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Review

The Impacts of COVID-19 on Real Estate Market Dynamics: A Systematic Literature Review of Emerging Trends

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Abstract: The real estate market constitutes one of the major sectors that was influenced by the COVID-19 pandemic. It is therefore useful to understand the ways in which COVID-19 has changed the dynamics of the real estate market, establishing new trends in different market segments. The health crisis has upset the consolidated "human normality" by spreading new behaviors and involving almost all sectors. Among economic fields, the identification of temporary and permanent impacts on the real estate market is fundamental to assess the consequences worldwide and to evaluate countries' resilience ability. The aim of the research is to provide a systematic literature review on the existent academic insights in order to identify the aspects that have been mainly addressed regarding the real estate market's impacts from COVID-19 and to grasp how the real estate market dynamics have changed. Thus, through five structured steps—from the formulation of research questions formulation to an analysis and discussion of the selected papers for drafting overall conclusions—102 research papers published in the period between the second half of 2020 and the first half of 2023 collected from Scopus and Google Scholar were reviewed and examined. The findings reveal that (i) the housing market has been the most analyzed, (ii) the period between 2021 and 2022 has been the most scientifically prolific, (iii) the US real estate market has been the most studied, (iv) American authors have been the most active on the subject, (v) and the "article" type of research paper has been the most published. These results provide the basis for future research developments on COVID-19 and real estate market dynamics, supporting the implementation of recovery plan strategies and decision-making processes of the market operators for improving the sector.

Keywords: COVID-19 effects; literature review; real estate market; housing market; commercial market; offices market; global real estate dynamics

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1. Introduction

During the last several years, the COVID-19 pandemic has not only represented a global health emergency but has also led to a serious economic and labor market crisis, which has had a huge impact on communities. The timely adoption of effective and coordinated measures by central governments sought to limit the large-scale effects as much as possible in order to strengthen employment and income and support the economies of different countries. In this sense, the International Labour Organisation has established four fundamental pillars on which strategic policies for economic recovery in response to the emergency from COVID-19 should be based. These pillars concern (i) incentives for employment through expansionary fiscal and monetary measures and loans for most affected sectors, (ii) support for enterprises with income safeguarding actions, (iii) protection for workers through the adoption of remote work, (iv) and the development of job solutions based on social dialogue in order to strengthen work resilience to new social dynamics [1].

1.1. Overview of the Overall Effects of COVID-19

The effects that the pandemic has generated concern all fields, starting from the demographic one (population and health), passing through the detected high excess of mortality, to the contraction of migratory movements, the upheaval of the population's habits and free-time activities, including the use of leisure facilities [2–8]. Moreover, all economic sectors—agriculture, energy, transport, tourism, etc.—have been affected by the pandemic, both from quantitative and qualitative points of view, with the exacerbation of inequalities to the detriment of segments of the population already in a vulnerable condition before the pandemic. On the one hand, in 2020, this caused huge losses due to the forced stop periods; on the other hand, it led to a strong impulse to experiment with important technological and organizational changes destined to consolidate over time and still visible today (following the declaration of the end of the health emergency made official on 5 May 2023 by the World Health Organization [9]). In fact, an important role was assumed by the consequences of the measures aimed at containing the infection spread, including those on territorial mobility, especially during the first pandemic phase in 2020 [10–12]. In this sense, the impact of the pandemic on migratory flows is closely linked both to the direct effect of the restrictions on international mobility, implemented to counter the fast-spreading virus, and to the negative influence of the climate of uncertainty that has hindered migratory projects. Therefore, the impact of the pandemic has resulted in diversified implications for human behaviors and activities, which, overall, have profoundly transformed and consolidated some habits. Although some impacts have diminished and neutralized in the months following the forced confinement periods, allowing for a return to a life closer to the pre-crisis one, some others, instead, have determined a rise in new behavioral mechanisms that could last over time [13]. For example, in Italy, starting on 26 April 2021, a progressive easing of the confinement measures regarding restaurants, events open to the public, school activities, etc. has been established. As the vaccinated population increased, the spread of COVID-19 decreased. In the formation of these transformative processes, the digital industry has strongly imposed itself, accelerating dynamics that had already started or were ongoing (e.g., smart working), stabilizing alternative only tested models, and showing the numerous potentialities of the use of digital technologies during the restriction measures [14–16]. The deep and widespread crisis connected to the COVID-19 pandemic was limited in time for most of the business system and highly differentiated from the involved production or service sectors. In absolute terms, the most affected markets have been the sectors of tourist services (accommodations and catering) and recreational services (gyms, cinemas, theatres, and discos) due to prolonged administrative closures, restrictions on mobility, and a widespread prudential attitude of people. Conversely, considering the entire pandemic period, which started 11 March 2020 (when the WHO declared pandemic status), the industrial activities have been less affected by the health crisis due to the fact that in the subsequent periods of acute phases, general recovery has been observed. Economic activity has mainly returned to pre-crisis production levels, despite the new weakening factors induced by the acceleration of input and consumer prices strictly associated with the geopolitical situation caused by the Ukraine conflict. The economic [17–22], social [23–25], environmental [26–28], cultural [29–33], and demographic [34–37] impacts of the COVID-19 pandemic, which have also triggered imbalances in the financial global sphere, have been especially reflected in the stock [38–41] and real estate markets. The variations caused by the lifestyle changes have turned into new supply and demand dynamics within all the different real estate segments, such as residential, commercial, retail, offices, etc. In this global scenario, characterized by relevant uncertainty, a "new normal" approach has been defined in order to meet the changing community needs. Also, in this field, technology has played a key role, becoming an integral part of the real estate sales processes in order to build a communication strategy capable of adapting to the new needs of potential buyers and satisfying the requests of sellers, in the cases of sales, leases, and investments.

1.2. Aims of the Review

The relevance of the present review is strictly related to the current need to develop investigations into the effects caused by the pandemic on the economic sectors and, in particular, on the real estate market. The urge to identify the COVID-19 *temporary* impacts and the *permanent* ones could help the definition of an overall framework of the main consequences on the real estate market mechanisms in order to summarize new trends and behaviors. In this sense, the attention paid by the academic community to the analysis of the emergency implications in the different fields (social, health, economic, tourism, labor, etc.) attests the high significance of the topic in the last four years (2020–2023). The world of research has focused—and currently continues to focus on—the debate on the fundamental changes derived from the COVID-19 outbreak. One especially crucial issue addressed by scholars from various scientific disciplines concerns the 'ordinary' reaction to the exogenous impact. The need to create more livable and sustainable cities is connected to the notion of "resilience", i.e., the ability to resist exogenous events deemed unpredictable and to adapt to the modifications of the social and economic structure that may occur [42,43]. Future cities, in fact, should be able to adapt to ongoing transformation processes and unexpected and sudden events, based on the definition of an urban system in which each part is connected to the others and is included in a holistic vision of human settlements. Sudden event management models should provide more resilient responses in the presence of exogenous impacts in order to reduce the impacts generated on social and economic structures. The research on the topic allows for exploring several aspects of the COVID-19 pandemic in order to outline a general overview of the main questions and to give useful guidelines to address likely new and future exogenous impacts and related replies and solutions. The need to prepare to face challenges (environmental, social, health, cultural, etc.) and to vary long-standing dynamics represents a current prerogative of resilient future cities.

This review is part of an illustrated framework and provides a systematic analysis of the literature aimed at identifying the aspects that have been mainly addressed regarding the impacts of COVID-19 on the real estate market and grasping how the real estate market dynamics have been changed. To successfully achieve the fixed literature review's goals, this paper is articulated as follows. The second section presents the phases of the method carried out for identifying the papers. The third section consists of the analysis of the records included in the review according to the year of the publication, the geographical origins of the authors, the examined geographical context, the type of the research paper, and the investigated real estate market segment. The fourth section summarizes the most relevant selected contributions regarding the global real estate market and the residential, commercial, and office segments. In the fifth section, the conclusions of the work are provided.

2. Methods

In the present study, a systematic literature review structured into five phases was carried out to assess the implications of COVID-19 on the real estate market dynamics. The five phases were: (i) formulation of the questions according to the purposes of the work, (ii) Scopus and Google Scholar searches; (iii) research paper selection; (iv) analysis and synthesis of the selected papers; (v) discussion and conclusions.

The first phase involved the development of two research questions in order to support and better guide the achievement of the research's purposes, specifically indicated as follows:

Q1: Which aspects have been mainly addressed regarding the impacts of COVID-19 on the real estate market?

Q2: How have the real estate market dynamics changed due to the spread of COVID-19?

The second phase consisted of the identification of the databases to be used in the bibliographic research and in the selection of the keywords capable of identifying the research papers that met the aims of the work. Thus, Google Scholar and Scopus were selected in this study as the most suitable. Google Scholar is a freely available search engine that searches across a wide range of academic sources, including journal articles, book chapters, dissertations, and conference papers. Scopus is the largest multidisciplinary abstract and citation database of peer-reviewed literature and includes about 6.8 million conference papers and 21,000 peer-reviewed journals. For these reasons, both databases were used based on their reliability and accuracy. The keyword combinations used for searching in both the databases were: COVID-19 effects on housing/commercial/office/industrial/hospitality market—COVID-19 impacts on real estate dynamics—COVID-19 impacts on global real estate market—COVID-19 effects on housing selling prices—COVID-19 effects on rental housing/commercial/office market—COVID-19 housing/commercial/real estate demand variations. The mentioned terms were used to initially identify papers by title, abstract, and keywords. The designated timespan refers to the time between the initial outbreak of the pandemic in 2020 and when this research was carried out, i.e., June 2023.

