Improving. *Current History (1916-1940)*, 26(1), 37-40.
- [46] Batteau, Allen W. "The anthropology of aviation and flight safety." *Human Organisation* 60, no. 3 (2001): 201-211.
- [47] Kraus, T. (2015). Indianapolis: Where Civil Aviation Innovation Matured and Thrived. *Indiana Magazine of History*, 111(3), 249-285.
- [48] Johnson, C. W., and Holloway, C. M. (2007). A Historical Perspective on Aviation Accident Investigation. UK Safety-Critical Systems Club, Newcastle. URL: [http://www.dcs.gla.ac.uk/~johnson/papers/Johnson\\_Holloway\\_History\\_1,2](http://www.dcs.gla.ac.uk/~johnson/papers/Johnson_Holloway_History_1,2).
- [49] Stoop, J. A., and Kahan, J. P. (2005). Flying is the safest way to travel: How aviation was a pioneer in independent accident investigation—*European Journal of Transport and Infrastructure Research*, 5(2).
- [50] Kraus, T. L. (2010). Celebrating a history of excellence: Federal Aviation Administration/Civil Aviation Administration of China executive-level cooperation and the agreement process.
- [51] Oster Jr, C. V., & Strong, J. S. (1992). The worldwide aviation safety record. *Logistics and Transportation Review*, 28(1), 23.
- [52] Moghimi-Esfandabadi, M. H., Djavareshkian, M. H., & Abedi, S. (2023). Significance of aviation safety, its evaluation, and ways to strengthen security. *International Journal of Reliability, Risk and Safety: Theory and Application*, 6(2), 37-45.
- [53] Houston, Stephen. "Aircrew exposure to handheld laser pointers: the potential for retinal damage." *Aviation, space, and environmental medicine* 82, no. 9 (2011): 921-922.
- [54] Barco, A. (2024). Safety Studies for European Space Nuclear Power Systems (Doctoral dissertation, University of Leicester).
- [55] Wallerstein, I. (2011). The modern world-system II: Mercantilism and the consolidation of the European world-economy, 1600–1750 (Vol. 2). Univ of California Press.
- [56] Wallerstein, I. (2011). The modern world-system III: The second era of great expansion of the capitalist world-economy, the 1730s–1840s (Vol. 3). Univ of California Press.
- [57] Wallerstein, I. (2011). The modern world-system I: Capitalist agriculture and the origins of the European world-economy in the sixteenth century (Vol. 1). Univ of California Press.
- [58] Lyotard, J. F. (1994). The postmodern condition. The postmodern turn: new perspectives on modern theory, 27-38.
- [59] Foucault, M. (2013). *Archaeology of Knowledge*. Routledge.
- [60] Temin, P. (2010). The great recession & the great depression. *Daedalus*, 139(4), 115-124.
- [61] Elder, G. H. (2018). *Children of the great depression*. Routledge.