



LEEDS  
BECKETT  
UNIVERSITY

---

Citation:

Abdul Rahman, MS and Awang, M and Jagun, ZT (2024) Polycrisis: Factors, impacts, and responses in the housing market. *Renewable and Sustainable Energy Reviews*, 202. pp. 1-16. ISSN 1364-0321  
DOI: <https://doi.org/10.1016/j.rser.2024.114713>

Link to Leeds Beckett Repository record:

<https://eprints.leedsbeckett.ac.uk/id/eprint/11065/>

Document Version:

Article (Published Version)

---

Creative Commons: Attribution 4.0

© 2024 The Authors

The aim of the Leeds Beckett Repository is to provide open access to our research, as required by funder policies and permitted by publishers and copyright law.

The Leeds Beckett repository holds a wide range of publications, each of which has been checked for copyright and the relevant embargo period has been applied by the Research Services team.

We operate on a standard take-down policy. If you are the author or publisher of an output and you would like it removed from the repository, please [contact us](#) and we will investigate on a case-by-case basis.

Each thesis in the repository has been cleared where necessary by the author for third party copyright. If you would like a thesis to be removed from the repository or believe there is an issue with copyright, please contact us on [openaccess@leedsbeckett.ac.uk](mailto:openaccess@leedsbeckett.ac.uk) and we will investigate on a case-by-case basis.



## Polycrisis: Factors, impacts, and responses in the housing market

Mohd Shahril Abdul Rahman<sup>a,\*</sup>, Mariah Awang<sup>b</sup>, Zainab Toyin Jagun<sup>c,\*\*</sup>

<sup>a</sup> Department of Real Estate, Faculty of Built Environment and Surveying, Universiti Teknologi Malaysia, Skudai, Johor, Malaysia

<sup>b</sup> Department of Civil Engineering Technology, Faculty of Engineering Technology, Universiti Tun Hussein Onn Malaysia, Pagoh, Malaysia

<sup>c</sup> Department of Real Estate, School of Built Environment, Engineering & Computing Leeds Beckett University, City Campus, Leeds, LS1 3HE, United Kingdom

### ARTICLE INFO

#### Keywords:

Polycrisis  
Real estate  
Housing  
Impact  
Responses  
Stakeholders

### ABSTRACT

The phenomenon of polycrisis poses a significant and pressing challenge to the global community in the present era. The issues show diverse origins, consequences, and remedies, yet possess the capacity to profoundly disrupt the lives of countless individuals globally. The objectives of this study are to identify the factors, impact, and responses related to the occurrence of polycrisis in the housing market globally, with the goal to increase awareness among housing market regulators and participants who have been directly impacted by polycrisis and to ensure preparedness for future crises. A qualitative research method was employed in this study, where a desktop study was conducted to fulfil the research objectives. The qualitative data was then subjected to a thematic analysis. To address polycrisis effectively, a thorough strategy is necessary, considering historical occurrences, present conditions, and future potentialities. Therefore, this paper holds significant value for governments, businesses, and individuals looking to reduce their environmental footprint and effectively handle the consequences of economic, political, and social upheavals. The study is in line with both local and global goals, including the Sustainable Development Goals (SDG) 8, 11, and 13.

### 1. Introduction

Various health crises, economic crises, armed conflicts, warfare, and climate change have inflicted harm upon human lives, residences, infrastructure, ecosystems, and economies. These crises result in joblessness, restricted availability of healthcare and education, heightened poverty levels, displacement, psychological distress, and long-lasting economic consequences. That phenomenon is known as polycrisis or metacrisis, which denotes a formidable and all-encompassing challenge currently faced by the world.

This crisis comprises a multitude of issues and obstacles that require attention. The phenomenon under consideration involves a variety of interconnected crises that worsen each other within the global ecosystem [1–4]. Regardless of their varied origins, impacts, and solutions, these crises all have the capacity to cause widespread devastation to the lives of millions of individuals globally [1–4].

The prevailing forms of polycrisis in contemporary times encompass environmental, economic, political, social, technological, and health crises [1,3–5]. Climate change, air pollution, and water scarcity are all part of the environmental crisis. Economic crises involve the occurrence

of financial crises, recessions, and stock market crashes. Social upheaval, lack of governmental stability, and armed conflict are among the phenomena associated with political crises. Instances of social crises include poverty, inequality, and crime. One example of a technological crisis is cyber-attacks. Health crises encompass pandemics, communicable diseases, and occurrences of drug overdose.

Polycrises are complex and often interrelated. Environmental crises often have the potential to trigger economic, political, or social crises [1, 3,4,6,7]. Water scarcity resulting from climate change can give rise to food shortages, political instability, and poverty. Likewise, an economic crisis has the potential to trigger a political or social crisis. For instance, an economic downturn can result in social unrest and destitution.

The impacts of polycrisis can have extensive and enduring consequences [1,8]. Polycrisis can lead to humanitarian catastrophes, such as the mass displacement of millions of individuals, in addition to economic and political instability. In addition, they can contribute to environmental degradation, such as the devastation of habitats or the decline of biodiversity [9].

Addressing polycrisis necessitates international collaboration and proactive measures. Collaboration between governments, businesses, and individuals is imperative to minimise their environmental footprint

\* Corresponding author.

\*\* Corresponding author.

E-mail addresses: [mshahril.ar@utm.my](mailto:mshahril.ar@utm.my) (M.S. Abdul Rahman), [z.t.jagun@leedsbeckett.ac.uk](mailto:z.t.jagun@leedsbeckett.ac.uk) (Z.T. Jagun).

### List of abbreviations

IMF	International Monetary Fund
SDGs	Sustainable Development Goals
SEC	Securities and Exchange Commission
UNDP	United Nations Development Programme's
WEF	World Economic Forum

and address the consequences of economic, political, and social turmoil [2,10,11]. Governments can bolster the economy and assist businesses by allocating funds towards renewable energy sources, thereby implementing economic stimulus packages. Enterprises could diminish their carbon footprints and allocate resources towards research and development of technologies aimed at mitigating climate change. People can endorse environmental initiatives and champion social justice.

Hence, the problem of polycrisis demands urgent attention due to the interdependence of existing and emerging risks. The Global Risks Report 2023 by the World Economic Forum (WEF) highlights three possible factors that could lead to a polycrisis: the crisis related to the cost of living, inadequate efforts to address the climate crisis, and the strain on limited resources [12]. A polycrisis has the potential to result in catastrophic outcomes, such as armed conflict.

The phenomenon of polycrisis is becoming more prevalent in the contemporary world. These are instances where multiple intricate and interrelated crises intersect, posing challenges in identifying an efficient response [3–5]. Polycrisis includes various categories such as economic, social, environmental, and political crises. Every variant of polycrisis presents distinct difficulties and differing degrees of intricacy.

Polycrisis is occurring more frequently in the current global environment, and its impacts are growing in significance. The world is currently grappling with an unparalleled level of intricacy and interconnectedness, ranging from the global pandemic to climate change. The emergence of new forms of polycrisis, such as the migration crisis, has resulted in widespread suffering and disruption globally [1].

The notion of a 'polycrisis' was deliberated upon at the 2023 WEF in Davos. A 'polycrisis' denotes a collection of interconnected global risks that have cumulative effects, resulting in a total impact that surpasses the individual contributions of each risk. The Global Risks Report 2023 by the WEF identifies various global risks and emphasises the need for proactive measures to equip the world in dealing with future disruptions [12]. The report highlights the cost-of-living crisis as the most pressing immediate concern, whereas the failure to address the climate crisis is identified as the most significant risk in a decade [12].

The International Monetary Fund (IMF) and the World Bank Group have been urged to intensify their efforts in tackling the numerous crises confronting their member nations [13]. These crises encompass the consequences of climate change and significant inflation. There have been proposals to restructure the global development finance system to mitigate the severe impacts of these crises on low- and middle-income countries (LMICs) [13].

The United Nations Development Programme's (UNDP) Regional Bureau for Asia and the Pacific has published a recent academic report titled "Polycrisis and Long-term Thinking." This report examines the concept of polycrisis and emphasises the importance of adopting a long-term perspective [14]. The report was published in 2023 by the UNDP. The report highlights that the accelerated process of globalisation since the mid-20th century has resulted in a multitude of emerging risks. Furthermore, it emphasises the significance of implementing governance and risk analysis measures that specifically target the underlying connections among various existential crises, with the aim of averting a worldwide polycrisis [14].

Managing a polycrisis is a challenging task, and it is unlikely that a single solution will be sufficient to address it effectively [15,16]. An

all-encompassing and integrated approach is required to tackle the root causes and effectively handle the consequences [3,15]. Furthermore, it requires collaboration among diverse entities, such as governmental bodies, non-governmental organisations, and businesses.

To proficiently handle a complex and interconnected series of crises, it is crucial to comprehend the fundamental reasons behind them and formulate tactics to effectively tackle them [3,5,9,10]. This takes a tight cooperation among various stakeholders to pinpoint the underlying factors and devise all-encompassing remedies that tackle the intricacy of the situation. It is crucial to ensure that all individuals involved in a polycrisis understand the consequences and are ready to act [10,15–17]. It demands educational and awareness initiatives that specifically target the significance of cooperation and collaboration in tackling intricate challenges.

An examination of polycrisis in the real estate market provides valuable insights into the impacts of economic and social forces on the housing market [3,15,16,18]. Polycrisis in the real estate market may refer to periods characterised by swift and unpredictable fluctuations in the housing market, which can have substantial ramifications for the overall housing market. Through the examination of these complex crises, economists can acquire a more comprehensive comprehension of the fundamental elements that contribute to the fluctuations in housing prices, as well as the potential ramifications of such occurrences.

Furthermore, examining these polycrisis can enhance the comprehension of real estate experts regarding the hazards and prospects linked to investing in the housing sector, and enable them to formulate tactics [10] to effectively manoeuvre through an unstable housing market. Studying polycrisis can offer valuable understanding of the operations of the real estate market, benefiting both investors and prospective homebuyers.

With the ongoing economic recovery, it is anticipated that the housing market will sustain its growth in the forthcoming years. The pandemic has had a significant impact on the residential housing market. Rental prices have declined, rental demand has decreased, and tenant rights have been modified. Landlords have had to adapt to the current economic environment.

It is crucial to analyse the collaboration between governments, businesses, and individuals to tackle polycrisis and minimise its impact. To accomplish this, it is imperative to conduct a thorough examination of worldwide collaboration and initiatives, as documented and emphasised by multiple sources such as WEF [12], IMF [13], and UNDP [14]. This study is also in line with three Sustainable Development Goals (SDGs): SDG 8, which focuses on promoting decent work and economic growth; SDG 11, which aims to create sustainable cities and communities; and SDG 13, which addresses climate action.

The study's novelty lies in its examination of different categories of polycrisis, such as economic, social, environmental, and political crises, and the complexities involved in each variant's impact on the housing market. The study also underscores the increasing importance of the impacts of polycrisis in the present global context, highlighting the unparalleled complexity and interdependence spanning from the global pandemic to climate change. An innovative aspect of this study is its emphasis on fostering collaboration among a wide range of entities, including governmental bodies, non-governmental organisations, and businesses. By considering the wide-ranging effects of economic and social forces on the market, this analysis offers valuable insights into the factors that contribute to the polycrisis, as well as the strategies employed by housing stakeholders - regulators and participants - to mitigate these impacts. The strong emphasis on collaboration as a primary strategy for addressing complex and interconnected crises represents an innovative approach. Its contribution focuses on advocating for an integrated approach that recognizes the underlying connections among different crises.

This study has four research questions.

**RQ 1.** What are the contributing factors of the polycrisis

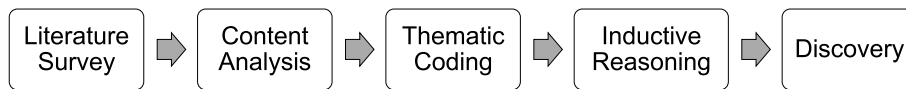


Fig. 1. Literature review flowchart.

**RQ 2.** What are the impacts of polycrisis on the housing market housing market regulators and participants?

**RQ 3.** How polycrisis has been mitigated in the past and present by the housing market regulators and participants?

**RQ 4.** What actions should be taken to decrease the impacts of future polycrisis on the housing market regulators and participants?

Three research objectives were formulated based on the research questions.

**Objective 1.** To determine contributing factors of the polycrisis?

**Objective 2.** To examine the impacts of polycrisis on the housing market housing market regulators and participants.

**Objective 3.** To determine the responses in mitigating the impacts of housing market for future polycrisis.

The focus of this study is to provide an overview of the polycrisis, encompassing its factors, impact, and responses in the housing market. In this study, there are no specific geographical limitations, but the focus is on the overall housing market.

The following section will commence by outlining the study methods that were utilized. The next part will outline important terms that are crucial for this research, such as stakeholders, the housing market, and polycrisis. The subsequent part will discuss the evolution of polycrisis, examining its past, present, and future iterations. Following the previous segment, the next part of the presentation will focus on the discussion of the study findings. The findings will explore the factors that contribute to polycrisis, its impacts, and how the market responds to it.