The third phase applied exclusion criteria, meaning that only research papers that studied the real estate market during COVID-19 were included in the collection phase, and papers lacking coverage of this were excluded. Only English language papers with accessible full text were analyzed in order to ensure—through the content analysis—that the papers responded to the established research questions, Q1 and Q2. In this way, an initial overall database of 360 research papers was obtained. The application of the exclusion criteria allowed us to acquire a final dataset of 102 research papers.

The fourth phase concerned the analysis of the contents of the final 102 research papers from the following points of view: no. of publications per year, geographical provenance of the authors, geographical context of analysis, research paper type and real estate segment. In the fifth phase, discussions about the content analysis were carried out, and the conclusions of the work are provided in order to outline an overall overview of the impacts of COVID-19. Figure 1 summarizes the literature review procedure for the current study.

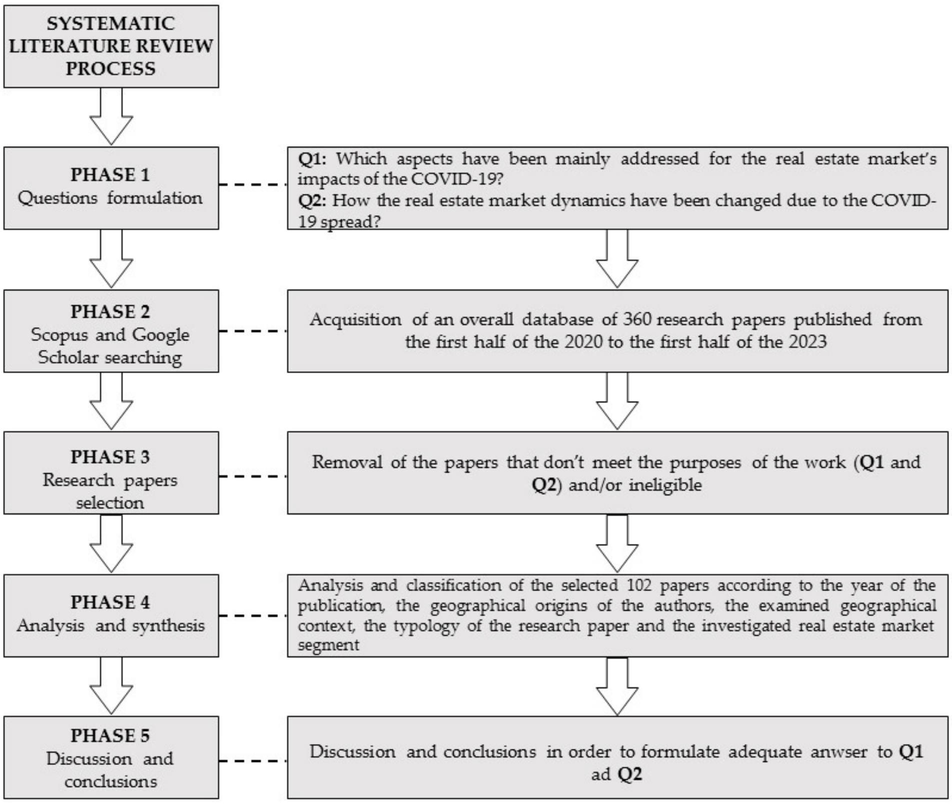

Figure 1. Flow chart of the literature review procedure developed in the present analysis.

Figure 2 presents the Preferred Reporting Items for Systematic reviews and Meta-Analysis (PRISMA) flow diagram for the current study.

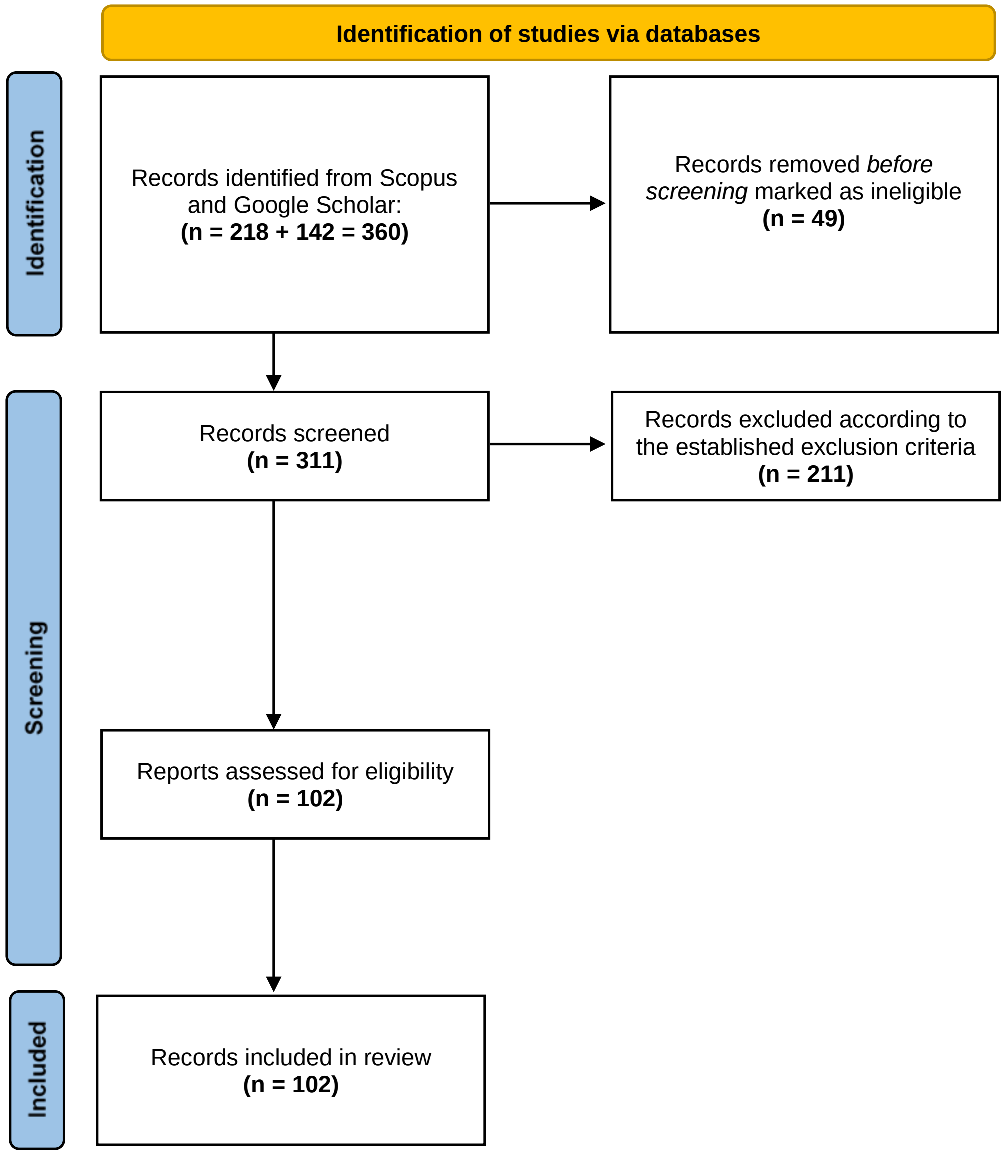

Figure 2. PRISMA flow chart of the literature review.

The "Identification" step involved record identification from the Scopus and Google Scholar titles, abstracts, and keywords of the 360 contributions retrieved, and we identified studies that were ineligible for screening (49 papers). The subsequent step, "Screening", focused on the filtering of the 311 papers identified using the exclusion criteria. The exclusion criteria relate to the characteristics of the papers, including their language (different from English), full-text availability, and their relevance to the effects of COVID-19 on the real estate market, resulting in the exclusion of 211 studies. Finally, of the initial 360 academic papers identified in the databases, 102 were found to be consistent with research questions Q1 and Q2, and their contents were analyzed.

3. Analysis of the Records Included in the Review

Based on the PRISMA results, 102 papers meeting the purposes of the work were identified. This section describes these papers, providing a general overview of their relevant features. In particular, each research paper was analyzed in terms of its year of publication, the authors' provenience, the examined geographical context, type, and investigated real estate market segment.

