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The role of social capital in managing risks: a bibliometric analysis and literature review

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ABSTRACT

Disasters and crises affect more people around the world than reported in official documents by national or international agencies. Meanwhile, climate change, the COVID-19 pandemic, several wars worldwide and other crises expose a large proportion of the entire population to substantial risks, as well as profoundly affecting human health globally. Many of these impacts remain unnoticed by governance authorities, since many coping strategies are based on bottom-up activities rather than top-down policies. This raises the question: how can we be adequately prepared for a next pandemic or other unforeseen extreme events? Social capital could provide some clues for resilient responses that could be integrated in risk planning and management practice. In this paper, a comprehensive review is provided based on bibliometric analysis. A total number of 2872 published articles were documented and classified. In addition, the geographic locations and the institutional affiliations were assessed and visualized. Four salient research themes were identified as follows: (1) Knowledge sources of the research domain; (2) Individual social capital and risky behaviors; (3) Disaster management and resilience building; and (4) Health issues in the COVID-19 Era. This study offered some practical insights for mobilizing and developing social capital in different phases of risk management. Nevertheless, more inter- and trans-disciplinary research across domains is needed to articulate a more comprehensive view of the development of social capital in various risk situations.

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Social capital; risks; disaster management; bibliometric analysis; resilience

1. Introduction

Disasters, pandemics and other catastrophic events affect more people around the world than openly publicized or officially reported. For example, the COVID-19 pandemic put the health of the world population at risk. The WHO reports: “By 31 December 2020, this figure (death toll) stood at 1 813 188. Yet preliminary estimates suggest the total number of global deaths attributable to the COVID-19 pandemic in 2020 is at least 3 million, representing 1.2 million more deaths than officially reported” (WHO 2021). Similar accounts of underestimation can be

found in the literature on other hazards (Ioannidis 2020). In addition, when disaster strikes, the consequences are not distributed equally across individuals, communities and countries. Individuals with more social capital have better access to assistance and services than those with less social capital. This has been demonstrated in studies on social capital during the Hurricane Katrina crisis (Hawkins and Maurer 2010). Mortality rates resulted from the 3.11 tsunami in Japan were lower in communities with higher level of social capital (Aldrich and Sawada 2015). Country studies show the positive effect of social capital on health outcomes during the Covid-19 pandemic (Bartscher et al. 2021; Alfano 2022). These results support the proposition that public health responses that are directed towards increasing social capital could compensate top-down policies in achieving desirable common goals (Wong and Kohler 2020). However, in the aftermath of the pandemic, it was observed that social capital in some countries declined rather than increased (Codagnone et al. 2021), which deserves more attention as it may exacerbate social inequalities and social cost.

Another example is the response to climate change as one of the most threatening environmental problems, including climate change-related natural disasters, such as wildfires, and extreme weather events, such as intense storms, floods, and heatwaves. These hazardous events linked to climate change are increasing in frequency and intensity, which are challenging the ability of communities to prepare, respond, and recover. Beyond the local level, they also profoundly affect human health globally (Ebi et al. 2021). But adaptive governance is quite difficult, as it involves simultaneous governance of multiple risk sources and consequences from several sectors, such as agriculture, fishery, drought and flood, ecosystem function, health risks and climate-sensitive industrial risks (Zhang et al. 2008).

The COVID-19 crisis has produced cascading outcomes for the health system, but also to the economy and human well-being. The crisis also revealed the limitations of top-down governance addressing complex issues. How can we be adequately prepared for a next pandemic or other unforeseen extreme events? Social capital could provide some clues for improving resilience and crisis response. Firstly, social capital may influence people's risk perceptions across a broad range of hazards and make people better prepared for a disaster (Siegrist 2021). Secondly, social capital may enhance community resilience before, during, and after disasters. Thirdly, social capital can play an important role in different stages of disaster risk management cycle, both in pre- and post-disaster scenarios.

These three points will be further explored with the help of a bibliometric analysis. Although there are numerous review studies incorporating social capital in disaster research (Meyer 2018) and community resilience (Aldrich and Meyer 2015), a systematic overview of the role of social capital in wider risk settings is still missing. The relevant literature is quite fragmented in various disciplines and varies across different research topics. By applying a bibliometric method, we try to provide a more systematic answer to the role of social capital in disaster management and to offer further clues of the types and structures of services that social capital can provide.

2. Data and method

To investigate research developments of social capital in risk settings, relevant academic papers were searched in the Web of Science Core Collection. We collected 2872 published papers dating from 1992 to November 30 of 2022. The data search strategies are shown as follows:

Topics = ("social capital") and (risk* OR disaster* OR crisis*);
 Document Types = (Article OR Review);
 Language = English;
 Subdatabases = SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH;
 Time span = all years.

We deliberately included in our search the terms crisis, disaster and risk although they have different meanings and different connotations in the respective literature. They all relate, however, to the experience of threat or damage caused by natural, technological, or societal events. They also are influenced or moderated by social capital which is crucial for our analysis in this paper. Notwithstanding the different meaning of these three terms, they can be seen together as challenges that require preparatory as well as mitigating or adapting activities induced by human actions. Therefore, it is justified to extend the scope of the search to include all three terms in spite of our main interest in revealing the relationship between social capital and disaster management.

The bibliometric method has been widely used in knowledge mapping, especially in conducting systematic reviews (Li, Goerlandt, and Reniers 2021). In our research, we used the visual software VOSviewer (The Centre for Science and Technology Studies, Leiden University, the Netherlands) (van Eck and Waltman 2010). It was applied to generate the collaboration networks, and to show the leading countries/regions and institutions in the target research field. The keywords co-occurrence networks were also analyzed to show the major thematic focus areas for the targeted research field.

Based on our bibliometric analysis, we were able to retrieve the evolution of scientific production on the topic of social capital and disaster management. Secondly, we were able to visualize the geographic locations and institutional affiliations linked to this research field. Then we identified key research topics from the collected academic literatures, providing semantic clusters to investigate the underlying components linked to our research questions. After describing the salient research topics, we discussed future developments of social capital research for disaster and risk governance.