**2. Methods**

The study has employed a literature review, incorporating methods such as literature survey, content analysis, thematic coding, inductive reasoning, and discovery (see Fig. 1). These methods have previously been employed by researchers in the specific area of study, particularly in the real estate and housing market, namely Maalouf et al. [19], Jagun et al. [20], Jagun et al. [21], and Sassanelli et al. [22]. The description of the process can be found in Fig. 1.

Based on Fig. 1, this study began by identifying and collecting relevant literature using specific keywords. The search was performed using the following keywords: "polycrisis, AND factors, AND impacts, AND responses, AND housing AND market, AND stakeholders, AND regulators, AND participants, AND players." Through meticulous analysis, a grand total of more than two hundred articles were discovered that were directly pertinent to this study.

This involved searching databases, academic journals, books, and other credible sources to gather a comprehensive collection of literature related to the study topic. The collected literature was then analysed to extract relevant information. This consist of reading and reviewing the content of each source to identify key concepts, theories, methodologies, and findings that were pertinent to the research question.

After analysing the content, this study identified and coded themes present in the literature. Themes were recurring patterns or topics that emerged from the analysis. This process involved categorizing and organizing the information into meaningful themes that captured the main ideas and concepts within the literature.

Inductive reasoning involved the identification of patterns and themes in the literature, leading to the development of a conceptual framework and generalization. This step was essential in generating new

ideas and theories that could inform future studies, policy decisions, and market trends. Consequently, it enabled the formulation of conclusions and the generation of insights based on the coded themes.

From the processes, this study answered research questions and fulfilled research objectives.

**Table 1**  
Market regulator and market participants in the housing market.

Category	Stakeholders	References
Market regulators	1) Federal, State, Regional, and Local Government & Agencies	[23,24]
	2) Environmental Consultants	[10,25,26]
	3) Insurance Companies	[27–31]
	4) Financial Institutions	[2,16,32]
Market Participants	1) Real Estate Developers	[21,33–35]
	2) Landowners	[36–42]
	3) Architects	[43–45]
	4) Engineers	[46–48]
	5) Surveyors	[49–53]
	6) Real Estate Agents	[52,54]
	7) General Contractors	[21,55–58]
	8) Subcontractors	[21,55–58]
	9) Suppliers	[51,59,60]
	10) Property Managers	[61–63]
11) Property Owner	[62–66]	
	12) Tenants	[51,67–69]
	13) Investors	[21,53, 70–72]
	14) Legal firms	[73–76]

**Table 2**  
Types of crisis.

Category	Crises	Example	References
Political crisis	Political conflict, often between two or more countries or regions.	Civil wars Coups Secessionist movements	[23,84,85]
Economic crisis	These are periods of economic distress, often caused by a combination of factors.	Recessions Financial crisis Deflation	Tenants [3, 18,23] Tenants
Environmental crisis	These are events that cause large-scale damage to the environment, often due to human activities.	Oil spills Hazardous waste dumping Deforestation	[10,83,85, 86]
Social crisis	These are situations that cause disruption to the social fabric.	Ethnic or religious conflicts Civil unrest Pandemics	[10,80,85]
Cultural crisis	These are events that affect the culture of a community or society, often due to a clash of values or beliefs.	Identity politics Xenophobia Erosion of traditional customs	[83,87,88]
Health Crisis	A health crisis is a sudden outbreak of a disease, natural disaster, or other factors that can lead to significant health problems.	Pandemic Endemic Epidemic	[89–91]

**Table 3**  
Contributing factors to polycrisis.

Category	Contributing Factors	Lead to:	References
Economic Factors	Globalization and increasing economic inequality/economic insecurity and volatility	Financial market crashes Currency devaluations Debt defaults	[2,9,85,92]
Political Factors	Populist movements	Civil unrest Economic and financial crisis Other types of political crisis	[2,5,9,85,92]
Social Factors	Social divisions, such as those between different ethnicities, religions, or socio-economic classes.	Social unrest Exacerbate existing economic.	[10,85,92,93,94]
Environmental Factors	Climate change	Political crises Severe weather events Natural disasters Other environmental disasters worsen existing economic and political crises	[9,10,16,89]
Technological Factors	Rise of new technologies, such as artificial intelligence, which can lead to rapid technological change.	Economic disruption Social, political, and environmental crises	[83]

### 3. Introduction to polycrisis, housing market and its stakeholders

#### 3.1. Polycrisis

Polycrisis refers to the occurrence when an organisation or individual is confronted with numerous challenges or crises at the same time [3–5] This can be caused by numerous factors, including economic recessions, political instability, natural calamities, and the impacts of globalisation. Polycrisis can have severe repercussions, such as a deterioration in economic output, a rise in unemployment rates, and the emergence of social turmoil.

#### 3.2. Housing market

The housing market is a segment of the economy that is particularly susceptible to the impacts of a polycrisis. During periods of economic recession, such as the one we are experiencing now, the housing market tends to be negatively impacted because of decreased demand. Consequently, individuals face challenges in securing mortgages or locating potential buyers for their properties. Furthermore, political turmoil and catastrophic events can exert an adverse influence on the housing market, impeding individuals from obtaining or affording housing. To alleviate the impacts of a polycrisis on the housing market, governments can adopt strategies such as offering monetary assistance to both businesses and individuals, as well as making substantial investments in infrastructure and services.

#### 3.3. Stakeholders in the housing market

The housing market stakeholders can be divided into two main parties: market regulators and market participants. Market regulators

are responsible for overseeing and enforcing regulations, while market participants are the individuals and organisations involved in buying, selling, and investing in housing.

This study defines, a market regulator is an autonomous entity or governmental organisation tasked with overseeing financial markets and safeguarding the interests of investors. Market regulators have the primary responsibility of overseeing and enforcing the rules and regulations established by a governing body, such as the Securities and Exchange Commission (SEC). In addition, they supervise the actions of brokers, dealers, and other participants in the financial market to guarantee their adherence to the established rules and regulations. Furthermore, market regulators possess the authority to scrutinize and legally pursue infringements of the established guidelines and regulations, and to levy penalties and other punitive measures as required.

In this study, a market participant refers to an individual or entity that engages in any activity or transaction associated with the purchase and sale of goods and services within a specific market. Market participants encompass a variety of entities such as consumers, producers, wholesalers, retailers, government agencies, financial institutions, and market intermediaries.

The list of stakeholders in the housing market is as per Table 1.

### 4. Polycrisis: a historical, present and future perspectives

The term "polycrisis" denotes the concurrent occurrence of multiple crises on a global scale [3,4]. The concept of polycrisis has existed for centuries, with ancient times supplying some of the earliest documented instances. Today, the term is now employed to characterise the unparalleled multitude of global challenges that nations and individuals are confronting.

In the past, polycrisis has arisen due to factors such as warfare, famine, economic downturns, natural calamities, and various other

**Table 4**  
The impacts of Polycrisis on real estate markets based on geographical regions.

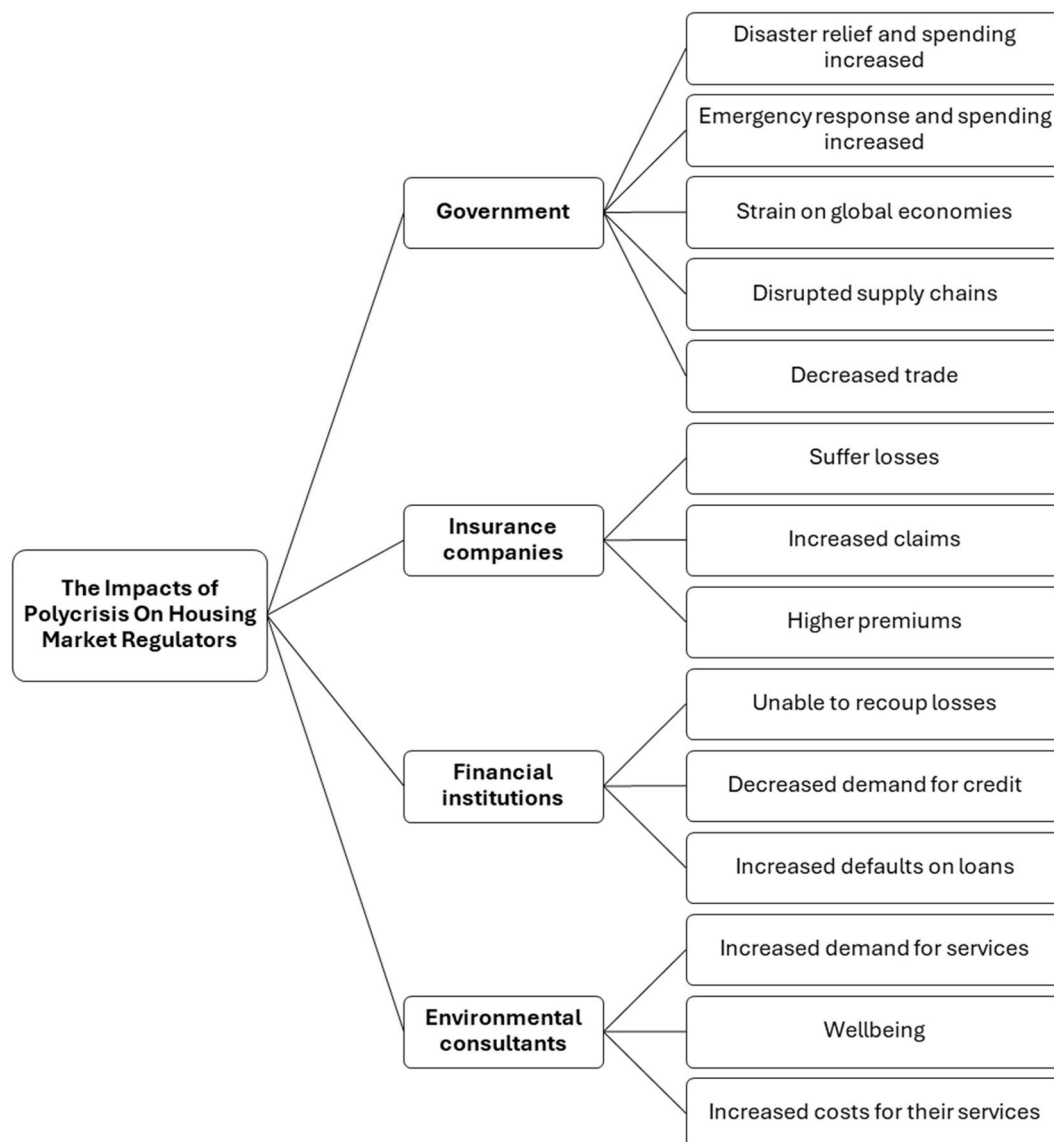
Region	Impacts	Percentage Change	References
United states	Homes sales declined	-17.8 %	[106]
	Rental rates decreased	-1.4 %	[66]
	San Francisco rental rates dropped	-9.2 %	[63]
United Kingdom	Property sales dropped during the first lockdown period	-50 %	[108]
	House prices fell in May 2020, the largest monthly decline since 2009	-1.7 %	[108]
Australia	Rental rates fell in the second quarter of 2020, the sharpest decline in over two decades	-1.3 %	[67]
	Property prices declined between April and September 2020	-1.8 %	[67]
Germany	Property prices increased despite the pandemic	N/A	[96,97]
South Korea	Property prices increased despite the pandemic	N/A	[96,97]
China	In Wuhan, housing prices decreased in the first quarter of 2020	-2.5 %	[102]
	Rental rates in major cities fell in the first half of 2020	-6%	[100]
Canada	Home sales fell in March 2020 compared to the previous years	-14.3 %	[109]
	Rental rates in Toronto decreased in the second quarter of 2020	-5%	[109]

**Table 5**  
The impact of polycrisis on the housing market regulators.

Stakeholders	Impacts	References
Governments	<ul style="list-style-type: none"> <li>• Increased government spending on disaster relief, emergency response, and reconstruction efforts</li> <li>• Increased stress on government resources due to large-scale relief efforts</li> </ul>	[90, 110–114]
Environmental Consultants	<ul style="list-style-type: none"> <li>• Increased strain on the global economy due to disruption of supply chains and decreased trade</li> <li>• Increased request to assess the damage caused by a natural disaster and provide solutions.</li> <li>• Potential increase in costs for environmental consultants due to increased demand for their services.</li> </ul>	[115,116]
Insurance Companies	<ul style="list-style-type: none"> <li>• Worker's wellbeing</li> <li>• Insurance companies must pay more claims in the event of a natural disaster.</li> </ul>	[27,117,118]
Financial Institutions	<ul style="list-style-type: none"> <li>• Potential losses for insurance companies due to increased claims and higher premiums</li> <li>• Financial institutions may suffer losses due to decreased demand for credit or increased defaults on loans.</li> <li>• Increased risk for financial institutions, as they may be unable to recoup losses due to decreased demand for credit or increased defaults on loans.</li> <li>• Increase in costs for businesses.</li> </ul>	[2,16,119]

global concerns. During the Roman Empire, a combination of factors including civil wars, invasions, and economic decline contributed to its ultimate downfall [77,78]. The Spanish conquest of the New World in the 16th century led to a series of interconnected crises, including the enslavement of Indigenous populations, the transmission of diseases, and the devastation of the environment [79].