3.1. Numbers of Papers per Year

The 102 analyzed articles cover the period between the first half of 2020, the time of the initial spread of COVID-19 around the world, and the end of the first half of 2023, the time of this study (June 2023). In these three years, 37% of the 102 considered papers were published in 2021, followed by 35% in 2022, 19% in 2020, and only 9% in 2023. This temporal distribution seems to follow the natural development of the COVID-19 pandemic: the pandemic has been declared over (2023), and therefore, the smaller number of studies found in the literature is justified by the change in research topics towards more urgent problems, including the effects of the war in Ukraine on global markets. Moreover, it should be highlighted that for 2023, only six months were considered for the paper collection. Several papers were published in the second half of 2020, right after the spread of the pandemic, but for 2021 and 2022, it was possible to find most of the studies, specifically 74, due to the fact that these years can be considered the core of the pandemic disease. In particular, in order to efficiently and clearly detect the tangible effects of the health crisis on the real estate market dynamics, especially those that are not immediately measurable and visible, many authors conducted their works in the period between 2021 and 2022. In this period, the extent of the effects on the real estate market and, simultaneously, the different phases of the pandemic's evolution have allowed for the development of research. Figure 3 shows the distribution of the number of papers per year with reference to the sample of 102 articles analyzed. With reference to the last four years (2020–2023), the graph reports the percentages of published scientific contributions. The analysis allowed us to attest to the significance of the topic for academic communities during the full duration of the pandemic (2021 and 2022) while also considering the generally long publication time and the time during which the present review was written.

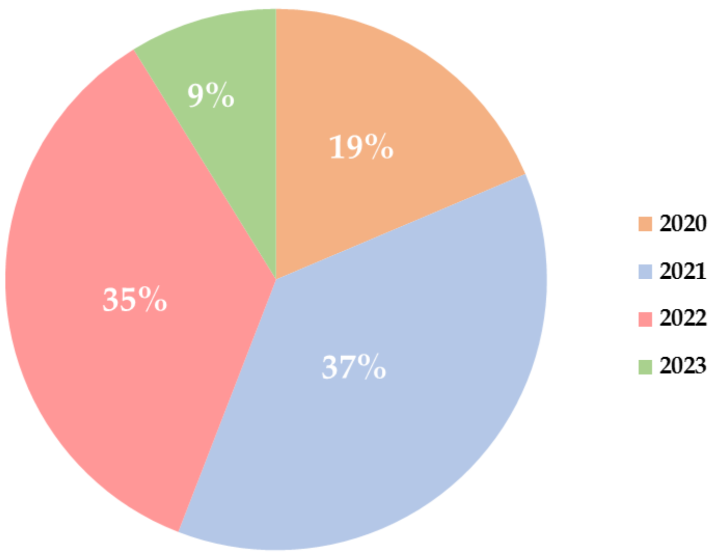

Figure 3. Percentage distribution of the 102 analyzed papers per year (2020–2023).

3.2. Number of Papers per Type

In the Scopus and Google Scholar databases, it is possible to find several academic papers which differ in the type of contribution. Among the 102 sample papers, four different types of academic contributions were identified: (i) reviews, (ii) opinion papers, (iii) proceedings or volume contributions, and (iv) articles. The "opinion paper" type included studies that contain relevant reflections or data examinations of the first evidence of variations in the property market following the spread of COVID-19. Most of the papers belonging to this category were published in the second half of 2020. The reason can easily be traced back to the scarcity of analytical data at the beginning of the pandemic. Many authors have provided their contributions to the subject, sharing interesting and critical reflections on: (i) how the residential market is changing, (ii) how the global real estate market is being impacted by COVID-19, (iii) how the economic recovery policies of local governments should be set up to curb serious repercussions on the real estate market. A total of 4 studies pertained to this type, out of the 10 proceedings and volume contributions and 8 reviews that were selected. Most of the collected papers were research articles, with 80 out of 102. This composition allows us to say that both the conferences, with an additional collection of contributions to volumes, and the journals, with special issues and dedicated topics, have given great attention to the issue of COVID-19 in the construction sector, resulting in widespread discussion. The fact that most of the research papers were articles could be due to the complexity of the analyses necessary for the study of the effects of COVID-19 on the real estate sector, requiring articulated and structured research works and not suitably adequate to be traced back to the form of proceedings or volume contributions. In Figure 4, the distribution of the analyzed papers within the four mentioned typologies is reported. With reference to the graph, the largest number of scientific contributions is constituted by article; this is in line with the relevance of the topics dealt with in the different studies that were fit for this type of paper. In this sense, it should be outlined that numerous special issues promoted by prestigious journals have been launched in the last several years concerning the analysis of specific aspects of the COVID-19 pandemic.

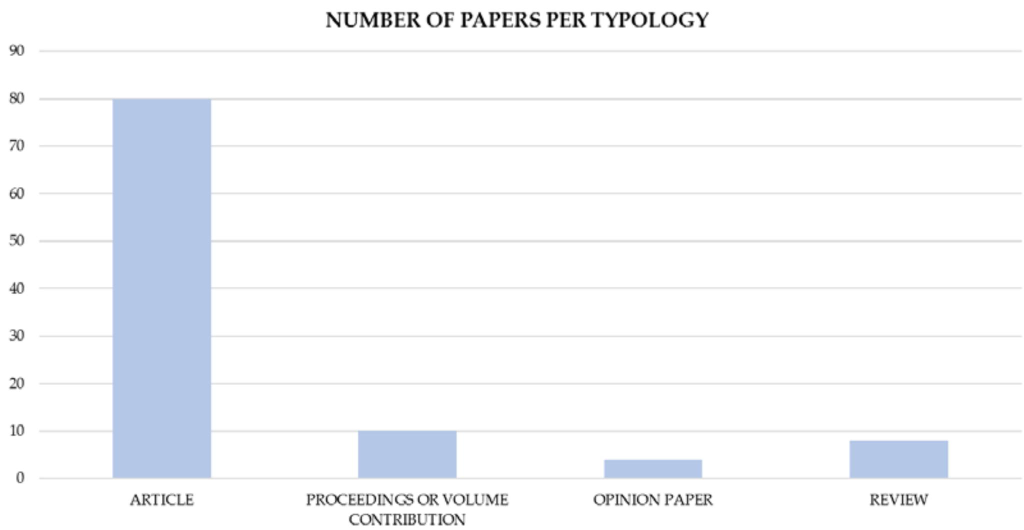

Figure 4. Number of papers per type among the 102 analyzed.

3.3. Number of Papers per Geographical Provenance of the Authors

Another important issue that helps to identify the main effects of COVID-19 on real estate dynamics is investigating the geographical provenance of the authors. This analysis provides the possibility of understanding in which state the relationship between the real estate market and COVID-19 has received more academic attention. As shown in Figure 5, contrary to what is generally expected about the prevalence of China in studies on the building sector, the United States of America (USA) had the most. Among the 102 papers, 114 origin states were identified. Exactly 26 authors came from the USA, followed by 14 from the United Kingdom, and China came in third with 11 authors. Less attention has been paid by the authors of academic institutions based in Slovakia, Germany, Serbia, Kosovo, Russia, Japan, Portugal, Sweden, Netherlands, Ireland, Korea, Pakistan, Israel, Turkey, and Switzerland. Several reasons that support these findings can be proposed. First of all, the political attention given to the topic and public opinion may have played a crucial role in the early research on the real estate sector, and the USA and the United Kingdom are certainly particularly focused on this issue. Moreover, it is important to highlight that there is not always an overlap between the origin of the authors and the geographical context of the analysis (described in the following subparagraph), and therefore, it is good to consider the origin of the authors as a proxy element of the socio-economic attention paid to the real estate sector in this period. This in turn reflects the importance that the property sector holds in the economies of the authors' country of origin, and these are useful data for understanding the significance of the modifications that COVID-19 caused in the relevant real estate market.

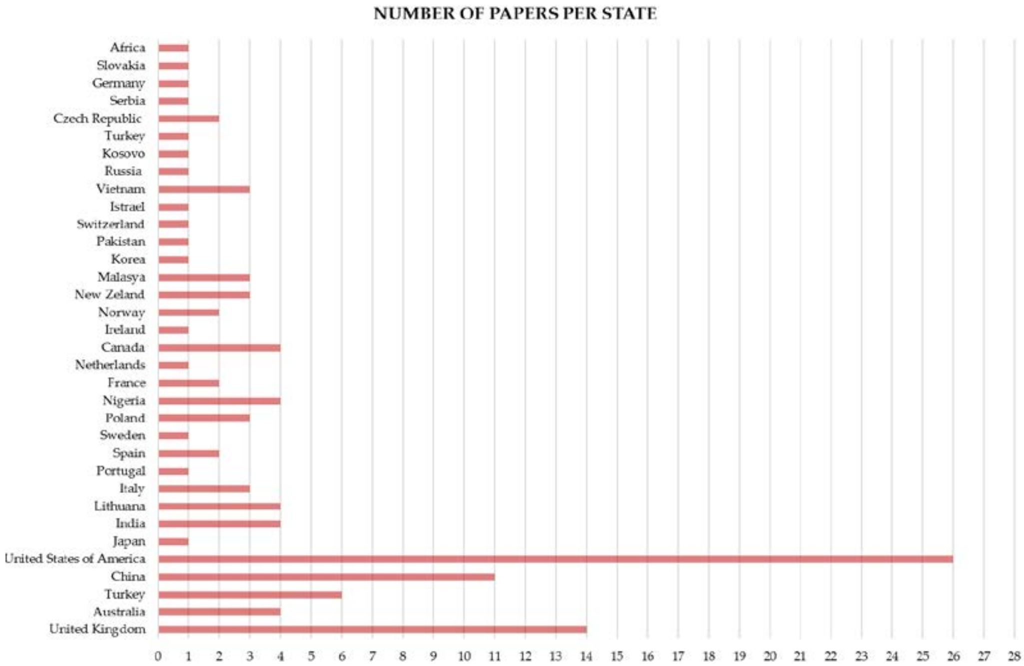

Figure 5. Number of papers per geographical provenance of the authors among the 102 papers.