3. The landscape of social capital studies in risk settings

3.1. Overview of scientific productivity in the research domain

Figure 1 shows the distribution of 2872 papers published in the risk/disaster/crisis domain from the year 1992 until the data collection date. The first paper that we found was published in 1992 in the *Journal of Asian and African Studies* (Sottas 1992). It discussed the importance of social capital for small-scale farmers to survive in Laikipia of Kenya under unfavorable ecological and economic conditions. The number of articles grew slowly after 1992. The research output reached the cumulative number of one hundred papers in 2003 and crossed the 100 articles per year ratio in 2012. After that, there was a rapid increase of research activities. In 2015, the number of publications reached over one thousand, and in 2018 it surpassed the benchmark of 200 articles per year. The ratio 300 articles per year was reached in 2020 when the cumulative number of publications amounted to over two thousand. In the year 2021, we observed 331 entries as the highest output of papers. Till the date of data collection, we identified two additional articles preprinted in 2023 (Zhang et al. 2023; Völker 2023).

Figure 2 provides insights into how the targeted research domains of the 2872 papers are located in the disciplinary landscape of scientific knowledge. Based on the analysis, the most frequently occurring scientific categories are “public, environmental & occupational health” with 710 papers amounting to 25% of the total sample. The following categories are “environmental sciences” (270 papers), “environmental studies” (264 papers), “economics” (207 papers), “sociology” (195 papers), “management” (177 papers) and others. The research domains encompass a variety of academic disciplines, ranging from engineering, natural sciences (e.g. geography, healthcare, computer science), to humanities and social sciences. In addition, there were studies based on multidisciplinary sciences and interdisciplinary research. Social capital is a traditional research topic in sociology and the social sciences in general. So, one would expect a high frequency of social science articles dealing with social capital. Recently it also attracts attention from other disciplines such as “meteorology & atmospheric sciences” and other research domains such as “water resources”.

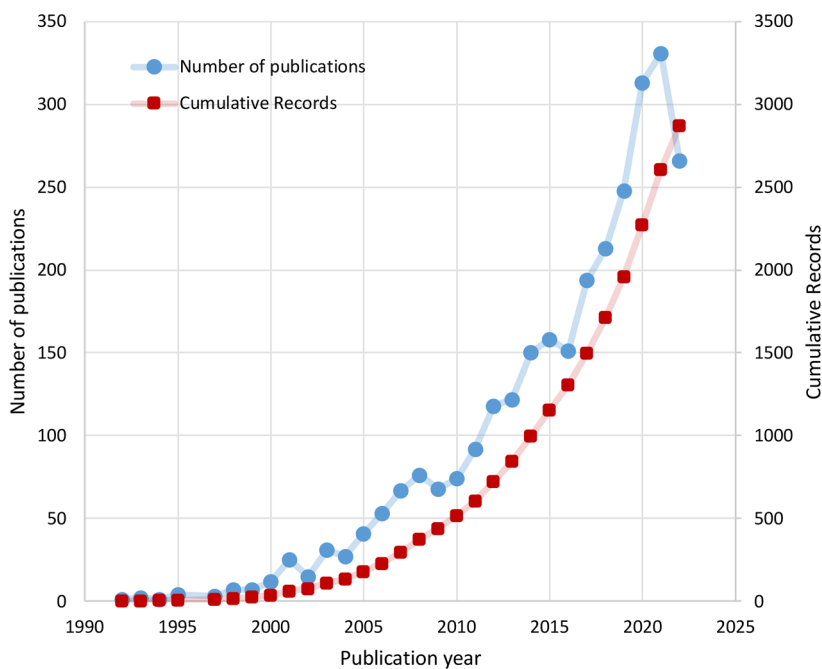


Figure 1. Annual publication productivity in the field of social capital related to risks, disasters and crises.

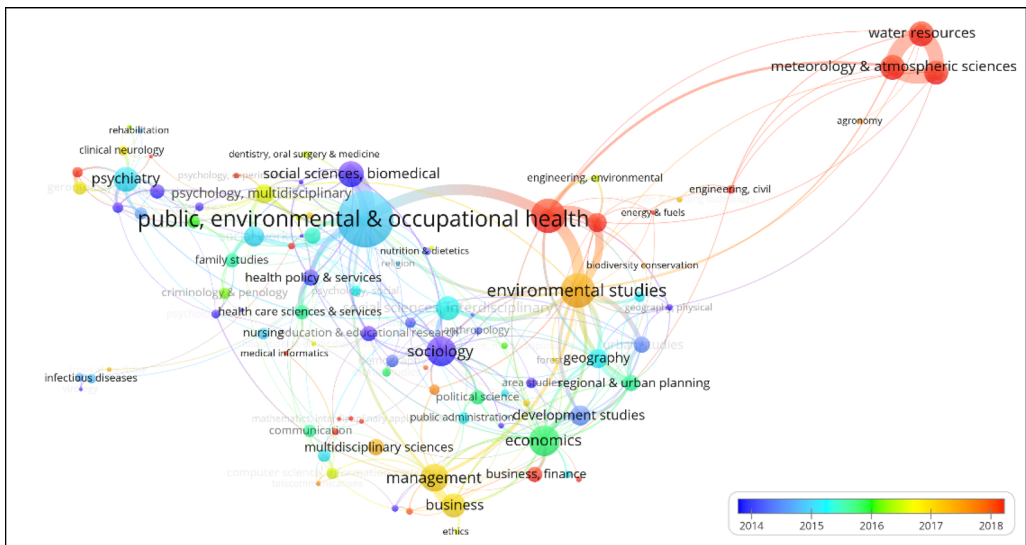


Figure 2. Distribution of web of Science categories.

The top 5 source journals are “Social Science & Medicine” (109 papers), “International Journal of Disaster Risk Reduction” (87 papers), “International Journal of Environmental Research and Public Health” (81 papers), “BMC Public Health” (67 papers), and “Sustainability” (60 papers). The journal Sustainability was found to play as an important hub for sustainability research and interdisciplinary studies involving discussion of social capital.