Currently, the world is still experiencing a widespread polycrisis, as showed by the works of Lawrence et al. [3], Kinski [5], Henig & Knight [4], and Homer-Dixon et al. [80]. Humanity is currently confronted with several urgent challenges, including the climate crisis, economic inequality, pandemics, and escalating geopolitical tensions. These global issues are interrelated, implying that addressing one crisis will



**Fig. 2.** Conceptual framework of the impacts of the polycrisis on housing market regulators.

**Table 6**  
The impact of polycrisis on housing Market Participants.

Stakeholders	Impacts	References
Real Estate Developers	<ul style="list-style-type: none"> <li>●Decreased profits</li> <li>●Project delays</li> <li>●Risk of insolvency</li> </ul>	[125–127]
Landowners	<ul style="list-style-type: none"> <li>●Increased financial risk</li> <li>●Reduced property values</li> <li>●Difficulty obtaining financing for projects.</li> </ul>	[128,129]
Architects	<ul style="list-style-type: none"> <li>●Reduced demand for their services</li> <li>●Longer project timelines</li> <li>●Fewer opportunities for new work</li> </ul>	[130–132]
Engineers	<ul style="list-style-type: none"> <li>●Reduced demand for their services</li> <li>●Longer project timelines</li> <li>●Fewer opportunities for new work</li> </ul>	[133–136]
Surveyors	<ul style="list-style-type: none"> <li>●Reduced demand for their services</li> <li>●Longer project timelines</li> <li>●Fewer opportunities for new work</li> </ul>	[51,137]
Real Estate Agents	<ul style="list-style-type: none"> <li>●Reduced demand for their services</li> <li>●Fewer transactions</li> <li>●Fewer investment opportunities</li> </ul>	[72,138–140]
General Contractors	<ul style="list-style-type: none"> <li>●Reduced demand for their services</li> <li>●Longer project timelines</li> <li>●Fewer opportunities for new work</li> </ul>	[57,98,141–143]
Subcontractors	<ul style="list-style-type: none"> <li>●Reduced demand for their services</li> <li>●Longer project timelines</li> <li>●Fewer opportunities for new work</li> </ul>	[57,98,141–143]
Suppliers	<ul style="list-style-type: none"> <li>●Reduced demand for their materials</li> <li>●Delayed payments</li> <li>●Increased default risks</li> </ul>	[56,144–146]
Property Managers	<ul style="list-style-type: none"> <li>●Reduced demand for their services</li> <li>●Fewer tenants</li> <li>●Increased vacancy rates</li> </ul>	Tenants [51,61,62, 147]
Property Owners	<ul style="list-style-type: none"> <li>●Reduced property values</li> <li>●Fewer tenants</li> <li>●Increased vacancy rates</li> </ul>	[108,139,148–150]
Tenants	<ul style="list-style-type: none"> <li>●Reduced housing options</li> <li>●Increased rental costs</li> <li>●Reduced affordability</li> </ul>	[124,151–154]
Investors	<ul style="list-style-type: none"> <li>●Increased financial risk</li> <li>●Reduced returns</li> <li>●Fewer investment opportunities</li> </ul>	[109,155–158]
Legal Firms	<ul style="list-style-type: none"> <li>●Revenue affected</li> <li>●Closure of courts and offices</li> <li>●Delayed or postponed proceedings</li> <li>●Decrease in billable hours</li> <li>●Remote work</li> <li>●Difficulties in maintaining communication and collaboration</li> </ul>	[159–163]

have repercussions on the other. Addressing the climate crisis can mitigate the spread of diseases, while reducing economic inequality can alleviate conflict.

In the coming years, it is expected that polycrisis will become more intricate and polycrisis, as suggested by various sources [1,10,12, 81–83]. Advancements in technology, such as artificial intelligence and robotics, have the potential to worsen economic inequality. Similarly, the rise in global travel can contribute to the dissemination of novel diseases. Therefore, it is imperative for nations and individuals to collaborate to find remedies for these issues prior to them becoming overwhelming. This encompasses activities such as allocating funds towards sustainable energy, ensuring universal healthcare coverage, and enhancing global collaboration.

In general, polycrisis is a long-standing global issue that has persisted for centuries and is expected to persist in the future. Collaboration between nations and individuals is imperative to tackle these challenges and safeguard both humanity and the planet.

Polycrisis is often characterised by intricacy and challenges in its management. It is crucial to determine the nature of the polycrisis and devise a suitable course of action to minimise the crisis's impacts and achieve a positive result. They can appear in diverse contexts, encompassing social and political matters as well as economic and

environmental considerations. Table 2 presents instances of polycrisis.

## 5. Contributing factors to polycrisis

Polycrisis, also known as multiple crises, are becoming more prevalent in the contemporary world [1]. The reasons for this can be attributed to various factors, which can be broadly classified as shown in Table 3.

To mitigate the likelihood of polycrisis in the future, it is crucial to comprehend the primary causative elements behind such occurrences [16]. The factors have led to substantial disruptions in both microeconomics and macroeconomics, which are clear in the present day. The real estate market, including the housing market, has been significantly affected by polycrisis. Hence, it is imperative to thoroughly analyse the complete scope of these impacts and investigate strategies to overcome them. This will allow us to mitigate the adverse impacts of polycrisis.

## 6. Polycrisis impact

This subtopic will begin by exploring the broader implications of polycrisis in a general context. It will then examine how this crisis specifically affects the real estate and housing market. Finally, the discussion will assess the complex consequences of the polycrisis on key stakeholders in the housing market, including market regulators and participants.

### 6.1. The impacts of polycrisis in general

The notion of polycrisis has gained significance in contemporary times owing to the surge in global interconnectedness and the intricacy of the interdependent global economy. The repercussions of a polycrisis can be large, exerting influence on individuals, enterprises, and the broader economy.

Polycrisis typically engenders a condition of ambiguity and volatility. This can have significant detrimental impact on businesses and the economy, as it can result in diminished consumer confidence and decreased investment. Uncertainty among consumers reduces their propensity to make significant purchases, thereby causing a ripple effect on businesses and the overall economy. It can result in heightened levels of stress and anxiety at the individual level [9,16]. Individuals may experience uncertainty about their employment stability, financial solvency, or capacity to meet financial obligations. This can give rise to a variety of mental health disorders, including depression, anxiety, and potentially even suicide.

Furthermore, polycrisis can exert a detrimental impact on the environment [9,10,18] When multiple natural disasters coincide, they can exert excessive strain on local resources and lead to amplified environmental devastation compared to if they had happened sequentially.

Polycrisis can ultimately result in a social impact, as stated by Hoyer et al. [10]. Political turmoil, economic volatility, and social upheaval can result in a deterioration of social unity and heighten the likelihood of violence and civil disorder.

In general, polycrisis can have extensive consequences for individuals, businesses, and the economy [4,16,18,82,93]. Consequently, it is crucial for governments, businesses, and individuals to implement measures to alleviate the impacts of polycrisis and be ready for next occurrences.

### 6.2. The impacts of polycrisis on the real estate market

The impacts of the ongoing economic crisis on the real estate market is significant and should not be underestimated [3,16,95–97]. The pandemic has led to a significant decrease in the demand for real estate, as a reduced number of individuals have the financial ability to acquire or lease properties. This has had a significant impact on the industry, resulting in a reduction in prices, sales, and available inventory.

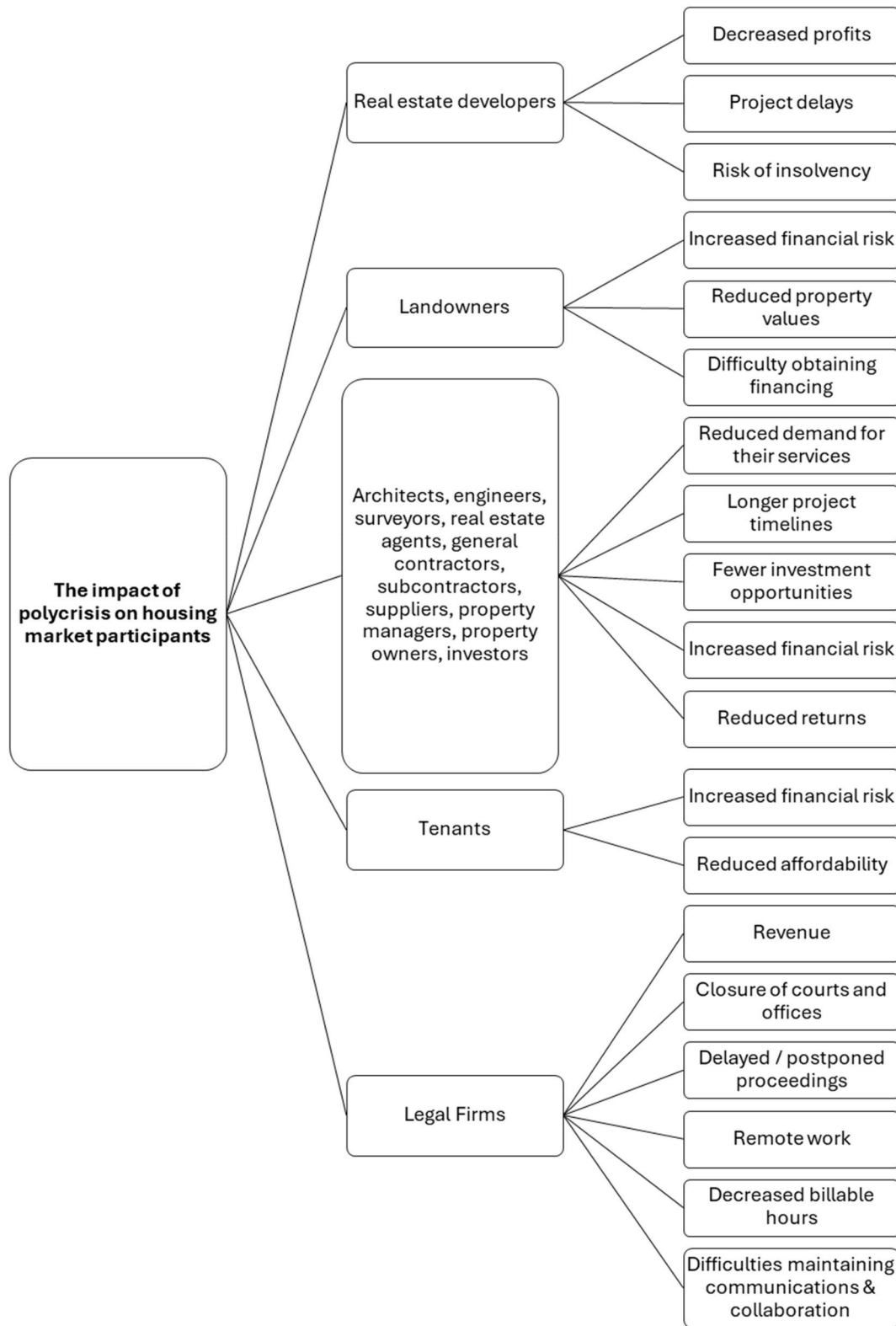


Fig. 3. The impacts of polycrisis on the housing market participants.

Consequently, real estate investors are facing a challenging predicament, unable to generate profits due to the decline in property prices and reduced demand.

The decline in sales has had a direct impact on the real estate market, resulting in a reduction in the volume of new construction projects [35, 71,98,99]. Consequently, there has been a decline in employment

opportunities for construction workers and developers, along with a reduction in the construction of new residential properties. Moreover, the decline in the construction of new residential properties has led to a reduced availability of choices for prospective home purchasers.

The drop in demand for real estate has set back the real estate market. With a decrease in home affordability, there is a corresponding



**Table 7**  
Housing market regulators responses towards polycrisis.

Market Regulators	Responses	References
Government	<ul style="list-style-type: none"> <li>•Tightening regulations.</li> <li>•Increasing oversight of the housing market.</li> <li>•Increasing the number of inspections and appraisals.</li> <li>•Implementing new licensing requirements</li> <li>•Increasing penalties for violations of existing regulations.</li> </ul>	[164–169]
Insurance companies	<ul style="list-style-type: none"> <li>•Increasing the premiums.</li> <li>•Introducing new insurance products</li> <li>•Ensure that the insurance products they offer are sufficient to protect customers.</li> </ul>	[170–172]
Financial institutions	<ul style="list-style-type: none"> <li>•Increasing the due diligence on real estate transactions</li> <li>•Introducing new forms of financing that reflect the risks associated</li> <li>•Ensure that the loan products they offer are sufficient to protect lenders.</li> </ul>	[16, 173–175]
Environmental consultants	<ul style="list-style-type: none"> <li>•Performing more detailed environmental assessments of prospective real estate investments</li> <li>•Developing new strategies to reduce the environmental risks associated with polycrisis.</li> <li>•Work with government regulators to ensure that environmental regulations are sufficient to protect communities from environmental losses</li> </ul>	[176–179]

decrease in demand for rental properties [100–102]. This has resulted in a decline in rental rates, as landlords are unable to sustain the prices, they were previously able to impose before the pandemic.

The prevailing economic crisis has exerted a substantial influence on the real estate market, prompting numerous investors to reassess their strategies [103,104]. While there is a possibility of the market recovering in the future, investors must be mindful of the risks linked to the present economic conditions and adapt their strategies accordingly.

### 6.3. The impacts of polycrisis on the housing market

The impacts of polycrisis on the housing market can be classified into direct and indirect impact.