The various states of origin of the authors of the analyzed works are shown in the ordinate axes, and a number of contributions is associated with each one. It should be emphasized that numerous studies have been conducted by authors from different countries; these demonstrate the relevant collaborations between different academic communities aimed at integrating and improving the "local" knowledge of each working group on the topic of COVID-19. In this regard, comparisons on such a global issue are highlighted.

3.4. Number of Papers per Geographical Context of Analysis

In the examination of the geographical context of the analysis, it is important to understand which real estate markets were considered the most relevant during the spread of COVID-19 and which of them was the most transparent in terms of available data necessary to carry out the research development. The findings shown in Figure 6 suggest that in absolute terms, the USA's real estate market is the most studied, followed by those of China and of United Kingdom. It should be pointed out that 13 out of 102 papers analyzed multiple countries within the same study. This is an interesting result, consistent with the empirical evidence. According to this, the USA, China and the United Kingdom are the countries that have contributed the most to the research on the effects of COVID-19 on the dynamics of the property market. At the same time, these markets, representing the main global real estate markets, have allowed us to analyze the mechanisms of the major world markets in terms of the potential repercussions on local ones, understand the extent of the implications of COVID-19 on the construction sector, and establish the trends and changes to carefully determine economic recovery policies.

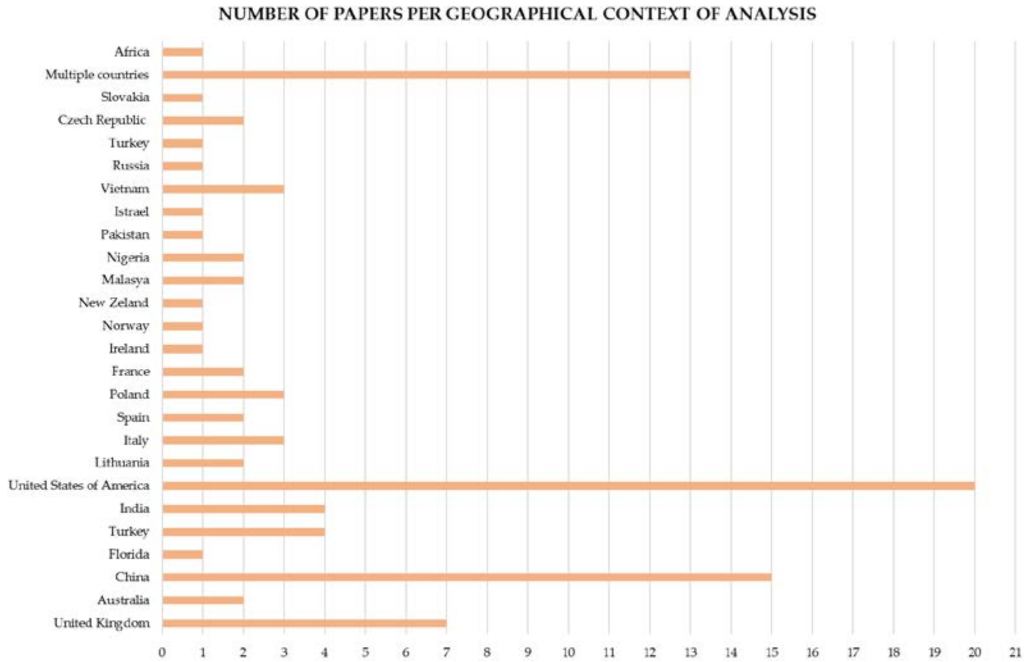

Figure 6. Number of papers per geographical context of analysis.

The graph reports the countries in which the analysis of COVID-19 effects has been most addressed (United States of America and China). In particular, these countries are those in which the highest impacts on the economic market have been detected: in fact, on 1 January, the USA was the most affected country in the world (in absolute numbers), with over 102 million confirmed cases and over 1,117,000 deaths, and China was the first nation from which the virus spread worldwide. The large number of studies carried out on multiple countries demonstrate the attention given by academic communities to the comparison of the effects of COVID-19 in different geographical contexts, in order to define a framework for the observed implications.

3.5. Number of Papers per Real Estate Market Segment Analyzed

The real estate market can be subdivided into different segments according to the features of the properties and the intended use. The principal real estate market segments are residential, commercial, and retail. Nevertheless, this distinction is sometimes not so clear-cut, especially for income-producing properties. For explanatory purposes, and on the basis of the declarations found in the 102 papers, three types of market segments were identified: (i) residential, (ii) commercial, and (iii) offices. Given the presence of several papers concerning the global real estate market and the examination of mixed intended uses in the same studies, two other "segments" were created. It should be specified that in the "mixed uses" segment, the studies that simultaneously analyzed the impact of COVID-19 on offices and residential properties or industrial and hospital buildings were included. However, the "global real estate market" segment is proposed for collecting studies that explore the trends and dynamics of global real estate indexes in order to detect the wider COVID-19 influences and not investigating a specific intended use.

Specifically, 58 research papers out of 102 focused on the residential segment, followed by global real estate, with 16 out of 102, the commercial segment with 14 out of 102, and the offices and mixed-use segments with 8 and 6, respectively, out of 102. These findings can be linked to several possible reasons, but they appear to be consistent with the empirical evidence. Firstly, the residential properties are strongly associated with the health restrictions introduced by governments to limit the transmission of infections, and therefore, many studies have examined different housing issues, such as the flexibility of spaces for remote working, the quality of environments, the healthiness of the buildings, and appreciation for the presence of gardens and green spaces or changes in the appreciation for various characteristics of the surrounding urban context, such as proximity to public transport. Secondly, due to the introduction and the spread of different modalities of remote working and the improvement in the logistics sector to guarantee the delivery of goods and services despite the imposed restrictions, the commercial and office real estate market dynamics have been largely investigated.

In Figure 7, the distribution of papers according to the analyzed real estate market segment is represented. The histogram presents the relevance assumed by the residential market for which (i) the selling prices and rental fees trends, (ii) the transaction volume changes, and (iii) the variations in the housing demand have been mainly examined in the selected studies. For the time horizon considered in the present research, the analysis of the other real estate market segments confirms the lower interest of scholars in investigating the effects connected to the COVID-19 pandemic, especially due to the fundamental role played by the residential sector in the economic dynamics. Moreover, another possible reason for these findings could be related to the central role that the residential properties have assumed during the restrictions imposed by the governmental measures.

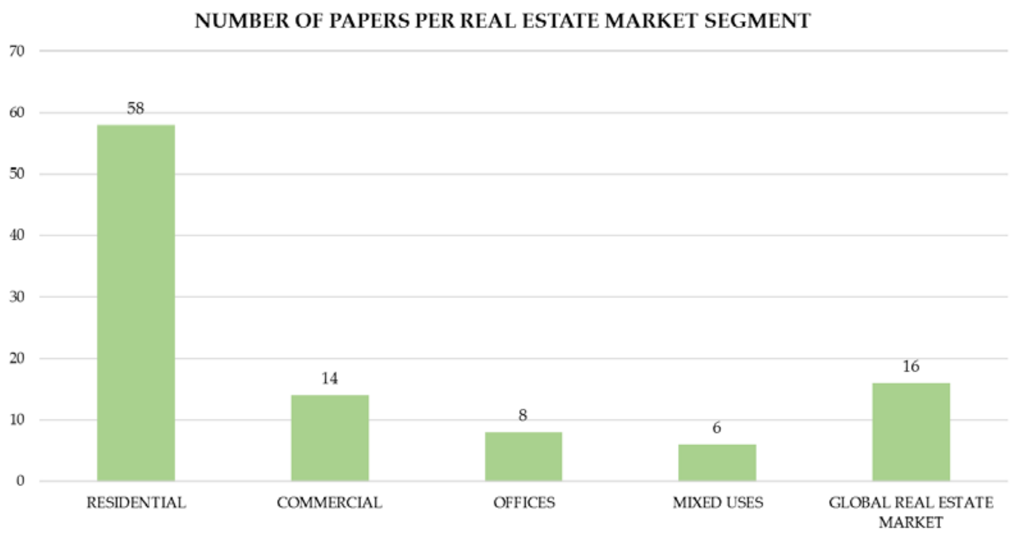

Figure 7. Number of papers per real estate market segment.

4. Discussion of the Results

In order to detect the aspects that have been mainly addressed regarding the impacts of COVID-19 on the property market and to grasp how the real estate market dynamics have changed, in the following sub-sections, an overview of the papers that support the achievement of these aims is provided.

4.1. Residential Market

The analysis of the implications of the COVID-19 pandemic on the residential market segment mainly concerned the exploration of housing price variations and changes in the market dynamics in terms of demand and supply [44–80]. It is possible to identify works that both report positive and negative impacts of this exogenous event on the real estate market's dynamics in several countries, as shown in the literature review of Mohammed et al. [81]. For example, Li and Zhang [82] studied spatial models and the heterogeneous allocation of housing price differentials in different contexts of the USA property market during the crisis and concluded that the effects of COVID-19 on housing prices have changed across space, not only from central metropolitan areas to rural ones, but also from one urban area to another. Similarly, Nelson and Frost [83] studied the spatial and temporal patterns of transfers in the urban hierarchy since the beginning of the COVID-19 pandemic in New England and confirmed movements of the population from metropolitan central areas to micropolitan and noncore counties, which might be initiating a new rural gentrification phenomenon. Likewise, Desmet and Wacziarg [84] showed a more severe impact of COVID-19 on densely populated areas through the analysis of the correlations of infection cases and deaths across USA counties.