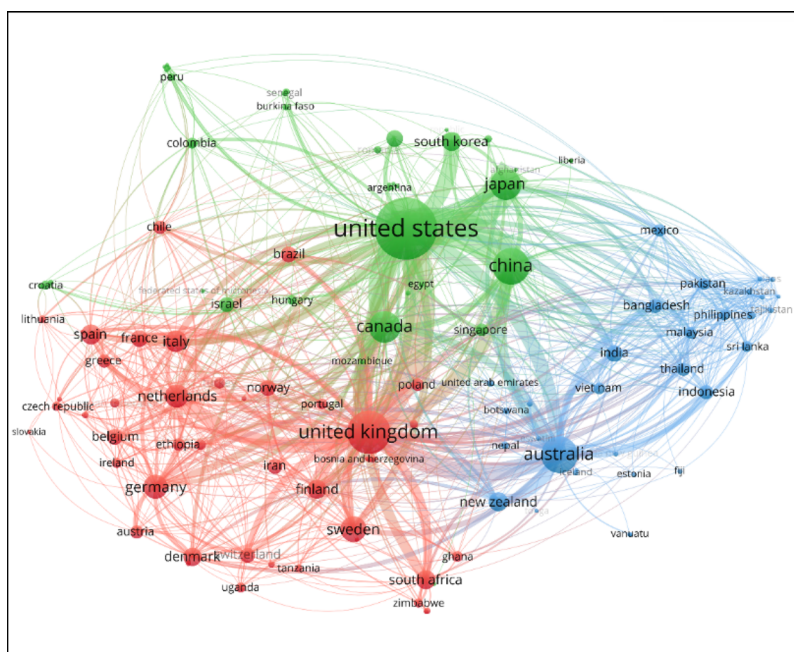


Figure 3. Cooperation network of countries/regions.

3.2. Networking of countries and institutions in the research domain

The six countries with the highest output in the field are the US, UK, China, Australia, Canada, and Japan. Figure 3 presents a network of highly condensed relationships between different countries/regions. The US and UK turn to be the leading countries when it comes to the extent of international collaborations: The US, UK and Australia also occupy core positions of the entire network, communicating frequently with others. The US, which has published the most papers of 1049 in total, cooperates closely with UK, China, Canada, Japan, and South Korea. In addition to the close cooperation between UK and US, as well as between UK and China, UK has stronger links to other European countries, such as Sweden, Germany, the Netherlands, and Italy. Similarly, Australia cooperates closely with other countries, such as New Zealand, India, Bangladesh, and Indonesia in addition to close links with the US and UK.

National/regional cooperation depends on the activities of research institutions to exchange knowledge with each other. Figure 4 presents a relatively evenly distributed network of institutions. The five institutions with the highest number of publications in the research field are Harvard University (US), University College London (UK), Lund University (Sweden), University of Sydney (Australia), and Northeastern University (US). Harvard University takes the lead in this research field by contributing 92 papers with 5221 citations in total. Within Harvard, the T.H. Chan School of Public Health published 36 papers alone. All other institutions follow with quite a distance to Harvard. For studying social capital research in risk settings, University College London published 49 papers in total (2277 citations), Lund University published 43 papers (1549 citations), University of Sydney published 42 papers (1008 citations), and Northeastern University published 35 papers (801 citations).

4. Identification of salient research topics

Figure 5 plots the co-occurrence network of keywords of the collected academic articles. The cluster analysis provides information about important research topics in the dataset. "Social

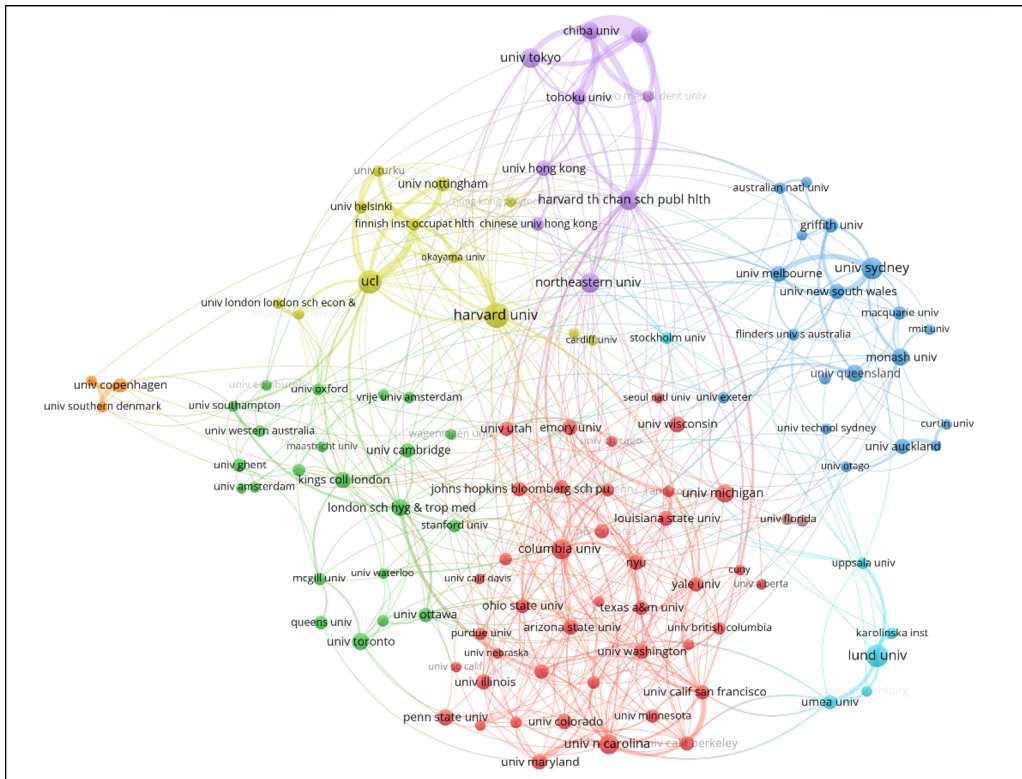


Figure 4. Cooperation network of research institutions.

capital” has gained prominence as one of the keywords that has entered the disaster and risk domains. Four salient research topics emerged from the collected articles: (1) knowledge sources of the research domain; (2) individual social capital and risky behaviors; (3) disaster management and resilience building; and (4) health issues in the COVID-19 Era. They will be described in more detail below. The 2872 papers that we identified address a variety of issues, but these issues illustrate a clear pattern that can be characterized by two distinct schools of social capital research: the first school focusing on the individual, the second on the collective level. The influence of COVID-19 emerged as a new hot topic that has influenced both individual and collective studies on social capital.