An immediate consequence of polycrisis on the housing market is a surge in housing demand. In periods characterised by economic, political, and social instability, individuals are inclined to pursue housing as a means of ensuring stability and protection [105,106]. This can lead to a rise in housing prices because of heightened competition. Moreover, the accessibility of inexpensive housing may diminish as a result of the polycrisis. With the escalation of prices, the task of finding affordable housing becomes progressively more challenging for low-income households. This can result in a rise in homelessness and other housing-related problems. Polycrisis can also exert indirect ramifications on the housing market [107]. For instance, economic instability causing a rise in unemployment can result in a decline in consumer expenditure, subsequently leading to a decrease in demand for housing. In addition, political instability can result in a decline in foreign investment, thereby impeding developers' ability to secure funding for new housing projects [35]. Ultimately, a social crisis can result in a surge in criminal activity, rendering specific regions less appealing to prospective purchasers. This can additionally diminish the demand for housing, leading to a decline in prices. Table 4 highlights the impacts of the pandemic, a part of polycrisis on the real estate market.

Table 4 presents a comprehensive summary of the impacts of polycrisis on real estate markets in various geographical regions, showcasing percentages that demonstrate the extent of changes in pricing, sales, and rental rates. The impacts have been conspicuous in most nations, with noteworthy decreases in property prices, sales, and rental rates.

Nevertheless, the extent of these changes significantly differs across different regions, indicating that the intensity of the consequences is affected by local characteristics and the unique conditions of each country. A notable contrast is observed between Western nations and Asian countries such as Germany and South Korea. Despite the pandemic, Germany and South Korea witnessed an increase in property prices, whilst the United States, United Kingdom, Australia, and Canada faced substantial losses in key real estate measures [96,97]. The difference can be attributed to various factors, such as the effectiveness of government interventions in mitigating the economic impacts of the pandemic, the strength of local economies, and the level of investor trust in these markets.

Another significant disparity lies in the magnitude of the decrease in rental rates among different locations. San Francisco, located in the United States, witnessed a remarkable decline of 9.2 % in rental rates [63] whilst major cities in China observed an average decrease of 6 % in rental rates [100]. Conversely, the United Kingdom and Australia witnessed comparatively smaller decreases of 1.7 % and 1.3 % correspondingly [67,108]. These discrepancies may be influenced by factors such as the stringency of lockup measures, the extent of government assistance for renters, and the overall supply and demand dynamics of each market.

The impacts on home sales also differed considerably among locations. During the first lockdown period, property sales in the United Kingdom decreased by 50 %, which was a significant drop compared to the United States and Canada, where the declines were 17.8 % and 14.3 % respectively. These differences can be attributed to factors like the timing and length of lockdowns, economic uncertainty, and the availability of financing options for potential buyers.

Hence, polycrisis can exert both immediate and indirect impacts on the housing market. Rising demand can result in elevated prices, while reduced accessibility of affordable housing can contribute to a surge in homelessness. Furthermore, secondary consequences such as reduced consumer expenditure and diminished foreign investment can result in a decline in both demand and prices. Having knowledge about the possible consequences of polycrisis is crucial in order to make well-informed choices regarding the housing market.

### 6.4. The impacts of polycrisis on the housing market regulators

The polycrisis has had an impact on regulators in the housing market. The polycrisis has prompted stricter regulations for governments, insurance companies, financial institutions, and environmental consultants. These entities now have to consider various factors when creating housing market policies or managing risks.

This encompasses a heightened emphasis on environmental concerns, along with regulations on the divulgence of information and conscientious lending practices. Simultaneously, polycrisis can introduce further intricacies and difficulties for regulators in the housing market. The convergence of multiple crisis scenarios can engender a more unstable marketplace, making it arduous to predict and mitigate risks. This may exert pressure on regulators to devise strategies to stimulate more investment, while guaranteeing that any modifications to market regulations are implemented in a prudent manner. Table 5 summarized the impacts of polycrisis on the housing market regulators.

The housing market regulators are significantly affected by the impacts of polycrisis, as shown in Fig. 2. The impacts of the polycrisis on housing market regulators are multifaceted. The increase in government expenditure on disaster relief and emergency response will put a strain on their budgets, diverting funds that could have been used for housing market regulation and oversight. The disrupted supply chains and reduced trade will have a ripple effect on the worldwide economies, leading to a slowdown in the housing market and a decrease in property values. This, in turn, will result in insurance companies facing a rise in claims and having to pay out higher amounts in settlements, leading to losses for them. As a consequence, insurance premiums may also

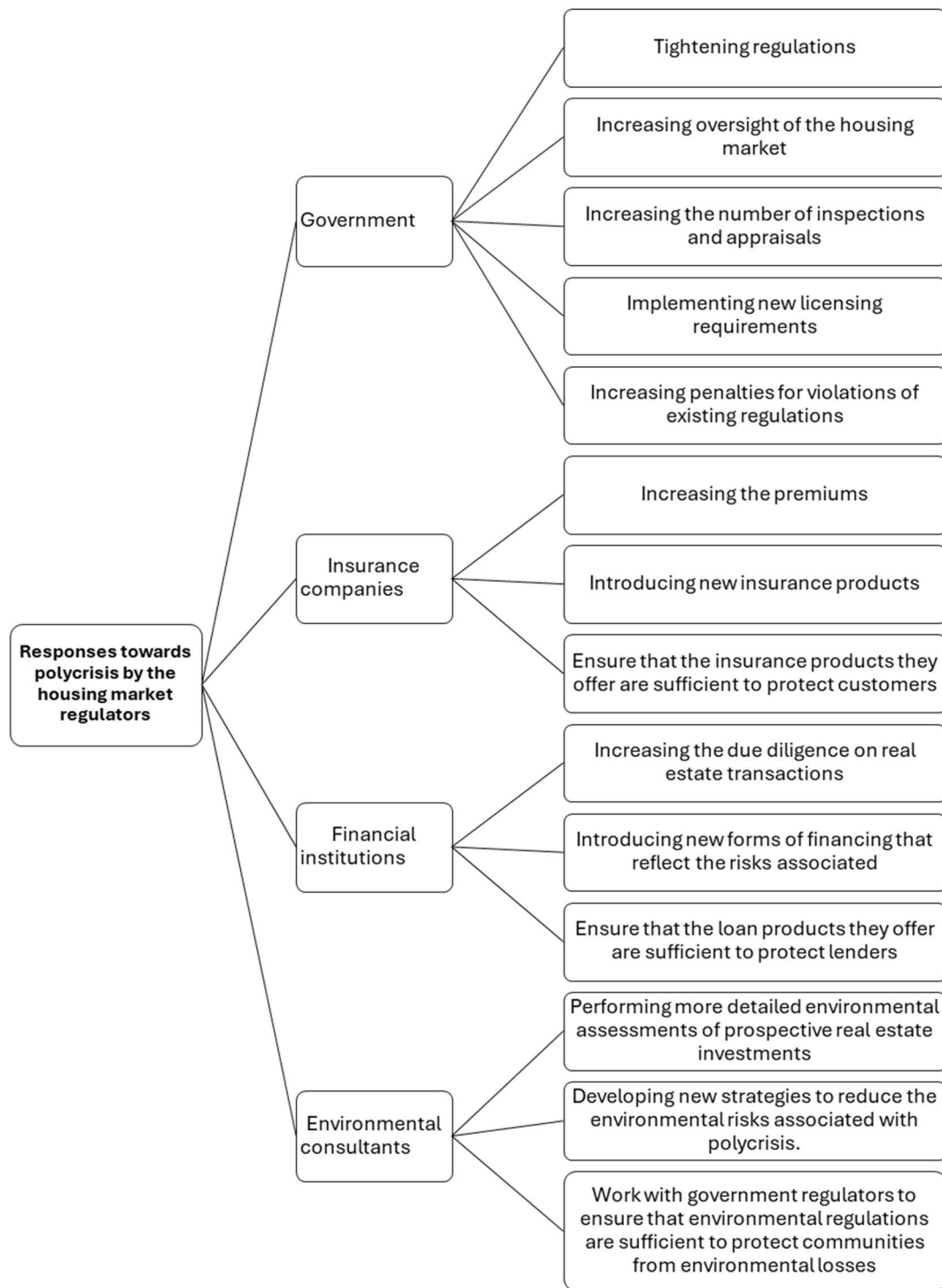


Fig. 4. Conceptual framework of responses towards polycrisis by the housing market regulators.

increase for homeowners, adding to their financial burden. Financial institutions will also be impacted as reduced credit demand and a surge in loan defaults will make it harder for them to recover their losses. They may have to implement stricter lending practices, further dampening the housing market. The polycrisis may also lead to environmental damage, requiring the expertise of environmental consultants to assess the extent of harm and develop mitigation strategies. However, the increased demand for their services will likely come with higher expenses, adding another cost for housing market regulators to bear. Overall, the polycrisis poses significant challenges for housing market regulators, requiring them to navigate through increased expenses, reduced market

activity, and potential environmental risks.

#### 6.5. The impact of polycrisis on housing market participants

The polycrisis crisis has caused significant distress among participants in the housing market [120]. Homeowners are facing financial difficulties as prices have sharply declined [121]. Due to circumstances, investors have been compelled to sell off their portfolios, resulting in an abundance of properties flooding the market [122,123]. The severity of the situation has led many people to seek assistance from the government. Even those who have successfully overcome the difficult

**Table 8**  
Housing market participants' responses towards polycrisis.

Market Participants	Responses	References
Real Estate Developers	<ul style="list-style-type: none"> <li>• Reduce development costs</li> <li>• Revise building plans to meet new market demands</li> <li>• Offer flexible payment terms</li> <li>• Explore new ways of financing projects</li> </ul>	[127, 180–183]
Landowners	<ul style="list-style-type: none"> <li>• Reduce lease rates</li> <li>• Offer incentives to potential tenants</li> <li>• Explore new ways of generating revenue</li> <li>• Investigate alternative uses for their land</li> </ul>	[38,184]
Architects	<ul style="list-style-type: none"> <li>• Using cost-effective materials and designs that help reduce construction and maintenance costs.</li> <li>• Explore alternative solutions for a project</li> <li>• Using prefabricated components or modular designs</li> </ul>	[43, 185–188]
Engineers	<ul style="list-style-type: none"> <li>• Exploring new ways of maximizing energy efficiency and minimizing costs</li> <li>• Investigate the use of renewable energy sources</li> </ul>	[187,189]
Surveyors	<ul style="list-style-type: none"> <li>• Reduce energy costs</li> <li>• Providing accurate assessments</li> <li>• Developing innovative solutions to help reduce costs</li> </ul>	[190–192]
Real estate agents	<ul style="list-style-type: none"> <li>• Offering flexible payment terms to potential buyers</li> <li>• Reducing commission fees</li> <li>• Exploring new ways to market properties</li> <li>• Develop marketing strategies to attract more buyers</li> </ul>	[61,193]
General Contractors	<ul style="list-style-type: none"> <li>• Reducing their overhead costs</li> <li>• Consolidating their subcontractors</li> <li>• Offer flexible payment terms</li> <li>• Offer incentives</li> </ul>	[143,194, 195]
Subcontractors	<ul style="list-style-type: none"> <li>• Offering flexible payment</li> <li>• Utilizing cost-effective materials</li> <li>• Exploring new ways to increase efficiency</li> <li>• Investigate alternative ways of generating revenue</li> <li>• Offering maintenance services</li> <li>• Renting out their equipment</li> </ul>	[143,194, 195]
Suppliers	<ul style="list-style-type: none"> <li>• Offering flexible payment</li> <li>• Offering discounted prices</li> <li>• Investigate alternative sources of materials</li> <li>• Seek out new markets</li> </ul>	[146,196]
Property Managers	<ul style="list-style-type: none"> <li>• Offering flexible rental terms and payment</li> <li>• Reducing management fees</li> <li>• Exploring new ways of generating revenue</li> <li>• Seek out alternative sources of income</li> <li>• Offering temporary housing services</li> </ul>	[61,72, 197–199]
Property Owners	<ul style="list-style-type: none"> <li>• Offering flexible payment</li> <li>• Reducing rental rates</li> <li>• Exploring new ways to generate revenue</li> <li>• Explore alternative uses for their property</li> <li>• Establishing small businesses</li> <li>• Developing a communal garden</li> </ul>	[61, 197–199]
Tenants	<ul style="list-style-type: none"> <li>• Seeking out flexible rental terms and payment</li> <li>• Explore alternative housing options</li> <li>• Sharing a rental unit</li> <li>• Taking advantage of short-term rental services</li> </ul>	[108,197, 199]
Investors	<ul style="list-style-type: none"> <li>• Exploring new markets</li> <li>• Seeking out alternative sources of income</li> <li>• Investigate different types of investments</li> <li>• Real estate crowdfunding</li> <li>• Peer-to-peer lending</li> </ul>	[200–206]
Legal firms	<ul style="list-style-type: none"> <li>• Adopting remote working</li> <li>• Adapting to technological advances</li> </ul>	[162,207, 208]

circumstances are still facing the consequences. As a result, they are forced to make significant adjustments to their way of life in order to meet their basic needs.

One example of this is the increase in rental prices, which is closely linked to gentrification. According to Rinn et al. [124], regular rent hikes play a crucial role in the process of gentrification, affecting both individual rental agreements and the overall housing market. These increases also contribute to various forms of displacement. The authors argue that the actions taken by residents have a significant impact on how gentrification occurs. Overall, the future of the housing market remains uncertain due to the impacts of the ongoing crisis. The impacts are summarized in Table 6.