In the UK, the impacts of COVID-19 have been assessed with reference to the financialization of housing by Blakeley [85], arguing that significant reforms are fundamental as the pandemic could determine an increase in wealth inequality and exacerbate the housing crisis. Within the Chinese context, the impact of COVID-19 on the housing market constituted the focus of the research carried out by Yang and Zhou [86], who used the average housing price to capture the trends of local housing markets. Their findings showed considerably positive impacts of the pandemic on residential prices in the Yangtze River Delta region and they have suggested the use of effective price control by the central government. Tsai et al. [87] examined the fluctuations in the performance of city-center and peripheral housing markets in regions with popular tourist attractions after the COVID-19 restrictions, using a hedonic model to reveal that a substantial structural change was found in the suburban residential market; the volatility risk of the prices substantially decreased, triggering an increase in transaction premiums. In addition, because sellers raised their asking prices and the transaction time becomes longer, the sellers in the city-center housing market are particularly influenced by the dispositions' impacts.

With reference to Turkey, the impacts of the COVID-19 pandemic, loan packages, and other macroeconomic variables on the abnormal returns of residential prices were identified using three econometric steps, in which an event study, panel data examination for the regional and city levels, and a regression model were implemented [88].

The same methodology was applied for the determination of the factors affecting real estate prices during COVID-19 in the Nam Tu Liem and Cau Giay districts in Hanoi (Vietnam) [89].

Moreover, Hromada [90] analyzed the effects of the measures on the COVID-19 pandemic on the property market in the Czech Republic and evaluated real estate price offers published on specific servers, expecting a demand growth particularly for low-cost flats and rooms for rent with good public transport access to the city of Prague center and recognizing the higher importance of the quality of housing compared to the price factor. In addition, the same author [91] investigated the development of the construction market in the same geographical context (Czech Republic) during the years of the health emergency, providing useful outputs for professionals, researchers, and small and large investors through basic statistical methods of processing a large dataset. The variations in housing demand connected to the crisis are at the core of the research carried out by Tajani et al. [92], who aimed at structuring a methodology to evaluate the change that has occurred in the residential market demand as an outcome of anti-contagion measures, exploring six metropolitan Italian cities.

With regard to the housing green features, some authors, like Kaklauskas [93], have carried out a systematic analysis of the articles that provide a perspective on green housing before, during, and post-COVID-19, highlighting that building hygiene and comfort, the indoor environment, the design concept, and the household energy source are among the factors with a major impact on the preference towards green buildings.

Zhang and Pan [94] found evidence for the permanent asymmetric impacts of economic supports on real estate prices only in Austria and Switzerland among 58 examined countries during the period from 1 January 2020 to 3 September 2022.

The effects of the pandemic on the rental housing prices were carefully addressed by Subaşı and Baycan [95] in 81 provinces of Turkey through the use of a descriptive analysis and comparison of the exchange of unit rental prices and unit selling prices at the provincial scale. The findings demonstrated that the rental prices grew from March 2020 to December 2021 in the whole country. Furthermore, the outputs pointed out that the highest rental price increase arose in provinces located in Central and Eastern Anatolia. More attention to the short-term rental market was given by Sequera et al. [96], who analyzed how the COVID-19 emergency caused changes in the supply of short-term rentals and the type of demand of such rentals in Spain. The platform suppliers were able to mainly survive despite the sudden end to tourism demand, which was essentially stopped. Also, Shen and Wilkoff [97] empirically studied the implications of the spread of COVID-19 on the short-term rental market with a machine-learning algorithm to create a wide "cleanliness dictionary" to detect whether an *Airbnb* unit is clean. They found that properties that were perceived to be clean increased their income by 17.5% and their occupancy by 16.5%, moderating the negative impact due to the pandemic. Within this field, the second homes during and after the pandemic were studied by Zoğal et al. [98]. They observed that a potential change in tourist preferences could place second homes at the center of tourist activity as soon as travel restrictions were limited. Tenants' adherence to lease obligations is another interesting topic in this line of research on the residential housing market. Gbadegesin [99] used descriptive statistics, factor analysis, and computer-aided qualitative data analysis to reveal that, in Nigeria, except for tenant status and tenant family size, there was no relevant relationship between tenants' health conditions and the consequences of COVID-19 on tenant non-compliance with lease obligations.

In attempting to identify a likely new 2007–2009-type crisis, Afxentiou et al. [100] compared the current residential market conditions with those of 2007–2009 and concluded that the many of the factors that caused the 2007–2009 crisis are not occurring currently.

The different behaviors of luxury and low-end housing markets have been analyzed by Wang [101] by employing a difference-in-differences method. The findings first show that house prices, demand, and supply all decreased from March to May 2020 and increased in July and August 2020, with demand prevailing in the city of Los Angeles. Second, the drop in overall prices and demand before June mainly originated from the lower-priced market, whereas for the higher-priced market, limited changes in demand have been detected.

How COVID-19 has modified the link between to-metro and by-metro accessibility and housing prices was investigated by Yang et al. [102], who found interesting results using a hedonic price model. COVID-19 strongly influenced the value of to-metro accessibility, and the flattening of the to-metro price gradient is more discernible for big or high-priced houses. The shifting preference of residents has also been verified by a reduction in the quantity of house transactions in metro-adjacent areas. Bangura et al. [103] highlighted both the positive and negative effects generated by Australian economic policies for the recovery of the post-pandemic period on first-home buyers' dynamics. Table A1 in the Appendix A presents each analyzed reference examining the effects of COVID-19, and a summary of the most important findings is shown.

4.2. Commercial Market

The relationship between the COVID-19 pandemic and commercial properties has been examined both in terms of selling and rental price variations and the influencing factors for buyers, sellers, and tenants for the commercial segment [104]. In this framework, Rosenthal et al. [105] estimated a drastic decline in the rent premium associated with employment density, quantifying a commercial rent gradient drop of roughly 15% in transit cities. Furthermore, the USA commercial real estate loss value caused by COVID-19 was assessed using equity market data and the Real Estate Investment Trusts (REIT) analysis by Chong and Phillips [106]. In the same geographical territory, the liquidity effects measured by the demand–supply gap in terms of asset pricing implications of the health emergency for private commercial real estate markets have been quantified in eight metropolitan cities: the results show the highest predicted average price reduction (between 19% and 30%) in the city of New York [107].

Conversely, Croom et al., in 2020 [108], applied a hedonic method to develop a commercial real estate pricing model in order to compare the situations with and without COVID-19 and found no significant price changes in the considered USA cities when COVID-19 parameters were input data for the model.

The comparison between the urban and suburban commercial property transactions before and after the start of the pandemic carried out by Rolheiser [109] in the USA showed a substantial price decline post-January 2020 (−8%) and a non-constant spread of the effects across cities and building types. At the city level, the highest reduction was shown for buildings in cities with high rates of working from home (−12%) and long shifts (−11%), whereas, at the building level, a significant reduction in prices was observed for the oldest buildings, and for the suburban areas, stable and/or increasing prices in the post-pandemic period was detected.

With reference to a wide context of 23 advanced economies and 7 emerging market economies, the vulnerabilities in the commercial real estate sector following the public health crisis were analyzed by Deghi et al. [110] in order to quantify the extent to which commercial prices reflect macroeconomic fundamentals and to suggest "macroprudential policy" for curbing financial stability risks.

Through timely proprietary data and regression analysis, the changes in the commercial property rent dynamics due to COVID-19 in the Asia–Pacific region led to strong declines in rents of approximately 15% during the first six months of 2020, with the most significant reduction in the most exposed regions and in the retail property sector (for which a drop over 30% was found) [111].

In Spain, the analytical research of Fernández Cerezo et al. [112] aimed at exploring the evolution of commercial real estate transaction numbers and prices by assessing the effects of the pandemic on the activity and stock prices of the Spanish real estate investment trusts specialized in this market segment. For a better understanding of the main results that can be obtained from the analyzed studies, Table A2 in the Appendix A shows their summary.

E-Commerce Market

The analysis of the volatility in the commercial market due to the COVID-19 pandemic has been the topic of different contributions aimed at defining the extent of this exogenous impact on variations in real estate dynamics. The "new normal" introduced in the lockdown phases (smart working, etc.) had relevant implications also in the next phases of the pandemic, transforming the lifestyle and consolidating or creating new ordinary behaviors.