4.1. Knowledge bases: social networks, trust, social capital theory

Interest in social capital research is often traced to the work of Bourdieu (1986), Coleman (1988) and Putnam (1993). Bourdieu (1986) distinguished social capital from other forms of capital, in particular economic, cultural, and symbolic capital. These different forms of capital can be applied to characterize individual life trajectories. Along this tradition, Coleman (1988) and Lin (1999a, 1999b) focused on the individual use of resources embedded in the social assets to which they have access. This is the first school of social capital research focusing on how individuals gain resources and agency from networks of social relationships. The second school of social capital research focuses on the collective level. Putnam (1993, 1995) emphasizes the role of social capital in generating benefits beyond individual gains at the neighborhood and community level. He defines social capital as ‘features of social organization, such as trust, norms, and networks, that can improve the efficiency of society by facilitating coordinated actions’

war. The third type, *high level of bridging connections*, enable communities to realize more efficient reconstructions (Kage 2011). Bonding, bridging and linking social capital offer viable pathways to sustain longer term survival and to assure wider neighborhood and community revitalization (Bhandari 2014).

4.1.2. Components of social capital

Although social capital includes many types of resources, most concepts mention three basic components: *social networks, trust and norms of reciprocity*. The individualistic school of social capital often measures social capital by focusing on social connections, that is, the network approach. Different forms of social capital can be characterized by the distinction between horizontal and vertical connections, formal and informal links, strong and weak ties (Ferlander 2007). The individualistic school of social capital also emphasize the community support (institutional, organizational, personal) of a social network to deal with personal, emotional and economic hardships (Hawkins and Maurer 2010). Virtual networks can also play a role in developing relationships and building trust among individuals, particularly activating bridging and linking ties in times of crisis (Page-Tan 2021).

The collectivist school focuses on components such as social trust, institutional services, and modes of cooperation. The emphasis is here on cognitive, organizational and structural aspects of social capital. Studies linked to this school normally explore the role of networks, norms and trust in maintaining the collective assets. Individuals within a group or community work together towards shared goals and generate shared outcomes (Tolbert et al. 2002). There are many examples for an effective community response to disasters. Cerquetti and Cutrini (2021) investigated the horizontal and vertical cooperation during the post-earthquake economic recovery in Central Italy. Fraser, Aldrich, and Page-Tan (2021) found that bonding and linking social capital explains why some U.S. counties have witnessed lower excess deaths during the COVID-19 pandemic than others. Choo and Yoon (2022) measured the effects of social capital on disaster management including informal networks and trust in local communities in Seoul (South Korea). They concluded that communities with high social capital are more likely to encourage disaster volunteerism, which can enhance a community's disaster response capacity. Lee and Kim (2021) found that the effective functioning of a "network" had a significant impact on reducing the experience of disaster conflict in large-scale disasters, whereas in the case of a small-scale disaster "trust" in neighbors and communities had a more significant impact on reducing the experience of disaster conflict.

4.2. Individual social capital and risky behaviors

Articles in this cluster investigate habitual health risks to individuals that affect individuals' life expectancy or those may lead to major crisis. Risky behaviors, such as drug use (Lundborg 2005), smoking (Pförtner et al. 2015), alcohol consumption (Dufur, Parcel, and McKune 2013), violence (Schober 2022), suicide (Nakano et al. 2022; Orlewska, Orlewski, and Klusek 2021) and HIV risks (Hallman 2008; Rhodes et al. 2005), particularly the adolescent group has long been of major interest to researchers. Family social capital (Coleman 1988) and school social capital (Lyimo et al. 2013; Banstola, Ogino, and Inoue 2020) are normally treated as explanatory variables. The parent-child relationship was found to mediate between other social and environmental factors (e.g. race/ethnicity) and adolescents' risky behaviors (Jiang, Sun, and Marsiglia 2016). Extrafamilial social capital such as access to community resources is also important and can assist parents and teachers to prevent or mitigate risky behaviors (Han and Grogan-Kaylor 2015), especially for troubled youth (Richardson, Johnson, and Vil 2014), or following exposure to disasters (Yagi et al. 2016). In particular, school shooting has become one of the most significant social problems in the US. Cultural norms and peer hierarchies in schools are important

causal factors in explaining school shootings (Klein 2006). The coping and caring capacity of the school may include protective effects to protect violence-exposed youth from perpetrating violence and prevent the perpetration of interpersonal violence (Schober 2022). Civic engagement including members of the young population can play a role in decreasing mass shootings (Kwon and Cabrera 2019). The same is true for religious institutions when they provide a basis for value education and peaceful conflict resolution (Szendrő 2022). Effective institutional social capital was also found to be associated with firearm-related homicide rates and incident counts in the US (Kim 2019).

4.3. Disaster management and resilience building

Articles in this cluster focused more on social capital supporting communities to better mitigate, prepare, respond, and/or recover from disasters. Social capital has been observed to play a crucial role across disaster types such as natural disasters, technological disasters, riots, terrorist acts, and others. Earthquakes, tsunamis and hurricanes received major attention in the literature (Meyer 2018). Social capital is usually described as a factor that may lead to a positive influence on disaster outcomes (Ye and Aldrich 2019; Sugawara et al. 2022; Pérez-Maqueo, Intralawan, and Martínez 2007). Social capital can play an important role in different stages of disaster risk management, both in the pre- and post-disaster phase, especially at the community level (Sanyal and Routray 2016). Social capital may influence people's risk perceptions, as general trust seems to be negatively correlated with risk perceptions across a broad range of hazards (Siegrist 2021). In particular, it improves trust in authorities which is crucial for performing the effective responses to a striking disaster. However, too much trust may also lead to complacency as people expect emergency staff to prevent any harm from them regardless of their individual behavior (Wachinger et al. 2013).