The participants in the housing market have been significantly affected by the polycrisis, as demonstrated in Table 6 and illustrated in Fig. 3. Real estate developers have met diminished profits, project setbacks, and the possibility of bankruptcy, while landowners have faced heightened financial risk, diminished property values, and challenges in securing project financing. Professionals in the fields of architecture, engineering, surveying, real estate, construction, property management, and investment have all experienced a decrease in demand for their services, longer project durations, and fewer opportunities for investment. Consequently, they face heightened financial risk, diminished returns, and decreased affordability. Legal firms are meeting difficulties that impact both their functioning and financial income. The challenges they are currently facing include remote work, postponed proceedings, and obstacles in keeping effective communication and collaboration.

## 7. Responses towards polycrisis

Building upon the previous topic, this subtopic will delve into the overarching reactions to polycrisis in a universal context. It will then scrutinize how this crisis specifically addressed by the housing market. Ultimately, the discussion will evaluate the stakeholders' responses to the polycrisis in the housing market, encompassing market regulators and participants.

### 7.1. Responses towards polycrisis in general

Reactions to a polycrisis can differ based on the seriousness and characteristics of the polycrisis involved. Occasionally, governments and organisations may choose to take a proactive stance by implementing comprehensive strategies to effectively tackle polycrisis concurrently. This may entail synchronising endeavours across various sectors, including healthcare, economy, and social welfare, to guarantee a comprehensive response. Furthermore, there may be a pursuit of international cooperation and collaboration to combine resources and expertise in addressing the interrelated challenges.

Conversely, reactions to polycrisis can also be reactive, as authorities focus on addressing immediate crisis situations rather than engaging in long-term strategic planning. This strategy may require the distribution of resources and focus towards the most urgent crisis, disregarding others, which could potentially worsen the overall impacts of the polycrisis. The success of responses to polycrisis hinges on the ability to identify the interconnectedness among various crises and devise comprehensive solutions that tackle their underlying origins.

### 7.2. Responses towards polycrisis by the housing market

The housing market has been affected by the repercussions of the polycrisis. Primarily, there has been a substantial decline in the demand for housing due to individuals exercising greater caution in making

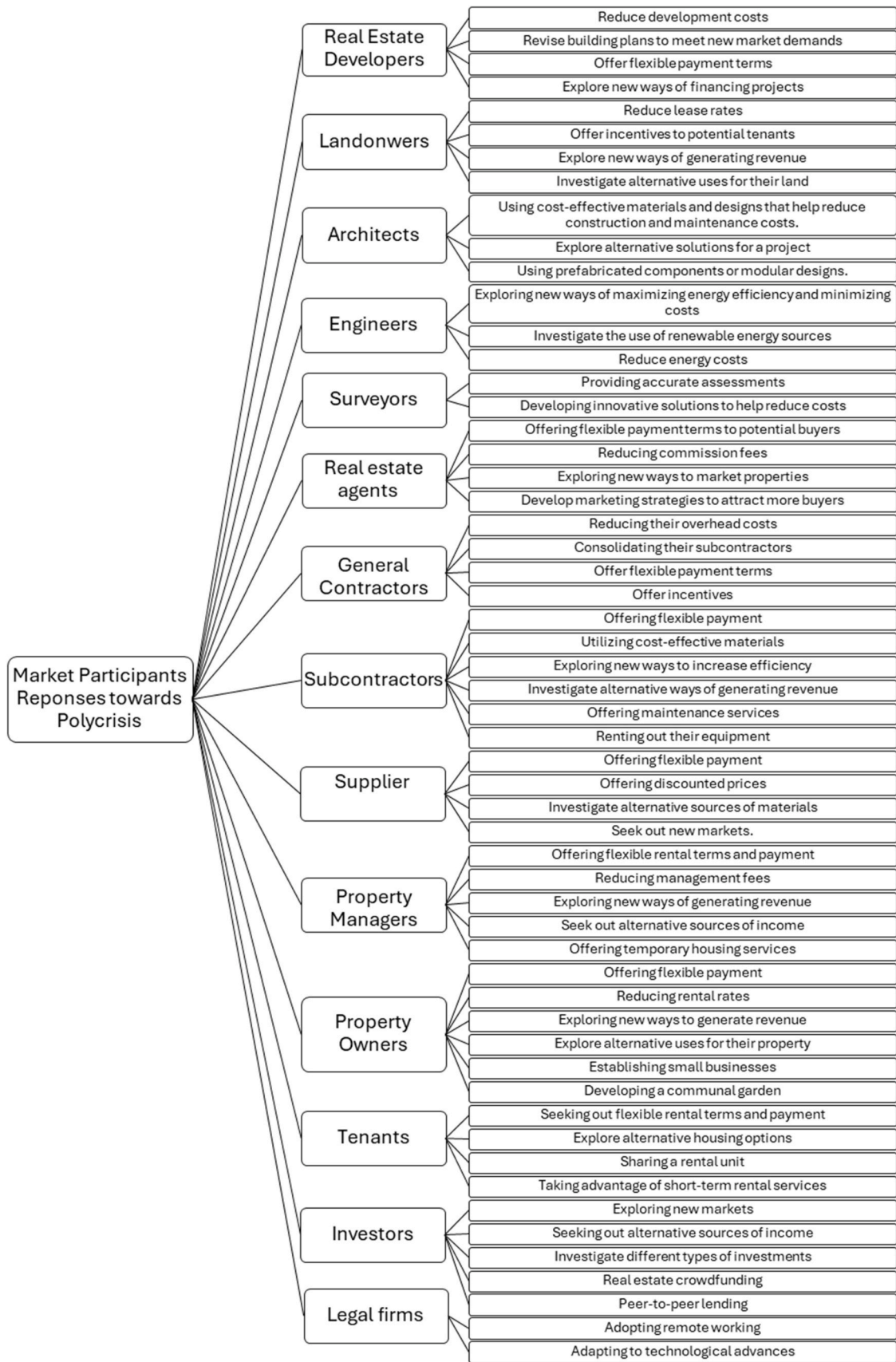


Fig. 5. Conceptual framework of responses towards polycrisis by housing market participants.

substantial financial commitments considering the prevailing uncertainty. Consequently, there has been a decline in property sales and a rise in the inventory of unsold homes. Moreover, numerous homeowners have met financial adversities because of unemployment or decreased earnings, resulting in challenges in meeting their mortgage payments. The consequence of this is an increase in foreclosures and a potential escalation in the number of homes listed as distressed properties. Moreover, the housing market's growth has been hindered by the suspension or postponement of construction projects and new housing developments. Collectively, the polycrisis crisis has engendered a formidable milieu for the housing sector, characterised by diminished demand, heightened financial hardships for property owners, and a deceleration in the development of new residential structures.

### 7.3. 7.3responses towards polycrisis by housing market regulators

The response to polycrisis involves the implementation of stricter regulations, enhanced oversight, higher premiums, the introduction of innovative insurance products, increased due diligence, the adoption of new financing methods, more comprehensive environmental assessments, and the formulation of novel strategies to mitigate environmental risks by the government, insurance companies, financial institutions, and environmental consultants. Specifically, Table 7 contains the list, while Fig. 4 provides a conceptual representation.

Government, insurance companies, financial institutions, and environmental consultants can all address polycrisis by implementing stricter regulations, raising premiums, enhancing due diligence, introducing innovative loan products, and conducting comprehensive environmental assessments. These measures are intended to safeguard homeowners, lenders, and communities against financial and environmental damages resulting from polycrisis. Parties can engage in collaboration with government regulators to ensure that the regulations.

### 7.4. Responses towards polycrisis by housing market participants

The participants in the housing market are reacting to a polycrisis, which refers to the convergence of polycrisis. The participants encompass a wide range of individuals involved in the real estate industry, such as real estate developers, landowners, architects, engineers, surveyors, real estate agents, general contractors, subcontractors, suppliers, property managers, property owners, tenants, and investors. Each entity is reacting to the polycrisis crisis in distinct manners, contingent upon their position within the housing market.

Table 8 displays the responses of housing market participants towards the polycrisis found in literature.

To summarise (as depicted in Fig. 5), the housing market is currently experiencing a complex crisis, and it needs diverse responses from all involved parties. Developers and landowners could decrease expenses and investigate alternative methods of funding, while architects and engineers can seek out economical materials and designs that optimise energy usage. Surveyors can offer property valuation assessments, while real estate agents can offer flexible payment options and reduced commission rates. General contractors and subcontractors could decrease their overhead expenses and provide adaptable payment conditions, while suppliers can pursue reduced prices and explore alternative sources. Property managers and owners have the option to lower rental rates and explore alternative sources of income. Likewise, tenants and investors can consider flexible payment arrangements and expand their investment portfolios.

Moreover, in response to the challenges posed by the polycrisis, market participants are adopting a strategic approach by enhancing productivity through digital transformation. This approach is similar to what has been observed in other fields, such as small and medium enterprises [209,210].

In summary, the responses demonstrate involved collaboration and initiatives – both locally and globally, as stressed by WEF [12], IMF [13],

and UNDP [14]. Therefore, the responses correspond to three Sustainable Development Goals (SDGs): SDG 8, which focuses on promoting decent work and economic growth; SDG 11, which aims to create sustainable cities and communities; and SDG 13, which addresses climate action.

## 8. Conclusion

The housing market is a complex system that is susceptible to numerous economic, political, and social shocks. These shocks can result in a state of "polycrisis," where multiple crises occur simultaneously, making it difficult to effectively address the issue. This study aims to identify the factors, impacts, and responses related to polycrisis in the housing market - globally, thereby increasing awareness and preparedness among regulators and participants. This is achieved through a comprehensive review of the current literature and meticulous analysis of the data.

The findings show that polycrisis and its contributing factors can be grouped into seven categories: economic, political, social, environmental, technological, cultural, and health. The impacts, conversely, can be divided between stakeholders, i.e., market regulators and market participants. Market regulators include government authorities, environmental consultants, insurance companies, and financial institutions, while market participants consist of developers, landowners, architects, engineers, surveyors, estate agents, contractors, subcontractors, suppliers, property managers, property owners, tenants, investors, and legal firms.

However, it is important to note that this study is limited to providing an overview of the polycrisis, encompassing its factors, impact, and responses in the housing market. While there are no specific geographical limitations in this desktop study, the focus is on the overall housing market. Therefore, it is crucial to further scrutinize the current housing market trends and methods for combating the polycrisis from regulatory and market participants' perspectives. Furthermore, conducting further research on the categories and field-specific studies of different countries' developmental stages is necessary. This will allow for a comprehensive identification of polycrisis factors, their impact, and the appropriate measures to mitigate them.

Moreover, it would be advantageous to conduct further research that considers the diverse developmental stages of different countries' classifications and field-specific investigations. This entails scrutinising the conditions of advanced economies, emerging nations, and the most underdeveloped countries. This will streamline the evaluation of the extent of polycrisis factors, their impacts, and the required interventions, as well as the development of appropriate measures, approaches, and strategies to tackle them.

In developed nations, research can prioritize the exploration of the complex relationship between economic, political, and social factors that contribute to situations characterised by multiple crises. This is due to the presence of advanced infrastructure, technology, and human resources. This involves analysing the impacts of financial crises, political turmoil, and environmental difficulties on the stability and adaptability of these nations. Furthermore, studies focused on specific fields have the capacity to investigate sectors such as healthcare, education, and transportation with the aim of identifying weaknesses and possible remedies.

Conducting research on the polycrisis faced by developing countries in managing multiple crises simultaneously would be advantageous. This may involve examining the possible difficulties presented by insufficient resources, governance structures that may need to be reinforced, and infrastructure that may require additional development to improve their ability to respond efficiently. Future studies can effectively identify and implement strategies to foster resilience and minimise the adverse impacts of polycrisis situations by gaining a thorough understanding of the specific developmental needs of these countries.

Conversely, it is crucial to give priority to focused research in order

to efficiently tackle the distinct difficulties encountered by the least-developed countries. These nations encounter difficulties associated with poverty, inadequate infrastructure, and constrained access to resources. Research in this context can seek to investigate the fundamental factors that contribute to polycrisis situations in these countries, encompassing issues such as food insecurity, health epidemics, and political instability. Future studies can also develop tailored strategies to address these challenges and promote sustainable development by acquiring a thorough understanding of the complex dynamics involved.

To obtain a thorough comprehension of the multiple factors that contribute to polycrisis, it is crucial to conduct research that considers the developmental stages of different countries and field-specific studies. This knowledge has the potential to aid in the creation of appropriate measures, tactics, and strategies that can help countries effectively navigate these complex challenges and promote resilience for the future.

### Funding

The authors would like to thank the Ministry of Higher Education Malaysia (MoHE) and Universiti Teknologi Malaysia, Malaysia for the unwavering and continuous support (UTMShine - Q. J130000.2452.09G85).

### Availability of data and material

The data used in the manuscripts is included in the text.

### Code availability

Not applicable.

### Ethics approval

Not applicable.

### Consent to participate

Not applicable.

### Content for publication

Not applicable.

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Data availability

No data was used for the research described in the article.