In this scenario, the purposes of various recent studies have concerned the analysis of the acceleration of e-commerce and digitalization on commercial real estate. For example, Nanda et al. [113] discussed strategy event data in the UK and insights obtained from interviews with retail asset managers and property owners using a mixed-method approach to determine the impact of the COVID-19 pandemic on the specific market and high street landscape, highlighting an urgent need to reposition the physical shops and recognizing digital platforms as key functions of multi-channel store businesses. Zhu [114] designed a real estate virtual e-commerce model based on big data technology by combining the advantages of e-commerce and virtual communities to collect platform data for analysis and processing to detect and meet the needs of customers and to encourage the fit and healthy development of the real estate sector. The same issue has been addressed by Sulaiman et al. [115] regarding the explanation of Matterport as a digital platform for a marketing approach through hyper-real 3D virtual tours, which aimed at helping potential buyers make decisions in the real estate business during COVID-19. Meanwhile, the impacts on the professional situation of people working in the real estate market (real estate agents, property managers, and valuators, etc.) in Poland have been analyzed through online surveys based on targeted questionnaires to identify the current and future/expected changes in this business type [116].

4.3. Office Market

The wide number of studies on the effects that COVID-19 has had on substantial modifications to locations at which work takes place, especially due to the widespread use of smart working, confirms the importance of these structural variations in real estate dynamics. In this sense, Hensher et al. [117] examined the relationship between the considerable growth of remote work and the responses from organizations in reviewing their office capacity requirements using the data of 459 businesses and related work spaces from pre-COVID-19 to April 2022 and stated intentions for 2023 for the Greater Sydney Metropolitan Area.

With a similar aim and through a structured online questionnaire survey, the paper by Barath and Schmidt [118] examined the potential sustainability of offices and identified the willingness of managers to transform or adapt to demands post-pandemic, discussing the changes that employers will make in terms of the work environment and office layout and assessing the attitude of managers toward the variations associated with a flexible office space to propose solutions for more effective work spaces in the future.

In [119], the influence of remote work on the office sector in New York city was determined by observing the high effects on both current and expected future cash flows for these properties and documenting large modifications in lease revenues, office occupancy, lease renewal rates, lease durations, and market rents. An overall 45% reduction in market values in 2020 and of 39% in the longer run were also found. Moreover, the authors pointed out the difference between higher-quality office buildings, for which an attenuation of these trends was detected due to the importance assigned to the quality standards of properties, and lower-quality office properties, for which more dramatic swings were outlined.

With reference to seven major Chinese cities, the research developed by Wang et al. [120] aimed to evaluate the direct effects of COVID-19 on office building rents and vacancy rates on the basis of a sentiment index, detecting an asymmetric effect, for which the COVID-19 sentiment index had a more substantial impact effect on rents where office vacancy was higher.

Also, Oladiran et al., [121] in their work, examined corporate firms across different industry sectors that have a business presence in the UK for analyzing the relationships among COVID-19, remote working, and changes to the firms' office space strategies. Their results revealed that firms were more inclined to make changes to the quantity of their office space rather than the quality. In line with this, how large UK corporate occupiers perceive the potential role of flexible work space in their office portfolios in a post-pandemic context was investigated by Cooke et al. [122]. Semi-structured interviews submitted to a sample of real estate managers indicated that although the pandemic has made corporate occupiers strongly re-assess where and when different work tasks have to be carried out, it is not yet evident whether this has significant implications for the flex space sector. The pandemic has certainly forced most large office occupiers to evaluate the role assumed by their office space. With the purpose of examining whether the shift to remote working during the COVID-19 crisis is going to diminish the need for renting large office space and how this emerging trend will impact the real estate market in Israel, Naor et al. [123] detected a reduction both in procuring office spaces and in their unitary price. Bangura and Lourens [124] analyzed the implications of the hybrid work arrangement on businesses and employee health and safety using the case study of Uni4 Online Westville Durban South Africa, showing that the post-COVID hybrid work modality can negatively affect workers on a psychological level. In Table A3 of the Appendix A, a summary of the main findings enhanced within the analyzed research papers of the office market are shown.

4.4. Mixed Uses

The real estate market is characterized by several segments that, in different ways and to various extents, have been affected by variations in their dynamics due to the onset of COVID-19. Due to the differences in the variations of the effects caused by the specific features and dynamics of each segment, some authors provided an analysis that simultaneously consists of an overview of multiple segments [125]. After the first stage of COVID-19 in 2020, different studies put forward some considerations on (i) variations in the residential, commercial, and financial real estate trends [126]; (ii) the world of real estate locations, in terms of consistent shifts in the location preferences of households and firms [127]; and (iii) the housing, commercial, and mortgage sectors [128].

In the more advanced phases of the pandemic, however, other authors explored in depth the dynamics of more than one real estate market segment. For example, Hoesli and Malle [129] reported that in the USA, UK, France, and Italy, retail and hospitality buildings, and to a minor extent, office properties, were the most impacted by COVID-19, whereas the housing and industrial segments were less affected by the emergency. The volumes of retail, office, and industrial properties of the metropolitan areas in Florida were examined by Wen et al. [130], who determined that the sales quantity of retail properties dropped instantly due to the impacts of COVID-19, but a strong recovery after one quarter was observed. Meanwhile, COVID-19 slowed the increase rate of rent for offices, in the short term, but the office rental market bounced back to about 70% just one quarter later. In comparison, the industrial segment witnessed a rise in the growth rate of sales and rent prices. In Table A4 of the Appendix A, a summary of the main findings of the analyzed research papers for the mixed-use category is reported.

4.5. Global Real Estate Market

The property market mechanisms have been turned upside down by COVID-19, strongly changing the market supply, demand, selling prices, and rental values [131]. Most of the studies aimed at evaluating the consequential pandemic effects on all aspects of the economy, including real estate, to provide recommendations to mitigate the influence of real estate transactions during similar pandemics in the future [132]. In this framework, Oyedeji [133] assessed real estate transactions in Lagos (Nigeria) during the health crisis through a systematic random sampling technique on the basis of professional briefs on properties available for letting and sales. The author found that warehouses are in the property class that is "most readily available for occupation and demand", with the highest selling and rental values during this phase, and identifying bank transactions as the most predominant problem in the study area. By using Zillow's Observed Rental Index for the measurement of variations in the residential rental rates at the zip code and Metropolitan Statistical Area levels, the implication of COVID-19 on migration models and real estate markets in US cities was quantified in [134], finding a "donut effect" that reflects the emptying of city centers and the growth of suburban outer rings. In addition, the research by [135] addressed the pre-pandemic property market and the COVID-19 effects in the Indian context by analyzing the risks and scenarios for the various real estate industry stakeholders (mortgage holders, real estate workforce, and builders). The global uncertainty within real estate markets due to the COVID-19 crisis was the focus of the analyses carried out by Worzala [136] regarding an examination of the increased risk that is significantly influencing the fields of property investment and finance. Similarly, the construction sector and the real estate development and their interconnections during the periods pre-, intra, and post-COVID-19 represent the core of the literature review by Kaklauskas et al. [137], which was aimed at providing evidence of variations in behaviour regarding investments in construction caused by COVID-19, with reference to many different countries. Along the same line of research, the study by Jovanović-Milenković et al. [138] can be included, given its main purpose of defining a parallel overview of the property market in the USA, China, some European nations, and the Republic of Serbia for identifying the harm to nations' economies and to real estate market development interventions due to the emergency. Although the virus appeared at different time periods in the different countries, the analysis concluded that the same trend of behavior regarding the indicators of changes in the building market was observed, with a reduction in real estate sales by 90% compared to the same period in 2019 in the Chinese context, a 15% reduction in sales in April 2020 compared to the previous year in the US real estate market, a decline of 70% in European nations, such as Great Britain, Italy, and the Republic of Serbia. By taking into account that the real estate market constitutes a substantial component of an overall country's economy, during the acute pandemic phases (especially in the lockdown periods), the real estate sector had to be significantly transformed, for example, by applying new technologies. In this sense, challenges and opportunities for real estate brokerage firms of Vietnam in the post-COVID-19 period were examined by Ngoc [139], in order to propose solutions and recommendations for real estate operators to improve their professional skills and knowledge. Likewise, in the Indian territory, an examination of the national building sector before COVID-19 was performed, implications of the health emergency on specific markets were detected, and the relative opportunities and threats for builders, homebuyers, and the workforce in real estate were deciphered by drawing a targeted summarized framework for the various real estate participants [140]. The same geographical context was analyzed by Yadav and Yadav [141] with the purpose of describing the influence of the pandemic on housing, tourism, retail, and commercial buildings through secondary data: the crisis impacted foreign exchange earnings and job chances caused by a substantial drop in the arrivals of foreign tourists in 2020 to India. Consequently, the retail and hospitality buildings were more affected by COVID-19 compared to the industrial and residential segments. Through an empirical investigation, the causal differences of three main macroeconomic indicators, i.e., real estate prices, gold prices, and the USA exchange rate on stock market returns, were assessed in the Pakistan market by considering the three months pre-COVID-19 and three subsequent months, explaining the most significant variations in the mechanisms of the capital market during the health crisis [142].

The worldwide rapid spread of the pandemic, which has involved all economic and investment divisions, has caused increasing public attention to be given to likely future real estate scenarios. Among the different implications of forced measures to restrict economic activities, some of them have resulted in long-term or permanent modifications in the features of the real estate market. Thus, new behavior models for the market participants and new strategies have been defined, also within the real estate legal regulations and by promoting the use of digital technologies for transactions [143].