Social capital was found to positively influence the implementation of mitigation and adaptation strategies (Fernández-Giménez et al. 2015; Liang et al. 2017; Chen, Wang, and Huang 2014), disaster preparedness behaviors (Yong et al. 2020; Reininger et al. 2013), and evacuation (Shoji and Murata 2021). Social capital also supports individuals during the disaster response period by providing information, food, water, shelter, and other basic needs, as well as emotional and financial support (Karunaratne 2021; Gultom 2016; Horiuchi et al. 2019). Many articles on the influence of social capital focus on recovery or resilience (Meyer 2018), which is consistent with the finding of our systematic literature search. Social capital is argued to play a primary role in recovery, especially when governmental interventions are not occurring on time or turn out to be less effective than possible (Aßheuer et al. 2013; Minamoto 2010). There are also studies that show the significance of social capital for the successful implementation of a recovery program (Joshi and Aoki 2014), or for a successful participation in the post-disaster recovery and in pre-disaster planning processes related to community development (Kumari and Frazier 2021).

Furthermore, social capital has been valued as a significant contributor to community resilience (Yang et al. 2021). For communities surviving and recovering from crises, informal relationships, for example to neighbors who might serve as first responders and provide immediate lifesaving assistance, play an effective role in coping with disaster at the local level (Shaw and Goda 2004). Households with stronger personal networks and higher levels of social capital experience faster recovery (Sadri et al. 2018). Horizontal and vertical ties correlate with greater resilience in humanitarian crises (Aldrich et al. 2021). In addition, newly created civil society organizations are better able to organize and coordinate post-disaster recovery, neighborhood activities and long-term planning than established centralized agencies (Aldrich 2011).

Social capital can be developed to enhance community resilience before, during, and after disasters. Unlike physical infrastructure, social capital provides one lens of norms and relationships that shape collective actions to study community mobilization, organization, and

development. Social capital helps to improve the understanding of how communities prepare for, respond to and recover from crises (Cai 2017). Participation and inclusion are important components of social capital. They enable communities to adopt and implement community-wide mitigation and adaptation measures, and contribute to faster redevelopment and more equitable and efficient recoveries (Loebach and Stewart 2015; Chamlee-Wright and Storr 2011; Ozcevik et al. 2009).

Most of the above-mentioned empirical findings focus on general post-disaster lessons for enhancing community resilience but not necessarily about effective strategies directed towards adapting to specific risks. One exception refers to climate change. There are many studies demonstrating the importance of social capital for dealing with impacts of climate change (Saptutyningasih, Diswandi, and Jaung 2020; Teklewold, Mekonnen, and Kohlin 2019; Vasseur, Thornbush, and Plante 2022) but most studies lack a thorough process analysis of how social capital can and should shape resilience in practices. For this knowledge gap, Carmen et al. (2022) proposed six ways of social capital to influence reactive/responsive/proactive resilience in the context of climate change. Yet this conceptual model needs more empirical verifications, as well as for other risks.

4.4. Health issues in the COVID-19 Era

The outbreak of COVID-19 pandemic evoked a heated academic discussion about its global significance (Wang and Tian 2021), including the physical as well as the mental health impacts (Akintunde et al. 2021). The pandemic itself and its mitigation measures triggered enormous mental health consequences and revealed significant vulnerabilities. Quarantine measures and other strict implementations were reported to exacerbate stress, foster depression and promote substance abuse. This all was reported to lead to higher domestic violence and sexual abuse behaviors (Gautam et al. 2020). Many authors concluded that COVID-19 amplified the risk factors generally associated with poor mental health such as financial insecurity and unemployment, which in turn exacerbated the mental health crisis (OECD 2021). Healthcare workers are under tremendous stress, resulting in increased psychiatric symptoms such as depression and anxiety (Lai et al. 2020). Patients, the elderly and children were also disproportionately affected (Ho, Chee, and Ho 2020). Many studies identified particular populations at-risk, who would require greater care and/or more resources to overcome barriers to access e-mental health care during the pandemic (Ellis et al. 2021). The use of digital technologies played a major part in developing individual as well as community responses to the various lock-out conditions, yet the digital divide makes the younger children and older adults more difficult to enjoy the potential benefits (Payne et al. 2020). When communities went virtual, it was found that both bonding and bridging components of social capital, online and offline, were associated with public perceptions of community resilience at the beginning of the pandemic. After months of getting used to virtual services, social media engagements were found to be the only critical factor for linking social capital to perceived community resilience (Zhang and Sung 2023).

The pandemic revealed a major dilemma. On one hand, since social interactions promote the spread of infectious diseases (Mosson et al. 2008), they have been limited or even prohibited by public officials. On the other hand, social bonds determine the extent to which individuals are able to access and act upon health-related information, thus are a major positive component of social capital. They are important for reaching out to the resources that communities can deploy to halt the spread of the disease. Social capital was identified as an important asset of individuals and communities for information acquisition since previous pandemics showed that the link between social capital and information acquisition was effective in rising awareness and encouraging health protective behaviors (Rönnerstrand 2014). Communities with higher levels of social capital were reported to have lower number of COVID-19 related deaths and hospitalizations (Borgonovi, Andrieu, and Subramanian 2021). It is noted

that COVID-19 policy interventions can generate or exacerbate social inequalities and equity harms (Glover et al. 2020). In addition, improper management could widen health disparities especially for highly vulnerable groups, such as pregnant women or members of racial and ethnic minorities (Hartwell et al. 2022). Social capital was found to exert protective effect on health promotion, but there are only limited studies about the disproportionate impacts of social isolation on mental health during such a global crisis. More research is needed in the post-pandemic era to address social capital inequalities (Zhai and Du 2022).

