Covid-19 Resilience: A Review

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ABSTRACT

The world-wide occurrence of Covid-19 has made prevention and mitigation of the pandemic an issue of serious concern universally. This paper reviews literature on Covid-19 resilience with a view to exploring the varied aspects been put in place to curtail or mitigate the disastrous tendencies associated with the prevalence of this contemporary disease. The sources of data for this paper were purely secondary with particular reference to covid-19 resilience. From the review it was inferred that aspect of Covid-19 resilience in relation to physical planning, tourism and community resilience have been undertaken significantly but aspect that relates to health resilience more especially which concerns people with terminal diseases needs adequate attention for further exploration as well as researches on Artificial Intelligence (AI) in Covid-19 resilience in relation to the environment also needs to be conducted the more.

Introduction

Widespread of COVID-19 around the globe since the beginning of the year 2020 requires a re-thinking of the meaning of the term "resilience" in all areas of human endeavour. Resilience has

been described as successful adaptation, competence and functioning in the face of stressful experiences (Bonanno, 2012; Egeland et al., 1993). Furthermore, Resilience has multiple concepts that differ depending on the context and cohort described. System/organisational resilience considers the ability of businesses and organisations to respond rapidly to changing environments, whereas social resilience has been described as the ability of individuals and communities to cope with stressful change (Hosseini et al., 2016). An ecological resilience framework considers individual, community and societal resilience to operate across and interact within multiple levels, with further research suggesting a need to move towards more ecological models of resilience in this area of research (Bennett & Windle, 2015; Donnellan et al., 2015; Windle & Bennett, 2012).

Scholars of resilience in complex adaptive systems increasingly avoid the term 'recovery', and tend to use the concepts of renewal, regeneration, and re-organization following a disturbance (Bellwood et al., 2004).The system is unlikely to recover to its previous pre-pandemic state, hence scholars should be analysing this disturbance towards a more resilient state. Thus, this paper reviews literature on covid-19 resilience with the view to identify gap in knowledge for further research.

Methodology

The sources of data collection for this paper were mainly secondary, through Google Scholar Search Engine by inputting the key words of the paper such as Covid-19 + resilience after setting a particular time frame (from year 2020 - 2022) was considered for this review such that relevant and current researches in relation to the subject matter were obtained. Also, after successful downloads of relevant papers, the review was further undertaken based on topical issues in relation to aspects of Covid-19 resilience.

Covid-19 Resilience in Physical Planning

Ever since the prevalence of Covid-19, there have been varied literature in relation to physical planning resilience such as the work of Badejo et al (2021) who discusses the COVID-19 pandemic experience in Ogun State, Nigeria and the imperatives for physical planning. Findings suggest that the disease is more prevalent in informal settlements and COVID-19 exacerbates several shocks in the state. The study makes a case for a new approach to physical planning that calls for the vigorous pursuit of resilience and the preparation of a resilience strategy to guide future city planning. Furthermore, Rahman et al (2021) provides lessons from a series of qualitative research projects that were adapted during the COVID-19 pandemic to ensure their continuation and completion. By reflecting on experiences and discussing the opportunities and challenges presented by crises to the use of a number of qualitative research methods, a series of insights and lessons for proactively building resilience into the qualitative research process was provided. It was shown that reflexivity, responsiveness, adaptability, and flexibility ensured continuity in the research projects and highlighted distinct advantages to using digital methods, providing lessons beyond the COVID-19 context. The paper concludes with reflections on research resilience and adaptation during crises. Additionally, Bartuviciene et al (2021) discusses the notion of the resilient university with a particular focus on academic continuity. In order to investigate the migration to online learning under the COVID-19 pandemic and examine students and faculty perceptions and lessons learned, a literature study on resilient organizations and academic continuity and a case study of the World Maritime University (WMU) were undertaken. The results show that in order to ensure academic continuity and build resilience, the university has to develop anticipation, coping, and adaptation capabilities and act on lessons learned. The research findings revealed the capability of a university in coping with the unexpected challenges and a potential to become a resilient university. Again, Arin et al (2021) focussed on the assessment of disaster risk management (DRM), which will help to develop pandemic-resilient urban strategies (response, mitigation, and preparedness phase) through