### References

- [1] Albert MJ. Navigating the polycrisis: mapping the futures of capitalism and the earth. MIT Press; 2024.
- [2] Lawrence M, Homer-Dixon T, Janzwood S, Rockstrom J, Renn O, Donges JF. Global Polycrisis: the causal mechanisms of crisis entanglement. 2023.
- [3] Lawrence M, Janzwood S, Homer-Dixon T. What is a global polycrisis, 4. Cascade Institute; 2022. Technical Paper.
- [4] Henig D, Knight DM. Polycrisis: prompts for an emerging worldview. *Anthropol Today* 2023;39(2):3–6.
- [5] Kinski L. 6 Representation in polycrisis: towards a new research agenda for EU citizens. *The EU under Strain? Current Crises Shaping European Union Politics* 2023;1:115.

- [6] Schimmelfennig F. 2 Polity attacks and policy failures: the EU polycrisis and integration theory. *The EU under Strain? Current Crises Shaping European Union Politics* 2023;1:27.
- [7] Madden D. Polycritical city? *City* 2023;1–4.
- [8] Koasidis K, Nikas A, Doukas H. Why integrated assessment models alone are insufficient to navigate us through the polycrisis. *One Earth* 2023;6(3):205–9.
- [9] Linnér A. A polycrisis of climate change, food insecurity, socioeconomic inequality, and conflict intensity?. 2023.
- [10] Hoyer D, Bennett JS, Reddish J, Holder S, Howard R, Benam M, Turchin P. Navigating Polycrisis: long-run socio-cultural factors shape response to changing climate. 2023.
- [11] Laffan B. Collective power europe?(the government and opposition/leonard schapiro lecture 2022). *Government and Opposition*; 2023. p. 1–18.
- [12] World Economic Forum (WEF). *The global risks report 2023*. eighteenth ed. Geneva: Insight Report; 2023. ISBN-13: 978-2-940631-36-0, WEF.
- [13] International Monetary Fund (IMF). *Annual report facing crisis upon crisis: how the world can respond*, by kristalina georgieva. Washington, DC: IMF Managing Director; 2022. April 14, 2022, <https://www.imf.org/en/News/Articles/2022/04/14/sp041422-curtain-raiser-sm2022>.
- [14] United Nations Development Programme (UNDP). *Undp rbap: anticipating risks and uncertainties for Asia and the pacific: 2023 updated key risks report*. 2023. New York, New York.
- [15] Kotarski K. The new era of polycrisis and how to tackle it. *Future Europe Journal* 2023;(3):1.
- [16] Hopper GP, Rattray G, Schuermann T, Power B. Stress testing in a world of compound risks and polycrises. 2023.
- [17] Jabold B, Baker-Friesen A, De Boer C, Bourban M, Barbara K, Lenzi D. *UT sustainability transformation*. 2023.
- [18] Leysnon A. *Economic geography II: the economic geographies of the COVID-19 pandemic*. *Prog Hum Geogr* 2023;47(2):353–64.
- [19] Maalouf J, Miklian J, Hoelscher K. *Business Survival Strategies in a Polycrisis: SME Experiences from Beirut, Lebanon*. *Bus Horiz* 2023. <https://doi.org/10.2139/ssrn.4602120>.
- [20] Jagun ZT, Daud D, Ajayi OM, Samsudin S, Jubril AJ, Rahman MSA. *Waste management practices in developing countries: a socio-economic perspective*. *Environ Sci Pollut Control Ser* 2023;30(55):116644–55.
- [21] Jagun ZT, Nyakuma BB, Daud D, Samsudin S. *Property development during the COVID-19 pandemic: challenges and outlook in Malaysia*. *Environ Sci Pollut Control Ser* 2022;1–10.
- [22] Sassanelli C, Rosa P, Rocca R, Terzi S. *Circular economy performance assessment methods: a systematic literature review*. *J Clean Prod* 2019;229:440–53.
- [23] Zeitlin J, Nicoli F, Laffan B. *Introduction: the European Union beyond the polycrisis? Integration and politicization in an age of shifting cleavages*. *J Eur Publ Pol* 2019;26(7):963–76.
- [24] Meissner KL, Schoeller MG. *Rising despite the polycrisis? The European Parliament's strategies of self-empowerment after Lisbon*. In: *The European union beyond the polycrisis?* Routledge; 2020. p. 113–31.
- [25] Hochachka G. *Climate change and the transformative potential of value chains*. *Ecol Econ* 2023;206:107747.
- [26] Dickson F. *Will 2023 be the year of the polycrisis and how can chief risk officers prepare?* *Governance Directions* 2023;75(1):786–91.
- [27] Stulz RM. *Crisis risk and risk management (No. w31252)*. National Bureau of Economic Research; 2023.
- [28] Dima AM, Danescu ER, editors. *Fostering recovery through metaverse business modelling: interdisciplinary perspectives on an emerging paradigm shift*. Springer Nature; 2023.
- [29] Newsome A, Riddervold M, Trondal J. *The financial crisis: an introduction*. *The Palgrave Handbook of EU Crises*; 2021. p. 375–80.
- [30] Amos S. *The development of a disruptive innovation response framework within the South African insurance context: adapt, regenerate, transcend (Art)*. master's thesis, Faculty of Commerce) 2020.
- [31] Quigley E. *Universal Ownership in the Age of Covid-19: social norms, feedback loops, and the double hermeneutic*. *Feedback Loops, and the Double Hermeneutic*. 2020 [Accessed 28 May 2020], <http://dx.doi.org/10.2139/ssrn.n.3612928>.
- [32] Farley J, Chandler N, Clarke A, Eisel L, Friedberg M, Geffert B, Walker D. *Creating a transnational knowledge commons to address the global polycrisis*. 2023.
- [33] Lau KY, Tey JH, Ting IWK. *Risk management practices and financial performance of property developers in the context of covid-19 pandemic*, 15. *Global Business & Management Research*; 2023.
- [34] Arkandana MT, Mariel WCF, Pramana S. *The impact during of pandemic COVID-19 on property sector case study: DKI jakarta province*. *Jurnal Ekonomi Indonesia* 2022;11(3):265–79.
- [35] Ling FY, Zhang Z, Yew AY. *Impact of COVID-19 pandemic on demand, output, and outcomes of construction projects in Singapore*. *J Manag Eng* 2022;38(2):04021097.
- [36] Waitthaka J. *The impact of COVID-19 pandemic on Africa's protected areas operations and programmes*. 2020. IUCN-WCPA Paper.
- [37] Sitanggang T. *The role of traditional landowners in the impact of the covid-19 pandemic on tourist visit guides*. 2021.
- [38] Chakrabarti S, Ekblom A. *Covid-19 pandemic effects and responses in the Maasai Mara conservancy*. *Tourism Hospit Res* 2023;14673584231162275.
- [39] Ondik M, Ooi M, Muñoz-Rojas M. *Insights from landowners on Australia's Black Summer bushfires: impacts on soil and vegetation, perceptions, and behaviours*. In: *EGU general assembly conference abstracts*; 2022, May. EGU22–10776.

- [40] Tiwari SP. The potential impact of COVID-19 on the asian rural economy: a study based on asian countries. *Journal of Education, Management and Development Studies* 2022;2(3):1–7.
- [41] Hays JN. *Epidemics and pandemics: their impacts on human history*. Bloomsbury Publishing USA; 2005.
- [42] Abd Hamid MN, Yunus NM, Berahim N, Zainudin AZ, Ali HM, Najib M, Azmi FAM. Taxation as an alternative to encourage idle land development. *Planning Malaysia* 2023;21.
- [43] Megahed NA, Ghoneim EM. Indoor Air Quality: rethinking rules of building design strategies in post-pandemic architecture. *Environ Res* 2021;193:110471.
- [44] Maturana B, Salama AM, McInnery A. Architecture, urbanism, and health in a post-pandemic virtual world. *Archnet-IJAR: International Journal of Architectural Research* 2021;15(1):1–9.
- [45] Aman AHM, Hassan WH, Sameen S, Attarbashi ZS, Alizadeh M, Latiff LA. IoMT amid COVID-19 pandemic: application, architecture, technology, and security. *J Netw Comput Appl* 2021;174:102886.
- [46] Mushtaha E, Dabous SA, Alsyouf I, Ahmed A, Abdraboh NR. The challenges and opportunities of online learning and teaching at engineering and theoretical colleges during the pandemic. *Ain Shams Eng J* 2022;13(6):101770.
- [47] King SS, Rahman RA, Fauzi MA, Haron AT. Critical analysis of pandemic impact on AEC organizations: the COVID-19 case. *J Eng Des Technol* 2022;20(1):358–83.
- [48] Smite D, Tkalic A, Moe NB, Papatheocharous E, Klotins E, Buvik MP. Changes in perceived productivity of software engineers during COVID-19 pandemic: the voice of evidence. *J Syst Software* 2022;186:111197.
- [49] Liu CH, Liu B. Exploring hotel appraisal determinants amid sales trend during COVID-19 pandemic: using a DANP-mV model. *Int J Strat Property Manag* 2022;26(4):258–71.
- [50] Unel FB, Yalpir S. Sustainable tax system design for use of mass real estate appraisal in land management. *Land Use Pol* 2023;131:106734.
- [51] Gbadegesin JT. Does the COVID-19 affect tenants' adherence to lease obligations in rental market? Property managers' perspective. *J Facil Manag* 2024;22(3):402–15.
- [52] Marona B, Tomal M. The impact of the Covid-19 pandemic on the operations of real estate agencies and the attitudes of their clients in Poland. *International Entrepreneurship Review* 2023;9(1):7–16.
- [53] Sandra AO, Nnamdi UA. The challenges of international real estate investment in the emerging economy as results of the restriction of movement due to omicron variants. *Int. Peer-Rev. J* 2022;(5):2456–8880.
- [54] Labadze L, Sraieb MM. Impact of anti-pandemic policy stringency on firms' profitability during COVID-19. *Sustainability* 2023;15(3):1940.
- [55] Mashuri AAS, Sari RHDP. Impact of implementing revenue recognition based on psak 72 in the COVID-19 pandemic period. *Journal Research of Social, Science, Economics, and Management* 2022;1(10):1621–32.
- [56] Al-Mhdawi MKS, Brito M, Onggo BS, Qazi A, O'Connor A. COVID-19 emerging risk assessment for the construction industry of developing countries: evidence from Iraq. *International Journal of Construction Management* 2023:1–14.
- [57] Abubakar ME, Hasan A, Jha KN. Delays and financial implications of COVID-19 for contractors in irrigation projects. *J Construct Eng Manag* 2022;148(9):05022006.
- [58] Olatunde NA, Awodele IA, Adebayo BO. Impact of COVID-19 pandemic on indigenous contractors in a developing economy. *J Eng Des Technol* 2022;20(1):267–80.
- [59] Ilatova E, Abraham YS, Celik BG. Exploring the early impacts of the COVID-19 pandemic on the construction industry in New York state. *Architecture* 2022;2(3):457–75.
- [60] Yang J, Liu Y, Jia Y. Influence of trust relationships with suppliers on manufacturer resilience in COVID-19 era. *Sustainability* 2022;14(15):9235.
- [61] Miguel C, Pechurina A, Kirkulak-Uludag B, Drotarova MH, Dumančić K, Braje IN, Giglio C. Short-term rental market crisis management during the COVID-19 pandemic: stakeholders' perspectives. *Int J Hospit Manag* 2022;102:103147.
- [62] Kuhlmann D, Rongerude J, Das B, Wang L. Rental property owner stress during the COVID-19 pandemic: results from a Minneapolis, MN survey. *Hous Soc* 2023:1–30.
- [63] Dagkouli-Kyriakoglou M, Tulumello S, Cocola-Gant A, Iacovone C, Pettas D. Digital mediated short-term rentals in the (post-) pandemic city. *Digital Geography and Society* 2022;3:100028.
- [64] de la Campa EA, Reina VJ. Landlords' rental businesses before and after the COVID-19 pandemic: evidence from a national cross-site survey. *J Hous Econ* 2023;59:101904.
- [65] Cohen JP, Friedt FL, Lautier JP. The impact of the Coronavirus pandemic on New York City real estate: first evidence. *J Reg Sci* 2022;62(3):858–88.
- [66] Li P, Han SS, Wu H. "Mobility restrictions and their implications" in pandemic times: how has COVID-19 changed the Airbnb market in Melbourne? *Int J Hous Mark Anal* 2023;16(3):450–73.
- [67] Baker E, Daniel L, Beer A, Rowley S, Stone W, Bentley R, Sansom G. The impact of the pandemic on the Australian rental sector. Oct: AHURI Final Report; 2022.
- [68] Gupta A, Bajaj D. Commercial office portfolio risks during the COVID pandemic and the future beyond—a survey of stakeholders in India. *J Property Invest Finance* 2023;41(5):523–37.
- [69] Dohig RK. "It's been a long road" the health and wellbeing impacts of the COVID-19 public health and social measures on public housing tenants in aotearoa New Zealand (doctoral dissertation. University of Otago; 2023).
- [70] Marzuki MJ, Newell G. Institutional investor management of Australian healthcare property assets as a pandemic-proof asset class. *Property Manag* 2022;40(3):437–55.
- [71] Chmielewska A, Ciski M, Renigier-Bilozor M. Residential real estate investors' motives under pandemic conditions. *Cities* 2022;128:103801.
- [72] Ngoc NM. The relevance of factors affecting real estate investment decisions for post pandemic time. *Int J Bus Glob* 2023.
- [73] Brescia RH. Lessons from the present: three crises and their potential impact on the legal profession. *Hofstra Law Rev* 2020;49:607.
- [74] Aidonjio PA, Anne OO, Ikubanni OO, Oyebade AA, Oyedeji AI, Okuonghae N. The challenges and impact of technological advancement to the legal profession in Nigeria given the covid-19 pandemic. *KIU Journal of Humanities* 2022;6(4):5–19.
- [75] Chandra G, Gupta R, Agarwal N. In: Chandra G, Gupta R, Agarwal, editors. Role of artificial intelligence in transforming the justice delivery system in covid-19 pandemic; 2020. p. 344–50. 2020.
- [76] Deo ME. Investigating pandemic effects on legal academia. *Fordham Law Rev* 2020;89:2467.
- [77] Davies M, Hobson C. An embarrassment of changes: international Relations and the COVID-19 pandemic. *Aust J Int Aff* 2023;77(2):150–68.
- [78] Kalb D. Two theories of money: on the historical anthropology of the state-finance nexus. *Focaal* 2023;2023(95):92–112.
- [79] Cabada L. Central europe between the west and east: independent region, the bridge, buffer zone or 'eternal' Semi-periphery? *Politics in Central Europe* 2020;16(2):419–32.
- [80] Homer-Dixon T, Renn O, Rockstrom J, Donges JF, Janzwood S. A call for an international research program on the risk of a global polycrisis. 2021.
- [81] Belov M. Rule of law and democracy in times of transitory constitutionalism, constitutional polycrisis and emergency constitutionalism: Towards a global algorithmic technocracy?. In: *In Rule of Law in Crisis*. Routledge; 2022. p. 21–46.
- [82] Henig D, Knight DM. Polycrisis: Prompts for an emerging worldview. *Anthropology Today* 2023;39(2):3–6.
- [83] Oxford RL, Perz SA, Schultz J. From polycrisis to peace. *Peace Res* 2023;55(1).
- [84] Schramm L. Exit from joint-decision problems? Integration and disintegration in the EU's recent poly-crisis. *European review of international studies* 2020;7(1):2–27.
- [85] Jayasuriya K. Polycrisis or crises of capitalist social reproduction. *Global Social Challenges Journal* 2023;1(aop):1–9.
- [86] Rüdiger F, Casas T. In: Casas i Klett T, Cozzi G, editors. The NextGen value creation barometer 2023: why sustainable value creation for young and future generations matters in a time of polycrisis. *Elite Quality Report*; 2023.
- [87] Ağh A. The EU polycrisis and hard populism in East-Central Europe: from the Copenhagen dilemma to the Juncker paradox. *Politics in Central Europe* 2017;13(2–3):7–32.
- [88] Mussinelli E. Inside the polycrisis. The possible necessary. *Techne* 2022;23:10–4.
- [89] Gomollón-Bel F, García-Martínez J. Chemical solutions to the current polycrisis. *Angew Chem Int Ed* 2023:e202218975.
- [90] Trondal J, Riddervold M, Newsome A. Polycrisis and resilience in the European union: covid-19 and avenues for future studies. In: *The politics of legitimation in the European union*. Routledge; 2022. p. 265–80.
- [91] Riddervold M, Newsome A, Trondal J. Epilogue: polycrisis and resilience in the European Union: covid-19 and avenues for future studies. In: *The routledge handbook of differentiation in the European union*. Routledge; 2022. p. 722–34.
- [92] Lošonc A. Principles of institutional and evolutionary political economy: applied to current world problems by phillip anthony O'hara. *Panoeconomicus* 2023;70(4):683–90.
- [93] Carver, H., Giolompea, T., Conway, A., Kilian, C., McDonald, R., Meksi, A., & Wojnar, M. Substance use disorders and COVID-19: reflections on international research and practice changes during the 'poly-crisis'. *Front Public Health*, 11, 1201967.
- [94] Ciampa F, Bosone M. Towards eco-social transition: community Regeneration Indicators respond to the polycrisis. *TECHNE-Journal of Technology for Architecture and Environment* 2022:200–10.
- [95] Van Nieuwerburgh S. The remote work revolution: impact on real estate values and the urban environment. 2023 AREUEA Presidential Address. *Real Estate Economics* 2023;51(1):7–48.
- [96] Kang D. The global economic polycrisis and the Korean economy. *Korea Institute for Industrial Economics and Trade Research Paper No* 2022;22. 11-1.
- [97] Bellini OE, Gullace MT, Mocchi M. Re-Start: le policrisi dello Student Housing post-Coronavirus/Re-Start: Student Housing Polycrisis post-Coronavirus. *Techne* 2022;23:94–103.
- [98] Zakeri B, Paulavets K, Barreto-Gomez L, Echeverri LG, Pachauri S, Boza-Kiss B, Pouya S. Pandemic, war, and global energy transitions. *Energies* 2022;15(17):6114.
- [99] Wen Y, Fang L, Li Q. Commercial real estate market at a crossroads: the impact of COVID-19 and the implications to future cities. *Sustainability* 2022;14(19):12851.
- [100] Li T, Jing X, Wei O, Yinlong L, Jinxuan L, Yongfu L, Yifan D. Mobility restrictions and their implications on the rental housing market during the COVID-19 pandemic in China's large cities. *Cities* 2022;126:103712.
- [101] Deghi A, Natalucci MFM, Qureshi MS. Commercial real estate prices during COVID-19: what is driving the divergence? *International Monetary Fund*; 2022.
- [102] Zeng S, Yi C. Impact of the COVID-19 pandemic on the housing market at the epicenter of the outbreak in China. *SN Business & Economics* 2022;2(6):53.
- [103] Benyakoub M, Elhannani FE. The investment strategy of global sovereign wealth funds during the period of the pandemic (COVID-19). *Finance and Business Economics Review* 2022;6(4):226–37.