5. Discussions

As depicted in Tables 1 and 2, the study examples covering various countries provided us with a deeper understanding of the research linking social capital to disaster and crisis management. The number of quantitative studies exceeded by far the number of the qualitative studies. For different risk contexts, the measurement of concepts is much clearer in quantitative than in qualitative studies. But qualitative studies allow participants to articulate open-ended responses, which help reveal a more dynamic picture of the formation, development, and function of social capital in various risk contexts. Although qualitative studies are less pronounced in the research domain, the number of mixed-methods investigations has increased in recent years. For example, there are mixed-methods studies exploring the importance of social capital for suicide prevention (Long et al. 2022), focusing on motivation of fishermen to respond to extreme weather warnings (Malakar, Mishra, and Patwardhan 2018), reducing the adverse effects of past floods (Karunaratne 2021), and its role in all stages of fire disaster management (Oteng-Ababio, Sarfo, and Owusu-Sekyere 2015). In addition to those methods mentioned in the tables, there are more and more studies using network analysis, spatial analysis, and machine learning techniques. Nevertheless, the longitudinal study or multi-wave qualitative survey is rather scarce, as well as comparative studies among different countries/regions or across disaster types.

Most of the analyzed studies focus on a single relationship between one aspect of social capital and performance in disasters or crisis. Most frequently investigators selected strength of social networks or trust as independent variables. The complexities of the potential impact of social capital on disaster preparedness and management and the interconnections and synergies among different types of social capital were less pronounced in the articles we collected. Several scholars reported that communities with more bonding and bridging/linking ties showed more resilience than those merely having bonding networks (Elliott, Haney, and Sams-Abiodun 2010; Hawkins and Maurer 2010). There is also a controversy among scholars in the literature whether bridging and linking networks reduce vulnerabilities and improve capacities of affected communities (Fraser and Naquin 2022; Masud-All-Kamal and Hassan 2018; Termeer et al. 2022). The role of social capital in disaster/risk management is more complex and defies simple linear relationships. More qualitative and comparative studies are required to conduct investigations across distinct groups and countries and to identify and test more sophisticated explanations for the variations observed.

High social capital normally contributes to positive health outcomes, community resilience and faster post-disaster recovery. The contribution of social capital in managing risks is, however, not uniformly positive. Social capital can also increase risks in some cases. Horney et al. (2010) found that some forms of social capital may lead to evacuation failure. Wolf et al. (2010) suggested that strong bonding networks could increase risk-taking behaviors of elderly people. Wachinger et al. (2013) concluded that too much trust can lead to complacency and unwarranted confidence that the public authorities would do everything to save each individual in crisis situations. Yong et al. (2020) revealed that societal trust could have both positive and negative effects on emergency planning uptake. The potentially negative effects of social capital need more empirical research.

Table 1. Examples of quantitative studies included in the review.

Titles of articles		Methodology	Research sub-topic	Measure of risks	Country and data collection year of study	Main findings
Rural households' flood preparedness and social determinants in Mwandishi district of Zambia and Eastern Zambesi Region of Namibia (Mabuku et al. 2018)		Questionnaire	Disaster management and resilience building	- Flood preparedness index - Risk perception (estimate of the likelihood of a set of risky flood events occurring and the feeling of worry concerning these flood events)	Zambia and Namibia, 2015	- Flood preparedness was influenced by sense of community, risk perception, self-efficacy, responsibility efficacy, outcome expectancy, education level, marital status, access and size of land. - Households with higher sense of community were more prepared for floods.
		Cost-benefit analysis; household survey and interviews	Disaster management and resilience building	- Flood occurrence experienced by households - Rating for the severity of the effects of the floods - Early warning system (EWS) performance	Nepal, 2018	- Households found the EWS to be beneficial and reliable in saving movable property, livestock and health costs. - After the trust was built, EWS can gradually change behaviors of communities over time which leads to more social capital and a wider range of early actions that reduce avoidable loss and damage.
Building disaster resilience using social messaging networks: the WeChat community in Houston, Texas, during Hurricane Harvey (Chu and Yang 2020)		Questionnaire	Disaster management and resilience building	- Disaster resilience (psychological well-being) - Recovery status	US, 2017	- WeChat groups not only accord users with a platform to build social connections and acquire services in their daily lives, but also permit them to access to different forms of social capital following a disaster. - Support from different social connections could influence a person's psychological status after a traumatic event. - The usage of WeChat groups facilitated the conversion and formation of grassroots bodies that are critical to disaster resilience at the individual and community level.
		Survey	individual social capital and risky behaviors	- Alcohol risk - Older people's quality of life	UK, 2016	- Cognitive and relational capital have a harm-reducing effect on alcohol risk. And, the interaction between sex and cognitive capital, indicating that older females have a significantly higher benefit from increased cognitive capital than do males. - Cognitive capital has a marginally stronger association than relational capital.

(Continued)

Table 1. Continued.

Titles of articles		Methodology	Research sub-topic	Measure of risks		Country and data collection year of study	Main findings
Rising risk: the influence of types of capital and social networks on the injection practices of drug users (Lovell 2002)		Questionnaires, interviews and field observations	Individual social capital and risky behaviors	• HIV risk • Risky injection behavior		France, 1997-1999	• Low Acquired Capital showed a tendency towards influencing risky injection behavior. • The results indicated that HIV status would not increase the risk of risky injection behavior. But the social circumstances of risky injection behaviors must be further targeted alongside the individual-level characteristics. • Social capital did not modify the relationship between child maltreatment and either aggression or depression-anxiety. • Social support did have a significant modifying effect. Specifically, instrumental social support alleviated the effect of maltreatment on aggressive behavior at the age of 6 years.
Effects of child abuse and neglect - Does social capital really matter? (Saluja, Kotch, and Lee 2003)		Longitudinal study	Individual social capital and risky behaviors	• Report of maltreatment • Health outcomes such as depression-anxiety and aggression		US, (Interviews and questionnaires) at the child's birth and at the age of 6 years.	• Social capital did not modify the relationship between child maltreatment and either aggression or depression-anxiety. • Social support did have a significant modifying effect. Specifically, instrumental social support alleviated the effect of maltreatment on aggressive behavior at the age of 6 years.
The legacy of wartime violence on intimate-partner abuse: Microlevel evidence from Peru, 1980-2009 (Østby, Leiby, and Nordås 2019)		Survey	Individual social capital and risky behaviors	• Wartime violence • Intimate-partner violence		Peru, 2004-2009	• War leaves a discernable mark on the propensity of violence in intimate relationships. Local exposure to general conflict violence significantly increased the risk of intimate-partner abuse. • In those areas most hit by sexual violence during the war, women would experience the legacy of war in their homes. • Health care policies are critical to population health. But they have to be adapted to the local features since the social capital dimension (mutual trust in particular) is shown to be an essential aspect of epidemic spreading and severity. The interplay of care services availability and social capital suggested that they should be considered in the implementation of public policies adopted to limit the severity and the spreading of the epidemic in addition to individual characteristics.
Healthcare system and social trust in the fight against COVID-19: the case of France (Amdaoud, Arcuri, and Levratto 2021)		Secondary data, spatial analysis	Health issues in the COVID-19 Era	• Hospitalization rate • Death rate		France, 2020	• Health care policies are critical to population health. But they have to be adapted to the local features since the social capital dimension (mutual trust in particular) is shown to be an essential aspect of epidemic spreading and severity. The interplay of care services availability and social capital suggested that they should be considered in the implementation of public policies adopted to limit the severity and the spreading of the epidemic in addition to individual characteristics.