analysing previously published literature. Short- and long-term recommendations for pandemic resilience urban planning and design have also been provided. In the response phase, implementation of the smart and resilient city design and policies has been highlighted to identify disease transmission. In the mitigation phase, new technological approaches can be adopted for better management of present and future pandemics. The physical (urban access, infrastructure, environmental factors, and land use patterns) and non-physical (socio-cultural, governance, and economic factors) aspects of resilient urban strategies have been focused, which may help to develop understanding of health- and disaster-related risks in pandemic. In the preparedness phase, proactive measures such as capacity building of people toward any outbreak and different simulation processes (models of transmission pattern) can be adopted for future pandemics. Also, Aboukorin (2021) emphasized the role of urban planning in containing Covid-19 outbreaks through running a series of analytical and statistical studies on European cities, worst inflicted regions, to analyse the main urban features they share and that may be propagating the disease spread according to their population size, density, form, intra-city connectivity and intercity connectivity. The study evaluated both the individual and combined impacts of these factors on recorded rates of infections. According to the context of this research, it is concluded that the diversity found in urban features are, to a large degree, related to cities being more vulnerable than others. Intra-city connectivity through public transport is found to be the possible prime factor of this study, and is followed by population size, density, and intercity connectivity. Urban morphology seems to also contribute to such outbreak, with both radial and grid cities being associated to higher infections rates as to linear cities. Henceforth, setting priorities in post-pandemic urban planning schemes is essential for planning resilient cities that are capable to thrive and maintain functionality with lowest possible infections amid else possible diseases that are to follow in severity. Additional, Hu (2021) examines how the economies of old industrial cities in Northeast China respond to the on-going COVID-19 pandemic crisis. The notion of resistance in regional economic resilience is used to explore what impact factors shape the response to the early stage of the crisis. The analysis reveals significant differences in terms of regional economic impact between COVID-19 and the 2008 financial crisis. It was found that large cities are more vulnerable and exposed to the pandemic at its early stage, state agency plays a crucial role in shaping the economic resistance in most cities. Going beyond the existing 2008 financial crisis-induced account on regional economic resilience, this paper argues that regional resistance amid COVID-19 is not merely shaped by economic structural factors but also influenced by state agency in terms of economic restriction and restoration measures. The study suggests that the nature of COVID-19 as a particular context of crisis itself needs to be taken seriously when exploring the determinants and outcomes of regional economic resilience. Furthermore, Campisi et al (2020) investigated the influence of the COVID-19 pandemic on road users' perceptions, needs, and use of sustainable travel modes (i.e., public transport, walking, and cycling). The results suggested that women were less likely to walk during the pandemic than men. Participants were more likely to resume remote work even after the second phase in order to reduce their daily travel needs and keep their isolation. Participants have expressed a positive opinion on the use of micromobility during pandemic situations. These results can be considered as a basis for sustainable urban planning and a guide for decision-makers who aim to encourage the use of public transport, walking, cycling, and micromobility. In addition, Bojovic et al (2021) discusses a possible model of resilient adaptation of residential buildings and neighbourhoods in Podgorica, Montenegro. The model addresses the flexibility of the apartment units, existence of indoor and outdoor common areas for social activities within the building and immediate contact with nature, and it is applicable in the wider territorial context as well. Formulated with the aim of long-term improvement of the concept of housing, the model presents a significant framework for the planning and design of future buildings. The resilient residential model is tested by its application to specific buildings of residential area Block 5 in Podgorica. This leads to the conclusion that the earlier concepts of