The possible consequences of the onset of COVID-19 on the global real estate development and management dynamics were explored by making interesting evaluations and insights into several studies and for different geographical contexts. Tanrıvermiş [144] used data on macro-economic variations and the real estate sector to provide a basis for the analysis and generalization of the prevailing situation in Turkey. The study observed that the Turkish government wants to recover the property market only through the growth of the sales of existing houses and businesses and through tourism-oriented measures (such as a hygiene certificate), but actions taken for fundamental changes in the long run are still inadequate. Jagun et al. [145] provided a review on Malaysian workers, construction sites, property development, and the national economy and found that the pandemic has significantly influenced real estate progress, the residential market, and the construction industry.

5. Conclusions

This review has identified the main aspects that have been addressed regarding the impacts of COVID-19 on the real estate market to grasp variations in its dynamics. In particular, according to the analyzed sample of 102 research papers, the following considerations can be outlined:

- The residential segment has been the most studied within the real estate sector in terms of selling and rental price variations, number of transactions, and changes in the appreciation of some property characteristics;
- The office segment has been strongly affected by the spread of remote work by rediscussing the current office environment configurations and their capacity to be adapted to meet the demands in the post-pandemic era, proposing solutions for more effective workspaces;
- The commercial segment has shown an overall drop in rental and selling prices but, nevertheless, the acceleration of digitization through the presence and diffusion of e-commerce has represented an important opportunity for the recovery of the sector;
- The examination of the global real estate market has highlighted the strong relationship that exists between the real estate implications of COVID-19 and the main trends in the financial markets. Furthermore, the debate on the best economic strategies that local

governments should pursue to start the recovery has attributed a relevant central role to the study of the property market as it represents local socio-economic conditions;
- The most implemented methodology is the econometric one (hedonic model), aimed at identifying and quantifying variations in the market demand for some specific property characteristics. Also, the difference-in-differences method appears to be frequently used.

Regarding the variations in real estate dynamics, the main transformations have been observed in the residential segment. Specifically, property characteristics, such as the presence of green spaces, a balcony or terrace, rooms to be used for remote work, and its proximity to public transport stops, have assumed a higher importance in the mechanisms of buyers and sellers' choices. In addition, the appearance of a novel paradigm—the so-called "donut effect"—has led to spatial patterns that are based on the renewed preference for suburban and rural areas compared to cores and city centers. This may be due to the possibilities offered by remote work to reduce the importance of proximity to workplaces, thus allowing for positive migratory flows towards smaller centers and rural areas. Given the impacts of the COVID-19 on second homes and, especially, touristic ones, the COVID-19 crisis has triggered modifications in the supply of short-term rentals. In this framework, the intensification of the existing processes of the commodification of housing has started, empowering accommodation platforms, like *Airbnb*, and placing profit potential around the tourist rental market.

In conclusion, the real estate market seems to have been quite resilient with respect to the impact generated by the pandemic outbreak, as several studies, despite having found a negative impact in the short-term, found that, instead, in the medium and long terms, the real estate market has mostly reacted more to the changes imposed by the crisis by starting a general recovery [146–150]. In fact, the changed needs expressed by the communities have been transposed into real estate dynamics through the definition of "new normal" models that have redefined the way in which residential, commercial, and office properties are able to meet the new modalities of living in cities, including the suburban areas. Currently, in the post-pandemic period, the property market has absorbed some of the mechanisms introduced by the spread of COVID-19 by creating novel ways with which to live in domestic spaces and to use the office and commercial ones. This contingency has been incorporated into the selling and rental processes by the main market operators involved (buyers, sellers, real estate agents, managers, and property valuators, etc.), establishing adequate processes of choice to allow for transparent and reliable transactions.

The main contributions of the present review relate to the provision of a clear and structured classification and categorization of the existent literature on the effects of COVID-19 on the real estate market, and the specific changes that the pandemic has generated on the real estate dynamics from different point of views, such as population flows, second house utilization, the spread of smart working, ways of living in office spaces, sub-urban area appreciation, market demand variations, and so on. Although most of the retrieved papers pertain to the USA, both in terms of the geographical provenance of the authors and the geographical context of the analysis, this review provides an overview of the studies at this moment, highlighting the impacts that COVID-19 has also generated in other European and international countries.

In this sense, this research represents an attempt to go beyond a simple summary of what has been conducted in the reference literature worldwide by providing useful information on each market segment analyzed.

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Appendix A

Table A1. Main findings of the residential property market.

		COVID-19 Effects		
Summary of the Main Findings	**Ref.**	**Positive**	**Negative**	**Notes or Other Observable Changes**
The residential market has seen growth in housing prices and the supply. Moreover, a general reduction in mass evictions was also observable. Regarding mortgages, construction materials, and the dynamics of the hotel and tourism market, the authors reveal numerous negative impacts, such as a reduction in hospitality demand, constraints on mortgage returns, and delays in housing construction.	[81]	x	x	
During the pandemic period, U.S. housing prices grew, but the effective influence of the COVID-19 on the variations differed across certain patterned spaces. The residential hot spots were mainly located in more affordable suburbs and low-density areas.	[82]	x		The spatial differences were taken into account.
The study showed that the population migration flowed from metropolitan areas to non-core zones, especially in summer 2020. At the same time, the newly populated places showed positive and relevant increases in real estate activity, suggesting new waves of rural gentrification.	[83]	x		The focus was mainly on population flow activities.
The impact of COVID-19 in densely populated areas shows correlations with the infection cases and the number of the deaths.	[84]			Impacts on the residential market were analyzed based on their correlations with infection cases and deaths.
The authors highlighted that the pandemic in the UK could increase social inequalities and deepen the critical issues of the housing sector.	[85]		x	
The Yangtze River Delta region has seen an increase in housing prices, mainly related to the better conditions and urban governance that exist in this considered region.	[86]	x		
The suburban property prices and volatility risk increased after the spread of the pandemic. For the inner-city residential market, only asking prices have undergone a structural change. It was possible to observe the so-called "spillover effect", which was linked to the difference between the city center and suburban housing markets. However, a lag of information in the transaction premiums for the city center occurred for these property prices.	[87]	x	x	Volatility risk and lag of information are negative impacts; property prices rise could be a positive impact.
The authors state that at the city level, negative effects on the residential market are reported in terms of significant returns of residential prices. Regarding the regional analysis, instead, a mainly positive COVID-19 effect was obtained.	[88]	x	x	According to the two models implemented at the different scales of analysis, the results are considered differently.
In Vietnam, the pandemic has had a disruptive effect on the real estate sector, due to the fact that the investors have become more hesitant to invest in the real estate market, and therefore, a sharp decrease in the housing market's demand has occurred.	[89]		x	

Table A1. *Cont.*

Summary of the Main Findings	Ref.	COVID-19 Effects		
		Positive	Negative	Notes or Other Observable Changes
The authors observed that in Prague, the pandemic could enhance the already existing trend of the real estate market towards the richest segments of the population. Regarding the rent of cheap flats near public transport access, the price was the most important factor, not the quality of the property. This is especially valid for the AirBnB apartments for which shortfalls in incomes have been generated by the pandemic.	[90]		x	The focus is on the AirBnB and short-term rental dynamics.
The rental housing market stagnated or slightly increased during the spread of COVID-19, except for touristic attractions.	[91]			No significant impact of COVID-19 was observed for the property segment under analysis.
The study highlights how appreciation for property features has changed after the spread of COVID-19. The results highlight the relevance assumed by indoor acoustic and thermal comfort property factors, compared to the pre-COVID-19 conditions.	[92]			Indoor acoustics and thermal comfort have increased their relevance in residential market appreciation.
The property choices underwent a variation in the COVID-19 period, and in fact the buyers' preferences are moving towards the green buildings for having better living conditions. The residential real estate market of the future will require smart bathrooms, energy efficiency, and more open spaces.	[93]	x		COVID-19 generated a "green" change in the trend of real estate market buyers.
Regarding the achievement of the sustainable economic development goal of China, the residential real estate market is fundamental. The authors observed that the negative impacts of the spread of COVID-19 were small on the residential market. For this reason, the real estate market can be considered "resilient" and it is able to support the sustainable economic development of China during such critical periods.	[94]	x		The residential market is considered "resilient" regarding the occurrence of COVID-19.
In Turkey, the unit rent prices of the residential segment increased from March 2020 to December 2021. However, a difference between the metropolitan cities and the provinces is reported; the former has the highest unit rental prices.	[95]	x		Spatial differences in the effects of COVID-19 on the real estate market are highlighted.
The authors highlight, from their analysis of the Spanish short-term rental market, that providers have found flexible ways to accommodate their short-term rentals, which changed in 2020 due to the impacts of COVID-19.	[96]	x		The Spanish rental market is considered "resilient" to the spread of COVID-19.
The study reports that for the short-term rental market, available listings decreased by 25% once the pandemic started, income shrank by 22%, and occupancy decreased by 20%. The cleanliness of the properties, on the other hand, appears to be significant. What were perceived as clean accommodations increased their income by 17.5% and their occupation by 16.5%. However, rental prices for clean Airbnb apartments have not significantly increased since COVID-19.	[97]	x	x	A significant change in the appreciation for the short-term rental market is reported.
According to the results of the study, the shift in tourist preferences towards second homes following the pandemic could place second homes at the center of tourism activity, exacerbating the most critical aspects related to these activities.	[98]		x	Changes in tourist approval for second homes are not seen as a positive change induced by COVID-19.