(Continued)

Table 1. Continued.

Titles of articles	Methodology	Research sub-topic	Measure of risks	Country and data collection year of study	Main findings
An investigation of depression, anxiety, and stress and its relating factors during COVID-19 pandemic in Iran (Khademian et al. 2021)	Online survey	Health issues in the COVID-19 Era	- Perceived risk of COVID-19 - mental health Outcomes	Iran, 2020	- Most of the factors related to depression, anxiety, and stress were found to be related to COVID-19. - Perceived social capital had a negative and significant association with stress, anxiety, and depression.
Association between social capital and COVID-19 preventive behaviors: Country-level ecological study (Khin, Matsuyama, and Fujiwara 2022)	Cross-sectional country-level survey data (Facebook survey via the Internet)	Health issues in the COVID-19 Era	Preventive behaviors	9 waves of 23 countries, 2020	- Group affiliations were associated with high percentage points of physical distancing and the use of face mask. - Social trust had significant positive association with performing hand hygiene.

Table 2. Examples of qualitative studies included in the review.

Titles of articles	Methodology	Research sub-topic	Measure of risks	Country and data collection year of study	Main findings
Social capital and livelihood strategies in response after 2013 Kedarnath disaster (India) (Naithani and Saha 2021)	Case study, interviews and participant observations	Disaster management and resilience building	- Landuse change detection matrix - disaster mortality	India, 2013-2014	- Bridging and bonding social capital seem to be more helpful in immediate response and in psycho-social support for long term. - Generation of new opportunities with the help of resourceful outside agencies or societies proved to be beneficial in bringing sustainable livelihood. - Bonding and bridging networks could also be immensely resourceful for villages that may suffer geographical isolation.
Role of religious institutions in disaster risk management: A systematic review (Sheikhi et al. 2021)	Review	Disaster management and resilience building	Disaster management	22 selected studies done in US, New Zealand and Indonesia	Religious institutions have a vital role and great potential in disasters management, especially when the network of religious organizations, nonprofit organizations, private sectors, and government agencies would be able to provide critical information and resources for people affected at different stages of the disasters.
The Commons of the Tragedy: Temporary use and social capital in Christchurch's earthquake damaged central city (Carlton and Vallance 2017)	Case study and interviews	Disaster management and resilience building	Post-disaster recovery	New Zealand, 2014	- Despite being temporary, the project the Commons developed and (re)generated the social capital in and through the space for the city recovering from disaster. - A great deal more nuance is required around the connections and synergies among and between different forms of social capital.
Informational capital and disaster resilience: the case of Jalin Merapi (Tasic and Amir 2016)	Case study	Disaster management and resilience building	Disaster resilience	Indonesia, 2015	- The article explained how informational capital was formed after the 2010 volcano eruption, and the importance of information technology in facilitating disaster management processes and in the mobilization of social capital. - Informational capital has the potential to enhance community network and information access, and boosts community capacity for disaster response.
"Remain calm, negotiate or defer but by all means, call me": Father-son communication to keep sons safe from violence involvement and victimization (Johnson et al. 2020)	Interviews	Individual social capital and risky behaviors	- Perception of violence (randomness, ubiquity) - The psychological consequences of violence - Strategies for avoiding violence and victimization	US, 2019	- The assets and resources that Black fathers and father figures provide in protecting their sons from violence involvement and victimization are important family-based social capital. - The benefits that their sons derive from their father's advice and strategies aid to build confidence to confront hopelessness given the range and scope of violent threats facing them. - Fathers' support also contributes to their sons' personal agency and resilience.

(Continued)

Table 2. Continued.

Titles of articles	Methodology	Research sub-topic	Measure of risks	Country and data collection year of study	Main findings
A photo voice perspective on factors contributing to the resilience of HIV positive Yoruba adolescent girls in Nigeria (Adegoke and Steyn 2017)	Photovoice interview	Individual social capital and risky behaviors	• Personal challenges such as poverty and fear of disclosure of HIV status • resilient resources	Nigeria, 2013	• HIV positive adolescent girls are no longer passive victims, who sit and wait for help. They can frame positive goals, and actively cope with difficult circumstances through their coping skills, social networks of family and friends.
Understanding the experiences of plasma donors in Canada's new source plasma collection centers during COVID-19: A qualitative study (Holloway 2022)	Semi-structured interviews	Health issues in the COVID-19 Era	• Feeling safe in the donation centre (during a pandemic)	Canada, 2020-2021	• Canadian Blood Services successfully converted whole-blood donors to plasma donors by building on existing social networks and trusted communities. • Campaigns to convert existing blood donors to plasma donors should structure the Center as an accessible, safe and welcoming place.
Scaling the Children Immunization App (CIMA) to support child refugees and parents in the time of the COVID-19 pandemic: A social capital approach to scale a smartphone application in Zaatari Camp, Jordan (Khader et al. 2022)	A non-randomized trial study design, interviews and observations	Health issues in the COVID-19 Era	• Children vaccination	Jordan, 2021	• A positive receptivity of the CIMA app as a health promotion tool was observed, as an inclusive approach for all stakeholders was adopted, thereby building trust between the parents, clinics, and the local volunteers. • Digital solutions can be used to provide access to critical health information to hard-to-reach vulnerable population such as the refugees' parents and their children.
Social connection in Long-Term Care homes: A scoping review of published research on the mental health impacts and potential strategies during COVID-19 (Bethell et al. 2021)	Review	Health issues in the COVID-19 Era	• Mental health outcomes	133 studies	• It suggested social connection is possibly associated with better mental health in LTC residents. • 12 strategies were highlighted which can be implemented and adapted by LTC residents, families, and staff to help build and maintain social connection for LTC residents during COVID-19.
Beware the "loneliness gap"? Examining emerging inequalities and long-term risks of loneliness and isolation emerging from COVID-19 (Patulny and Bower 2022)	Multi-wave qualitative survey	Health issues in the COVID-19 Era	• Loneliness	Australia, 2020	• COVID has increased potential long-term inequalities in loneliness, and digital interaction did not substitute for lost physical contact. • COVID-19 lockdown impacted social networks and capital directly. Those lacking physical health, social capital and digital interactive skills are already more marginalized and at greater risk of loneliness in the post-COVID-19 world.