housing present in theory and practice in the second half of the twentieth century in Montenegro and the region were more adequate in the context of resilience. Again, Muhajed et al (2021) studied the relation between COVID-19 and urban environmental study cases about cities around the world, and learns from their models to face COVID-19. In Amman, people's behaviour has changed towards public transportation and public green spaces. New governmental regulations focus on increasing people's mental awareness, supporting local businesses, and enhancing neighbourhood planning that can help Amman to face any future pandemics. Again, Kakderi et al (2021) discusses the transformational impact that the pandemic brought to specific urban domain, especially with regards to the promotion of sustainability, the smart growth agenda, and the acceleration towards the smart city paradigm. Findings suggest that emerging strategies, although mainly temporary, are transformational, in line with the principles of smart growth and sustainable development. Most policy responses adopted during the first months of the pandemic, however, fail to leverage advancements made in the field of smart cities, and to adopt off-the-shelf solutions such as monitoring, alerting, and operations management. Again Keenan (2020) provides a perspective on the reciprocal relationships between public and private sector resilience planning activities and the ongoing COVID responses in the U.S. Through the lens of the built environment, the article provides selected insights into how various disaster, organizational, and engineering resilience activities have likely positively shaped COVID responses within the healthcare sector. These positive influences are contextualized within extensive efforts within public health and healthcare management to calibrate community resilience frameworks and practices for utilization in everything from advancing community health to the continuity of facilities operations. Thereafter, the article shifts focus to speculate on how ongoing experiences under COVID might yield positive impacts for future resilience designs, plans and policies within housing and the built environment. Through this perspective, the article hopes to explore those often overlooked aspects of the physical and social parameters of the built environment that may be understood as providing opportunities to inform future disaster, public health, and climate change preparations and responses.

AI in Covid-19 Resilience

Literature on AI in Covid-19 resilience majorly include the work of Modgill et al (2021) who examines how firms employs it and considers the opportunities for AI to enhance supply chain resilience by developing visibility, risk, sourcing and distribution capabilities. Results of the study highlight the emergence of five critical areas where AI can contribute to enhanced supply chain resilience; (i) transparency, (ii) ensuring last-mile delivery, (iii) offering personalized solutions to both upstream and downstream supply chain stakeholders, (iv) minimizing the impact of disruption, and (v) facilitating an agile procurement strategy. The study presents the dynamic capabilities for supply chain resilience through the employment of AI. AI can contribute to readying supply chains to reduce their risk of disruption through enhanced resilience

Covid-19 Resilience in Health

Some other literature concentrated on Covid-19 resilience related to health such as works undertaken by Chiu et al (2021) who investigated the practical assistance rendered to soldiers in aid of their mental health. Specifically, this study analysed the development and implementation of a teaching action plan aimed at improving the psychological resilience of soldiers. The plan was based on the community counselling model, and it serves as a reference for social workers, especially in their conduct of educational programmes. Also, Hanna et al (2022) explore the different factors of resilience for people living with dementia and unpaid carers, in response to sudden changes in care and lifestyle during the COVID-19 pandemic. The paper reported protective and risk factors of resilience concerning (1) communication, (2) adaptations, (3) support networks and (4) lifestyle factors and coping mechanisms. Furthermore, Reguera-Gracia

et al (2020) analysed the relationships between physical activity, a sense of coherence, resilience and coping among people diagnosed with Multiple Sclerosis during the health emergency situation. The results showed that the average age was 46.9 and that 67.9% had Relapsing Remittent Multiple Sclerosis diagnosed on average 13.9 years ago. They had a high degree (33.3%) and moderate degree (34.5%) of physical activity, high levels of resilience, while the level of a sense of coherence was average and the most commonly used strategies for coping were active confrontation and religion. Physical activity was not related to the rest of the studied variables, but there were correlations between the other variables. The people with multiple sclerosis who belong to patient associations have remained physically active during the obligatory confinement period and have elevated degrees of resilience and an average sense of coherence, as well as using suitable coping strategies, which is why the social-health resource of belonging to a patient association could be boosting these variables that are beneficial to their health. In addition DeWit (2020) reviews whether the Japanese governments' responses in terms of financial stimulus consider longer term resilience and sustainability. This paper reviews pertinent academic literature and publicly available data from governments and organisations. The research is a rapid analysis of emerging information provided by the government of Japan and other international organisations. Using the case of Japan, this paper suggests that it is possible both to protect public health and essential services, while also promoting resilience and sustainability. Japan's integrated solutions show that pandemic response can include accelerated decarbonisation and resilient, sustainable development. The paper also warns that failure to act on long-term sustainability risks increased inequality, higher opportunity costs, cascading hazards, and further retreat from planetary thinking and globalism.