Table A1. *Cont.*

Summary of the Main Findings	Ref.	COVID-19 Effects		
		Positive	Negative	Notes or Other Observable Changes
Except for tenant reputation and membership, there was no significant relationship between tenant health and the effect of COVID-19 on tenant failure to fulfill their tenancy. Failure to comply with lease obligations by tenants is, however, conditioned by affordability, reputation, and their ability to maintain a commitment.	[99]			No significant effects of COVID-19 were observed on tenant failure to fulfill their tenancy.
Even if prices in the real estate market were at historic highs with COVID-19, a series of regulatory and governmental factors considered by the authors allow us to say that it is unlikely that the real estate crisis of 2007–2009 will repeat itself. It is important to say that changes in legislation and the characteristics of supply and demand have helped to avoid the crisis of the great recession.	[100]			COVID-19 has not established a situation that would recreate the real estate crisis of 2007–2009.
The research determined that the outbreak led to a drop in house prices of about 3% in April and May 2020 and then to a rise in house prices of almost 4% in September. From March to May, both the demand and supply of housing decreased, and then increased in July and August, when the first openings occurred. Price volatility is closely related to demand. This suggests that recovery policies should focus more on demand, which, following the analyses conducted in the study, seems to have been more linked to the dynamics of COVID-19 than the supply.	[101]			The housing demand has suffered more than the housing supply from the effects of the spread of COVID-19.
COVID-19 significantly has influenced the relevance of subway accessibility in the dynamics of the residential real estate market. Specifically, small or inexpensive houses have been less affected than large or high-priced houses.	[102]			Different appreciation for metro accessibility was observed during the spread of COVID-19.
The externalities of the economic policies provided in Australia for first-home buyers have generated a short-term growth in the number of first-home buyers. However, the real estate market, as a result of fiscal and monetary policies, including changes in interest rates, has become disadvantageous for many potential first-home buyers, who fear they will never be able to afford home ownership.	[103]	x	x	The work highlights the need to mitigate the unintended negative consequences of economic recovery policies on potential first-home buyers.

Table A2. Main findings of the commercial property market.

Summary of the Main Findings	Ref.	COVID-19 Effects		
		Positive	Negative	Notes or Other Observable Changes
In some U.S. urban areas studied, the rent of business premises on long-term leases is inversely proportional to the distance from the city center. Evaluating the effect of COVID-19, the commercial rent gradient decreased by about 15%, and the rent premium associated with occupational density decreased dramatically following the impact of COVID-19.	[105]		x	
The analysis carried out shows that, thanks to government interventions, the commercial real estate market of the United States has not recorded any estimated decreases in value between approximately −47% and −62% and approximately −10% and −16% for returns.	[106]			The US commercial real estate market, were it not for the extreme monetary and fiscal policy pursued during the first months of the pandemic, would have experienced significant negative impacts.

Table A2. *Cont.*

		COVID-19 Effects		
Summary of the Main Findings	**Ref.**	**Positive**	**Negative**	**Notes or Other Observable Changes**
The pandemic's spread has significantly prompted the decline of the commercial market liquidity of eight major US markets.	[107]		x	
The applied hedonic model did not show significant COVID-19 changes in the geographic areas considered in the study.	[108]			The spatial distribution of the effect of the COVID-19 spread on the commercial segment is considered an important factor to be included in the analysis on the topic.
Urban commercial real estate prices have dropped significantly since January 2020 (−8%), but the effect differs across cities and building types. At the urban scale, the propensity to work from home and make long journeys plays a significant role. Regarding the type of buildings, the prices of older buildings have decreased significantly. However, in suburban areas, prices have tended to be stable and/or to increase over the long term. Significant increases were observed for buildings in high commuting cities, office buildings, apartment buildings, and buildings less than 20 years old.	[109]	x	x	
The gap between the observed prices and the implied fair value of the commercial real estate sector widened in the first year of COVID-19, following a sharp decline in demand and net operating income. Additionally, with declining transaction volumes and falling prices globally in 2020, retail real estate, hotels, and office buildings were heavily impacted by the pandemic.	[110]		x	
In the Asia–Pacific commercial real estate rental market, substantial rental decreases of approximately 15% were documented during the first six months of the first year of the pandemic (2020). The most important drops were recorded in the regions with the highest number of cases of infection, where there were also drops exceeding 30%, with little recovery starting during the second quarter of 2020. At the expense of the commercial sector, new capital flows appeared in the residential and industrial sectors.	[111]		x	
COVID-19 has caused a sharp decrease in non-residential investment and has triggered a change in sale prices, transaction numbers, and new financing operations. Conversely, to date there have been no significant deteriorations in credit quality associated with this market segment.	[112]		x	

Table A3. Main findings of the office market.

Summary of the Main Findings	Ref.	COVID-19 Effects Positive	Negative	Notes or Other Observable Changes
The authors highlight (i) a potential drop in the number of required workspaces at the main office of between 85.2% and 62.8%, (ii) a decrease in office space compared to pre-COVID-19 of 79.6% for an average of one day of remote work and of 72.1% for an average of two days of remote work.	[117]		x	
The positive outcomes of COVID-19 in the office sector are explained: the flexibility of office spaces represents the benefit of an increase in employee protection and comfort, new technologies have allowed for the possibility of setting up online meetings, and working from home is more suitable for some employers, starting the definition of new job models for which the localization of a physical office is less important.	[118]	x		An analysis of the changes in the approaches of employers towards office space caused by COVID-19 was carried out.
The hybrid and remote work and the value of commercial office real estate in the short and medium terms are strictly connected. In the long run, with improvement in remote work technologies, the existing office assets can be used for alternative functions.	[119]			At the time of the analysis, a reduction in office supply and limited construction and adaptive reuse activities of office assets were observed.
A relevant and negative impact of COVID-19 on the Chinese office building market has been detected: a drop in the rent of more than 8% was found if a city was exposed to an increase of one unit of the COVID-19 sentiment index for an entire quarter. A high level of investors' COVID-19 sentiment index has led to a decrease in office rents.	[120]		x	The COVID-19 sentiment index has had a more substantial effect on office building rents where office vacancy is higher.
In Europe and North America, firms are likely to demand less workspace in the future in comparison to Asian, African, and the Middle Eastern companies. The authors commented that the effects of the COVID-19 pandemic may be much stronger than the quantitative aspects of office space use, depending on if the firms' perceptions have changed since the pandemic. In this sense, a health emergency may not automatically drive changes to firms' strategies, differentiating the companies that have generally reported a negative work-from-home experience from those with positive previous experiences.	[121]			The pandemic could have changed the firms' perception regarding the use of office space.
The COVID-19 pandemic forced the largest office occupiers to analyze the role of their office spaces. The flex space business model is suitable for activities needing accommodation quickly and/or with relatively short-term occupational horizons, and the coworking solutions are significantly demanded.	[122]			The office is recognized as a central hub that facilitates corporate connection and cooperation.
The research indicates a reduction both in procuring office spaces and in their unit prices.	[123]		x	After the pandemic, a continuous shift into a hybrid work mode is expected, as the employee productivity of remote workers remains relatively high despite the various home distractions.
The negative effects of post-COVID office hybrid work arrangements on employee health and safety have been analyzed: the physical distancing caused by staying at home contributes to isolation and a lack of distinction between work life and home life. Moreover, fewer opportunities for career development and promotions because of weakened ties between employees and the employer have been recognized as the main impacts on the working world.	[124]			New skills and abilities to adapt to new ways of working should be defined and tested by employees and managers.

Table A4. Main findings of the research papers on mixed uses.

Summary of the Main Findings	Ref.	COVID-19 Effects		
		Positive	**Negative**	**Notes or Other Observable Changes**
In the first month of the COVID-19 pandemic, a drop of 45% was observed in the real estate sales market, as a direct implication of the restrictions in the movement of people and businesses. The authors invite academic communities to focus on the future prospect of real estate, i.e., on monitoring the measurements of the indicators, such as prices and transaction volumes.	[126]		x	The real estate sector was heavily and immediately affected by pandemic.
The authors discuss the impact of the pandemic on different market segments. They argue that (i) the hospitality sector was the hardest hit real estate segment due to the COVID-19 emergency, (ii) the retail segment was strongly affected when the physical shops were closed and there were no online sales.	[127]		x	Relevant disruptions to property markets can be caused by a health crisis.
Among the different real estate sectors affected by COVID-19, the authors found a direct (but relatively limited) impact on the housing market, a significant influence on the mortgage market by further growing the wealth inequality between households, a non-unique effect on the commercial real estate segment, and a direct and hard consequence on the stationary and non-food retail industries.	[128]		x	
The retail and hospitality properties and, to a lesser extent, the office buildings are the most affected sectors. The residential and industrial segments have been less impacted by the pandemic.	[129]		x	
Retail sector: an immediate effect has been observed for the rental and sale markets, with an increase in the vacancy rate and a reduction in the sale volume transactions. Office sector: an instant suppression of the growth rate of rent for offices was detected in the first phase of COVID-19, even though this impact was short-lived, as the growth rate began to recover in the following quarter. Industrial sector: an immediate and negative implication on the rental market with an increase in the vacancy rate and a rapid positive market trend in the next quarter have been found.	[130]	x	x	

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