- [104] Akalemeaku OJ, Nwafor IV, Nnamani OC. Property management in a pandemic era: strategies for emerging markets. *European Real Estate Society (ERES)*; 2021 (No. eres2021\_66).
- [105] Igan D, Kohlscheen E, Rungcharoenkitkul P. Housing market risks in the wake of the pandemic. *BIS Bulletin* 2022;(50).
- [106] Gamber W, Graham J, Yadav A. Stuck at home: housing demand during the COVID-19 pandemic. *J Hous Econ* 2023;59:101908.
- [107] Benner C, Botta F. From safe savings to big bangs—German fiscal federalism during and between economic crises. *Revista Cuadernos Manuel Giménez Abad* 2023;(9):76–97.
- [108] Gallent N, Stirling P, Hamiduddin I. Pandemic mobility, second homes and housing market change in a rural amenity area during COVID-19—The Brecon Beacons National Park, Wales. *Prog Plann* 2023;172:100731.
- [109] Apergis N, Mustafa G, Malik S. COVID-19 pandemic, stock returns, and volatility: the role of the vaccination program in Canada. *Appl Econ* 2022;54(42):4825–38.
- [110] Mohan D, Bhaskaran A, Marri S, Sharma H, Kasodekar M. Modi government's budget 2023: a peek into the past, present and (likely) future. *The Wire*; 2023. p. 1–10.
- [111] Ghosh J. A critique of the Indian government's response to the COVID-19 pandemic. *Journal of Industrial and Business Economics* 2020;47(3):519–30.
- [112] Ali MJ, Bhuiyan AB, Zulkifli N, Hassan MK. The COVID-19 pandemic: conceptual framework for the global economic impacts and recovery. *Towards a post-covid global financial system*. 2022. p. 225–42.
- [113] Jackson JK, Weiss MA, Schwarzenberg AB, Nelson RM, Sutter KM, Sutherland MD. *Global economic effects of COVID-19*. 2020.
- [114] Min H. Assessing the impact of a COVID-19 pandemic on supply chain transformation: an exploratory analysis. *Benchmark Int J* 2023;30(6):1765–81.
- [115] Ng QX, Yau CE, Yaow CY, Lim YL, Xin X, Thumboo J, Fong KY. Impact of COVID-19 on environmental services workers in healthcare settings: a scoping review. *J Hosp Infect* 2022;130:95–103.
- [116] Jordan SR, Daddato AE, Patel HP, Jones CD. Forgotten frontline workers: environmental health service employees' perspectives on working during the COVID-19 pandemic. *J Hosp Med* 2022;17(3):158–68.
- [117] Kocović J, Mladenović Z, Boričić B, Gavrilović BJ. Challenges and insurance market's responses to the economic crisis. *Belgrade*; 2023.
- [118] Sterett S. *Litigating the pandemic: disaster cascades in court*. University of Pennsylvania Press; 2023.
- [119] Karaki K, Bilal S. Upscaling debt swaps for greater impact. *ECDPM Discussion Paper* 343. Maastricht: ECDPM 2023.
- [120] Christensen MB, Hallum C, Maitland A, Parrinello Q, Puturo C. *Survival of the Richest: how we must tax the super-rich now to fight inequality*. 2023.
- [121] Bailey N, Harrington A. The economic impact of the pandemic on older adults. *Generations* 2022;46(1):1–12.
- [122] Lane PR. *The market stabilisation role of the pandemic emergency purchase programme*. 2020.
- [123] Dąbrowska K, Koryński P, Pytkowska J. Impact of COVID-19 pandemic on the microfinance sector in Europe: field analysis and policy recommendations. *Microfinance Centre (MFC)*; 2020.
- [124] Rinn M, Wehrheim J, Wiese L. How tenants' reactions to rent increases affect displacement: an interactionist approach to gentrification. *Urban Stud* 2022;59(15):3060–76.
- [125] Al Amri T, Marey-Perez M. Impact of Covid-19 on Oman's construction industry. *Technum Soc. Sci. J.* 2020;9:661.
- [126] Ogunnusi M, Hama-Adama M, Salman H, Kouider T. COVID-19 pandemic: the effects and prospects in the construction industry. *Int J Reconfigurable Embed Syst* 2020;14(Special Issue 2).
- [127] Norhaidin NAF, Keng TC. Strategies by the construction companies in Malaysia to survive from the impacts of covid-19 PANDEMIC. *Journal of Architecture, Planning and Construction Management* 2023;13(1):17–28.
- [128] Grippa P, Schmittmann J, Suntheim F. *Financial risk*. Finance & Development; 2019.
- [129] Seddon N, Smith A, Smith P, Key I, Chausson A, Girardin C, Turner B. Getting the message right on nature-based solutions to climate change. *Global Change Biol* 2021;27(8):1518–46.
- [130] Alsharaf A, Banerjee S, Uddin SJ, Albert A, Jaselskis E. Early impacts of the COVID-19 pandemic on the United States construction industry. *Int J Environ Res Publ Health* 2021;18(4):1559.
- [131] Florida R, Rodriguez-Pose A, Storper M. *Cities in a post-COVID world*. Edinburgh, Scotland: Urban Studies; 2021.
- [132] Barbosa CE, de Lima YO, Costa LFC, dos Santos HS, Lyra A, Argôlo M, de Souza JM. Future of work in 2050: thinking beyond the COVID-19 pandemic. *Eur J For Res* 2022;10(1):1–19.
- [133] Piroșcă GI, Șerban-Oprescu GL, Badea L, Stanef-Puică MR, Valdebenito CR. Digitalization and labor market—a perspective within the framework of pandemic crisis. *Journal of Theoretical and Applied Electronic Commerce Research* 2021;16(7):2843–57.
- [134] Chen Z, Marin G, Popp D, Vona F. Green stimulus in a post-pandemic recovery: the role of skills for a resilient recovery. *Environ Resour Econ* 2020;76:901–11.
- [135] Pamidimukkala A, Kermanshachi S. Impact of Covid-19 on field and office workforce in construction industry. *Project Leadership and Society* 2021;2:100018.
- [136] McGee E, Fang Y, Ni Y, Monroe-White T. How an antisience president and the COVID-19 pandemic altered the career trajectories of STEM PhD students of color. *Aera Open* 2021;7:23328584211039217.
- [137] Uhruska M, Małkowska A. The impact of COVID-19 on the work of property valuers: a glance at the polish state of play. *J Risk Financ Manag* 2021;14(8):378.
- [138] Marona B, Tomal M. The COVID-19 pandemic impact upon housing brokers' workflow and their clients' attitude: real estate market in Krakow. *Entrepreneurial Business and Economics Review* 2020;8(4):221–32.
- [139] Balemi N, Füss R, Weigand A. COVID-19's impact on real estate markets: review and outlook. *Financ Mark Portfolio Manag* 2021:1–19.
- [140] Ngoc NM, Tien NH, Anh DBH. Opportunities and challenges for real estate brokers in post Covid-19 period. *J Sci Technol* 2020;170(10):203–8.
- [141] Shibani A, Hasan D, Saaifan J, Sabboubh H, Eltaip M, Saidani M, Gherbal N. Financial risk management in the construction projects. *J King Saud Univ Eng Sci* 2022.
- [142] Ayat M, Kang CW. Effects of the COVID-19 pandemic on the construction sector: a systemized review. *Eng Construct Architect Manag* 2023;30(2):734–54.
- [143] Alfadil MO, Kassem MA, Ali KN, Alaghabari W. Construction industry from perspective of force majeure and environmental risk compared to the CoViD-19 outbreak: a systematic literature review. *Sustainability* 2022;14(3):1135.
- [144] Siddi M. Europe's energy dilemma: war and the green transition. *Curr Hist* 2023; 122(842):83–8.
- [145] Pham HT, Quang HT, Sampaio P, Carvalho M, Tran DLA, Vo VX, Duong BAT. The impact of global risks on supply chain performance. An empirical study on construction sector in the COVID-19 pandemic. *Int J Qual Reliab Manag* 2022;40(4):1009–35.
- [146] Radzi AR, Rahman RA, Almutairi S. Modeling COVID-19 impacts and response strategies in the construction industry: PLS–sem approach. *Int J Environ Res Publ Health* 2022;19(9):5326.
- [147] Gupta A, Mittal V, Van Nieuwerburgh S. Work from home and the office real estate apocalypse (No. w30526). National Bureau of Economic Research; 2022.
- [148] Hromada E, Čermáková K, Krulický T, Machova V, Horak J, Mitwallyova H. Labour market and housing unavailability: implications for regions affected by coal mining. *Acta Montan Slovaca* 2021;26(3).
- [149] Koonkaduwa JR, Sandanayake YG. The impact of COVID-19 pandemic on the demand and supply of apartment projects in Sri Lanka. 2022.
- [150] Choi JH, Goodman L, Pang D. Navigating rental payment and eviction data during the pandemic. *Washington, DC: Urban Institute*; 2022.
- [151] Waldron R. Experiencing housing precarity in the private rental sector during the covid-19 pandemic: the case of Ireland. *Hous Stud* 2022;38(1):84–106.
- [152] Marcal K, Fowler PJ, Hovmand PS. Feedback dynamics of the low-income rental housing market: exploring policy responses to COVID-19. 2022. arXiv preprint arXiv:2206.12647.
- [153] Woo KH, Khoo SL. Affordable housing and public administration of a historic city: the perspective of a local community in a UNESCO World Heritage Site, George Town, Penang State of Malaysia. *Journal of Urbanism: International Research on Placemaking and Urban Sustainability* 2023:1–29.
- [154] Waldron R. Generation rent and housing precarity in 'post crisis' Ireland. *Hous Stud* 2023;38(2):181–205.
- [155] Glossner S, Matos P, Ramelli S, Wagner AF. Do institutional investors stabilize equity markets in crisis periods? Evidence from COVID-19. *Swiss Finance Institute Research Paper*; 2022. p. 20–56. Evidence from COVID-19 (September 3, 2022).
- [156] Yi Y, Zhang Z, Xiang C. The value of CSR during the COVID-19 crisis: evidence from Chinese firms. *Pac Basin Finance J* 2022;74:101795.
- [157] Al-Thaqeb SA, Algharabali BG, Alabdulghafour KT. The pandemic and economic policy uncertainty. *Int J Finance Econ* 2022;27(3):2784–94.
- [158] Lee S. Internal capital markets, corporate investment, and the COVID-19 pandemic: evidence from Korean business groups. *Int Rev Financ Anal* 2022;80:102053.
- [159] Hongdao Q, Bibi S, Mu D, Khan A, Raza A. Legal business model digitalization: the post COVID-19 legal industry. *Sage Open* 2022;12(2):21582440221093983.
- [160] Boonin SR, Herrera LE. From pandemic to pedagogy: teaching the technology of lawyering in law clinics. *Wash. UJL & Pol'y* 2022;68:109.
- [161] Thumma SA, Reinkensmeyer MW. Post-pandemic recommendations: COVID-19 continuity of court operations during a public health emergency workgroup. *SMU Law Rev F* 2022;75:1.
- [162] Alazzam FAF, Alshunnaq MFN. Formation of creative thinking of a lawyer in modern conditions of development including the influence of COVID-19 pandemic. *Creativity Studies* 2023;16(1):315–27.
- [163] Nir E, Musial J. Zooming in: courtrooms and defendants' rights during the COVID-19 pandemic. *Soc Leg Stud* 2022;31(5):725–45.
- [164] Tan Z, Tang Q, Meng J. The effect of monetary policy on China's housing prices before and after 2017: a dynamic analysis in DSGE model. *Land Use Pol* 2022; 113:105927.
- [165] Martin C, Sisson A, Thompson S. Reluctant regulators? Rent regulation in Australia during the COVID-19 pandemic. *International Journal of Housing Policy* 2021:1–21.
- [166] Longworth DJ, Milne F. Parallels between financial regulation prior to the global financial crisis and lack of public health preparation prior to Covid-19 (No. 1455). *Queen's Economics Department Working Paper*; 2021.
- [167] Fuster A, Hizmo A, Lambie-Hanson L, Vickery J, Willen PS. How resilient is mortgage credit supply? Evidence from the COVID-19 pandemic. *National Bureau of Economic Research*; 2021 (No. w28843).
- [168] Huynh N, Nguyen D, Dao A. Sectoral performance and the government interventions during COVID-19 pandemic: Australian evidence. *J Risk Financ Manag* 2021;14(4):178.
- [169] Konetzka RT. Improving the fate of nursing homes during the COVID-19 pandemic: the need for policy. *Am J Publ Health* 2021;111(4):632–4.
- [170] Volosovych S, Zelenitsa I, Kondratenko D, Szymła W, Mamchur R. Transformation of insurance technologies in the context of a pandemic. *Insurance Markets and Companies* 2021;12(1):1–13.