Covid-19 Resilience in Tourism

Significant literature concentrated on Covid-19 resilience related to tourism such as work carried out by Okafor (2021) who examines whether the level of a country's resilience to shocks moderates the link between the size of the tourism industry and the economic policy response to the COVID-19 pandemic using data from 113 countries. The findings suggest that countries with large tourism sectors responded more aggressively by using economic stimulus packages to mitigate the impact of the COVID-19 pandemic; however, the impact of the tourism sector is moderated by the country's resilience to shocks. The study also finds that both high level of economic resilience and high level of risk quality of a country moderate the link between the tourism sector and the economic policy response to the COVID-19 pandemic. Also, the findings of the study suggest that tourism businesses in high resilient countries are better prepared to cope with the disruptive challenges posed by the COVID-19 pandemic and thus needed less assistance from governments. Improving a country's resilience to shocks is an important strategy to minimise the impact of future negative shocks in the tourism sector. Furthermore, King (2021) uses an agency-based livelihood resilience framework to examine the social structures, agency, and livelihood capital of the surrounding socio-ecological systems as driven by these operations. The findings suggest that the dominant development discourse in Indonesia and among tourism planners focusing on the growth of 'high-end' exclusive forms of tourism has neglected livelihood capital and made communities more vulnerable to ruptures like COVID-19. Emerging from this crisis, this research urges academics, practitioners, and business owners to 'reimagine' the potential of tourism to first and foremost empower more resilient socio-ecological systems in the face of an increasingly uncertain future. In addition, Ntounis (2021) surveys businesses dependent on tourism located in English towns, to explore perceptions of resilience in this crisis context. They consider the nuances involved in resilience to disturbances such as Covid-19, revealing the temporal dimensions of resilience. Moreover, influences informing differing resilience levels within and between industries were identified. The paper also contributes a novel Business Resilience Composite Score, which enables academics, practitioners and policy-makers to draw comparisons between tourism and hospitality industry resilience and other

economic activity in urban locations. Also, Dewi (2020) (i) determined mitigation strategies of Ministry of Tourism and Creative Economy amid Covid-19 pandemic, (ii) learned the adaptation strategy of community ecotourism to survive amid Covid-19 pandemic and (iii) analysed the implication of Covid-19 epidemic on ecotourism destination resilience in Papua. The result of this study showed there were three adaptation strategies (1) physically (2) economically, and (3) social. Covid-19 pandemic gives big implication to the economic sector, social and culture sectors on ecotourism destination resilience. Cancellations of guest booking and travelling restriction impact on community ecotourism lifecycle.