One aspect that has only recently entered the debate on social capital is the effect on equity and social justice. Several studies showed that a lack of social capital had a disproportionately negative impact on people with low income or little access to private resources. If a community had a high capacity to deal with disasters, the poor and less resourceful people were the ones that benefited the most of it. The future research should be directed towards investigating the crucial conditions for social capital to be effective for individuals and communities when preparing and handling future risks. This could lead to better policymaking by allowing for improved and enlarged social spaces, interactive/community centers and communication channels which provide people with more opportunities to connect or where people, particularly marginalized groups, could find support in times of disasters.

Moreover, disaster social capital can be (re)created or might emerge in times of disasters (Carlton and Vallance 2017), differing from social networks in normal times. For example, disaster altruism may increase overall social connectedness in the affected communities, people with less localized bonding social capital could search “unknown neighbors” for immediate needs, media could also play as a “communication bridge” to facilitate emergent networks (Uekusa, Matthewman, and Lorenz 2022). However, the emergence and maintenance of disaster social capital has obtained little attention. Its prospects and barriers should be further studied to build long-term community resilience. The application of information technology and the potential of informational capital to boost individual/community capacity for disaster preparedness, response, and recovery deserve more attention. Social messaging networks permit residents to access to different forms of social capital, which have impacts on physical resources and mental health outcomes following a disaster (Chu and Yang 2020). Digital solutions can provide access to critical health information to hard-to-reach vulnerable populations and contribute to the inclusiveness of all stakeholders when scaling up public health interventions (Khader et al. 2022). Future research should investigate the utility of social media or other digital services in fostering resilience in different immigrant or ethnic communities, among marginalized populations in a variety of countries as well as across disaster types. Also, research on online discourse in crisis situations provides ample opportunities to improve disaster response (Beedasy et al. 2020; Yang and Ju 2021). Virtual social networking creates a new arena for interrelationships to flourish. Therefore, conceptualizing online/virtual social capital or the interactions between networks in cyberspace and in the offline world should be further examined.

Although there has been a great amount of research on the respective role of individual and community social capital in disasters or crises, the present research landscape lacks an integrated view. It would be more effective investigating the effects of social capital using a multi-level perspective (Boyce et al. 2008; Yap et al. 2019). Future research should integrate various levels of social interactions when investigating the role of social capital in different risk settings. Besides, social capital has implications for societal development and overall livelihood development. Therefore, efforts from government and institutions should be more pronounced in disaster and risk research as well as in practical guidelines. Bridging theory and practice can improve the structural aspects of social capital from a macro perspective, enhance the welfare of the whole society and narrow down the inequalities among individuals, families, groups, and communities. Also, the values and norms of citizens can be shaped by government policies, such as educational programs for drug control policies. With a close interaction between government and communities trust can emerge and the residents become more and more literate but also better prepared to cope with future crises.

6. Conclusion

Based on a systematic literature search, this study applied a bibliometric method to present the characteristics of how the concept of social capital is linked to disaster and crisis management in the literature. Our investigations revealed that there has been a major increase of

studies about social capital in research on disaster and health crisis governance. There is a consensus in all the literature that we reviewed that social capital is either directly or indirectly associated with disaster preparedness and coping capacity during a disaster or a health crisis.

We also found a clear distinction between two manifestations of social capital: the individual and the collective (community) level. The effect of each level has been investigated separately and there is a strong agreement that each level contributes to improved performance in disaster and crisis management. However, the interaction between both levels has been less prominent in academic research, especially when investigating community capacity based on social capital with individual post-disaster mental health or recovery behavior.

The review revealed several mechanisms of how social capital is organized. Most known were three types of social capital: (i) bonding between closely related people (within group ties), (ii) bridging different resource pools (between group ties) and (iii) linking entities of social capital that neither bonding nor bridging capital could provide (vertical ties with individuals or institutions in power). All three types offered valuable practical insights for mobilizing and developing social capital in different phases of risk and crisis management. The literature included many examples in which all three or each of them helped transform vulnerable into resilient communities. But the interconnections and synergies among different types of social capital needs to be further explored.

Research interest in social capital and disaster governance has been rapidly growing since 2012 (see Figure 1). But the related literature still remains fragmented in different disciplines (see Figure 2), or are spread over different domains, applications or scenarios (see Figure 5). We also encountered different conceptualizations of social capital between different authors, which makes it very difficult to compare results or to generalize empirical findings. In addition, the studies that we analyzed did not attract enough attention to the relationship between social capital and social cohesion in crisis situations and to the effects of social capital over a longer time frame of experiencing multiple disasters or even polycrisis (Lawrence et al. 2024). More comprehensive and comparative research across disaster types is needed to understand the complex relationships between social capital and performance in crisis and disaster situations. Inter- and transdisciplinary research across domains is lacking. We hope that this paper will be an incentive for the community of crisis and disaster researchers to address this gap and produce more comprehensive and integrative studies of the relationship between social capital and disaster management.

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