- [171] Gründl H, Guxha D, Kartasheva A, Schmeiser H. Insurability of pandemic risks. *J Risk Insur* 2021;88(4):863–902.
- [172] Sood K, Seth N, Grima S. Portfolio performance of public sector general insurance companies in India: a comparative analysis. In: *Managing risk and decision making in times of economic distress, Part B*. Emerald Publishing Limited; 2022. p. 215–30.
- [173] Rahmayati R. Competition strategy in the Islamic banking industry: an empirical review. *International Journal of Business, Economics, And Social Development* 2021;2(2):65–71.
- [174] Marcu MR. The impact of the COVID-19 pandemic on the banking sector. *Management Dynamics in the Knowledge Economy* 2021;9(2):205–23.
- [175] Perwej A. The impact of pandemic COVID-19 on the Indian Banking System. *International Journal of Recent Scientific Research* 2020;11(10):39873–83.
- [176] Moi L, Cabiddu F. Navigating a global pandemic crisis through marketing agility: evidence from Italian B2B firms. *J Bus Ind Market* 2022;37(10):2022–35.
- [177] Chanyasak T, Koseoglu MA, King B, Aladag OF. Business model adaptation as a strategic response to crises: navigating the COVID-19 pandemic. *International Journal of Tourism Cities* 2022;8(3):616–35.
- [178] Heredia J, Rubiños C, Vega W, Heredia W, Flores A. New strategies to explain organizational resilience on the firms: a cross-countries configurations Approach. *Sustainability* 2022;14(3):1612.
- [179] Zahoor N, Golgeci I, Haapanen L, Ali I, Arslan A. The role of dynamic capabilities and strategic agility of B2B high-tech small and medium-sized enterprises during COVID-19 pandemic: exploratory case studies from Finland. *Ind Market Manag* 2022;105:502–14.
- [180] Priya SS, Cuce E, Sudhakar K. A perspective of COVID 19 impact on global economy, energy, and environment. *Int J Sustain Eng* 2021;14(6):1290–305.
- [181] Costa DG, Peixoto JPJ. COVID-19 pandemic: a review of smart cities initiatives to face new outbreaks. *IET Smart Cities* 2020;2(2):64–73.
- [182] Tokazhanov G, Theuken A, Guney M, Turkyilmaz A, Karaca F. How is COVID-19 experience transforming sustainability requirements of residential buildings? A review. *Sustainability* 2020;12(20):8732.
- [183] Ye J, Al-Fadly A, Quang Huy P, Quang Ngo T, Phi Hung DD, Hoang Tien N. The nexus among green financial development and renewable energy: investment in the wake of the Covid19 pandemic. *Economic research-Ekonomiska istraživanja* 2022;35(1):5650–75.
- [184] Eisenberg A, Brantley K. The crisis is not temporary: evictions after emergency rental assistance in Detroit. 2023.
- [185] Kizilova SA. Mobile reserve architecture: designing the post-pandemic solutions. *IOP Conf Ser Earth Environ Sci* 2022, February;988(5):052029. IOP Publishing.
- [186] Amran M, Makul N, Fediuk R, Borovkov A, Ali M, Zeyad AM. A review on building design as a biomedical system for preventing COVID-19 Pandemic. *Buildings* 2022;12(5):582.
- [187] Navaratnam S, Satheskumar A, Zhang G, Nguyen K, Venkatesan S, Poologanathan K. The challenges confronting the growth of sustainable prefabricated building construction in Australia: construction industry views. *J Build Eng* 2022;48:103935.
- [188] Faragallah RN, Barakat PN. Reshaping future architecture approaches using shipping containers: student housing as a case study. *Int J Sustain Dev Plann* 2022;17(8).
- [189] Idrissi Gartoumi K, Aboussaleh M, Zaki S. Building information modelling a key for construction industry recovery post-Covid-19. *Proceedings of the Institution of Civil Engineers-Engineering Sustainability* 2022, June;176(2):82–93. Thomas Telford Ltd.
- [190] Renigier-Bilozor M, Żróbek S, Walacik M, Borst R, Grover R, d'Amato M. International acceptance of automated modern tools use must-have for sustainable real estate market development. *Land Use Pol* 2022;113:105876.
- [191] Di Liddo F, Tajani F, Amoroso P, Ranieri R, Anelli D. The assessment of the forced sale value in the Italian residential market. *Aestimum* 2022;80:15–32.
- [192] Mora-García RT, Cespedes-Lopez MF, Perez-Sanchez VR. Housing price prediction using machine learning algorithms in COVID-19 times. *Land* 2022;11(11):2100.
- [193] Ho AT, Morin L, Paarsch HJ, Huynh KP. A flexible framework for intervention analysis applied to credit-card usage during the coronavirus pandemic. *Int J Forecast* 2022;38(3):1129–57.
- [194] Aslan S, Türkakın OH. A construction project scheduling methodology considering COVID-19 pandemic measures. *J Saf Res* 2022;80:54–66.
- [195] Chih YY, Hsiao CYL, Zolghadr A, Naderpajouh N. Resilience of organizations in the construction industry in the face of COVID-19 disturbances: dynamic capabilities perspective. *J Manag Eng* 2022;38(2):04022002.
- [196] Nový M, Nováková J. Impact of the COVID-19 pandemic on construction companies in the Czech Republic. *Proc Comput Sci* 2022;196:717–23.
- [197] Revington N, Benhocine C. Financializing through crisis? Student housing and studentification during the covid-19 pandemic and beyond. *Tijdschr Econ Soc Geogr* 2023;114(5):415–30.
- [198] Reynolds K, Fallon K, Noble E, Boshart A, Evans LD, Jakabovics A. Preventing and mitigating evictions after the COVID-19 crisis. 2023.
- [199] Christy V, Tan TH. Understanding tenants' motivations for co-living arrangements: a case study of Klang Valley, Malaysia. *Int J Hous Mark Anal* 2022; 15(5):1225–41.
- [200] Sha, Sha Y, Zhang Y, Lu X. Household investment diversification amid Covid-19 pandemic: evidence from Chinese investors. *Finance Res Lett* 2022;47:102820.
- [201] Xu M. Analysis of changes in the investment strategies of real estate funds for multifamily/single-family houses after the pandemic. Doctoral dissertation, Massachusetts Institute of Technology; 2022.
- [202] Bertinetti GS, Ferranna L, Gardenal G. Pandemic risk exposure: impacts of COVID-19 virus on real estate investments. Department of Management, Università Ca'Foscari Venezia Working Paper 2023;1.
- [203] Jung Y, Lee K. Roles and tasks of peer-to-peer lending platforms in activating green finance. In: *Green digital finance and sustainable development goals*. Singapore: Springer Nature Singapore; 2022. p. 353–66.
- [204] Nigmonov A, Daradkeh H. From one crisis to another: impact of COVID-19 pandemic on peer-to-peer lending market. In: *Financial transformations beyond the COVID-19 health crisis*; 2022. p. 363–402.
- [205] Abrams D. The financing of minority entrepreneurial efforts in the USA. In: *Financing startups: understanding strategic risks, funding sources, and the impact of emerging technologies*. Cham: Springer International Publishing; 2022. p. 71–80.
- [206] Kassim SFM, Shafii Z. Pandemic chaos: equity-based crowdfunding in Malaysia. 2023.
- [207] Gilbert MG. Practicing law as a digital nomad advent of remote legal practice protocols: remote practice in and out of US. *Com. L. World* 2023;37:16.
- [208] Dilworth R. The (Re) making of a modern lawyer—an in-house lawyer's pandemic reinvention journey. 2022.
- [209] Rojas-García JA, Elias-Giordano C, Quiroz-Flores JC, Nallusamy S. Profitability enhancement by digital transformation and canvas digital model on strategic processes in post-Covid-19 in logistics SMEs. *Social Sciences & Humanities Open* 2024;9:100777.
- [210] Vanderveen G. Remote justice: a visual essay on the response of the Dutch justice system to the COVID-19 pandemic. *Vis Stud* 2022:1–4.