Covid-19 Community Resilience

Some other literature focussed on Covid-19 community resilience such as the work of Fenxia (2021) who explored the main influencing factors on community resilience and the magnitude of their impact during the pandemic (Covid-19). Results indicate that: (i) Domains such as Information and Communication, and Connection and Caring scored higher, while Disaster Management, Resources and Transformative Potential scored lower; (ii) A community got higher resilience scores if it took more effective measures to prevent and control the pandemic(Shanghai > Chengdu > Wuhan), people within the community participated more actively in disaster risk reduction activities and activities of volunteer responder groups, and people were more closely connected with the community; (ii) Variables such as the participation in affiliated volunteer responder groups, and community disaster risk reduction activities exerted the biggest impact on community resilience. Therefore, it is urgent to establish a community based, resilience-centred framework of community resilience in the post-pandemic era. Additionally, Zang et al (2020) focuses on COVID-19 and discusses the formation and structure of community disaster resilience, which is an effective method for coping with such a public health emergency. Based on the management of the COVID-19 outbreak in China, Shanghai's experience was illustrated to show how community disaster resilience was formed for risk management. Results indicated that four actions were recommended based on Shanghai's experience: (i) Applying a vulnerability analysis matrix for targeted risk governance, (ii) empowering volunteer groups for emergency response, (iii) policy and action for public health emergency prevention, and (iv) risk communication for uncertainty-oriented planning. It was concluded that Shanghai's experience offers a reference to tackle the COVID-19 at the global level. The COVID-19 outbreak highlights that humans will still face various unpredictable health risks in the future. Forming a connection-based resilience at the community level is an effective way to risk management. While, Bento and Bento and Couto (2021) discusses the emergence and dynamics of community resilience by empirically investigating the case of the favela of Paraisópolis in São Paulo, Brazil. The emergence of innovative practices that initially contributed to significantly lower rates of COVID-19 infection and mortality when compared to the city average is described. The analytical framework combines two conceptual perspectives in the study of complex systems. First, resilience in socio-ecological systems highlights the adaptation processes characterized by an interplay of previous experience and emerging new knowledge. Second, the metacontingency framework describes the interplay between a cultural milieu, as a context for cultural practices; an aggregate product; and a selecting environment that embed the acquisition and continuity of interlocking behavioural contingencies. Research methods that combine elements of the descriptive analysis and an exploratory basic qualitative study are employed to understand how the community has self-organized during this period. The findings demonstrate how previous experience with social challenges facilitated self-organization and the emergence of innovative practices in the context of uncoordinated public health measures during the pandemic in Brazil. Furthermore, findings from interviews indicate the existence of positive feedback loops at the community level that facilitated the emergence of innovative practices. This study contributed to the understanding of community resilience by identifying the geographic, psychological, and ecological factors (contextual variables) that

facilitate responses to the pandemic. Whereas Xie et al (2022) built a model to examine how social media behaviours may influence community members' perceived community resilience, providing a "bottom-up" voice to deepen understanding of community resilience and its implications for public health. The results shows that community members' social media engagement was significantly associated with their perceived community resilience. While helping others on social media led people to perceive their communities as less resilient, the use of social media for social support helped foster social capital, leading to more perceived resilience at the collective level. Overall, social media use played important roles in shaping people's perception of community resilience, helping community members and organizations evaluate their strengths and weaknesses, and make improvement to better address future challenges in the times of global disasters. Facing the Covid-19 outbreaks, public health researchers share a consensus that community resilience should be maintained and strengthened because it helps mitigate the physical and emotional tolls on individuals and communities.

From the foregoing review, it is clear that various aspects of resilience in relation to covid-19 have been explored towards withstanding as well as curtailing the disastrous nature of the menace associated with it. Thus, from the review it can be deduced that there are extensive literature on Covid-19 physical planning resilience and also Covid-19 resilience in relation to tourism, community as well as health resilience but specifically there is little or non-literature regarding Covid-19 health resilience in relation to people with terminal diseases . This is very important to be explored, considering the fact that, such category of people are already in high risk being be impacted greatly such that the chances of their survival when exposed to the menace of Covid-19 is highly very minimal and hence the need for further research to consider aspect of resilience in relation to the aforementioned class of people as well as researches related to AI also needs adequate attention.

Conclusion

The paper reviews Covid-19 resilience such as physical planning, AI, health, tourism as well as community resilience were explored in which considering the devastating nature of this contemporary disease prevalence, there is need for more researches to be conducted more especially in relation to Covid-19 health resilience in terms of people living with terminal diseases as following the review undertaken less attention has been given to that and hence the need for further exploration as well as researches on AI in Covid-19 resilience needs also to be focussed on.

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