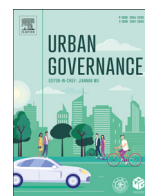




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## The moderating role of Covid-19-related support on urban livelihood capitals: Evidence from suburban Accra



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## ABSTRACT

In the Global South, the COVID-19 crisis has compelled varied efforts to quickly address the pandemic's impact on urban livelihoods. Families, friends as well as public, private, and civil society organizations have mobilized various resources to avert the pandemic's onslaught on the survival of the urban vulnerable. Indeed, there is a burgeoning 'pandemic urban scholarship' that shed insights on COVID-19 risks, local responses, and impacts on everyday urban life. Yet, it is unclear how many of these responses are affecting urban livelihoods. This paper thus investigates the impact of COVID-19 on urban livelihood capitals (financial, human, social, and physical) and analyses the moderating role of COVID-19-related support (from families, friends, government agencies, faith-based and non-governmental organizations) to address the pandemic's impact on these capitals. Drawing on a quantitative study in Adenta Municipality of the Greater Accra Region, Ghana, the study finds a negative association between COVID-19 impacts and all urban livelihood capitals. Crucially, COVID-19-related support only reduced the negative impact of the pandemic on financial capital, and not on the other forms of capital. The study suggests that building post-pandemic community resilience warrants the need to transition from the usual reactive, fragmented support to integrated, holistic, and contextually embedded long-term strategies that consider the multi-dimensionality of everyday urban life.

## 1. Introduction

*We know how to bring the economy back to life. What we do not know is how to bring people back to life. We will, therefore, protect people's lives, then their livelihoods.*

(President Nana Addo-Dankwa Akufo-Addo)

The COVID-19 pandemic has emerged as both a global health and livelihood threat with localised impacts and disruptions to the socio-spatial and economic aspects of everyday urban life. In Global South contexts, the pandemic hastened early warnings from the international development and scholarly community to national and local governments and their development partners to address existing vulnerabilities and develop robust responses to improve fragile livelihoods and

precarious living conditions of the urban vulnerable (Balde et al., 2020; Smit, 2020; UN-Habitat, 2020). In sub-Saharan Africa (SSA), capital cities gradually became the epidemiological loci of the COVID-19 virus (UN-Habitat, 2020) as well as the hotspots of its impacts on everyday livelihoods. In particular, the pervasiveness of the informal sector in African urbanism (Okyere & Kita, 2015; Okyere et al., 2021), coupled with structural challenges in urban governance and service provision, weak planning systems, and persistent socio-economic vulnerabilities compounded the pandemic impact across social, economic, spatial, and political aspects of urban life (Asante & Mills, 2020).

Across SSA, weak fiscal capacity to support local economies to limit the impacts of the COVID-19 pandemic on urban livelihoods remains a major source of concern (Visagie & Turok, 2021). Already, impacts such as job losses and declines in wage earnings, disrupted social networks,

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erosion of informal insurance mechanisms, business closures, and food insecurity have been reported in major African cities such as Cape Town, Accra, Addis Ababa, Lagos, and Kampala (Asante & Mills, 2020; Ojogiwa & Akinola, 2020; Bukuluki et al., 2020; Aragie et al., 2021; Schotte & Zizzamia, 2021). Cognizant of these impacts and the risk they pose to the sustainability of urban life (see Section 1 headline quote), various SSA national governments transitioned from or combined disciplinary lockdowns with mass risk information campaigns, distribution of everyday necessities and cash handouts (relief packages) to support those considered highly vulnerable. South Africa, for example, introduced special COVID-19 Social Relief of Distress grant estimated to have benefited about 4–5 million people (Visagie & Turok, 2021). Other support initiatives were introduced by governments such as the waiver of utility bills in Ghana (Gbedemah et al., 2022; Akrofi & Antwi, 2020) and cash handouts in Sierra Leone (Osuteye et al., 2020).

Correspondingly, these efforts have caught the attention of southern urban scholars, where burgeoning ‘pandemic urban scholarship’ in Africa has ensued, shedding insightful commentaries and critical analyses on entrenched vulnerabilities that foster COVID-19 risks (Smit, 2020), multi-scalar responses (Frimpong et al., 2022) and emerging impacts on people and places (Bukuluki et al., 2020; Visagie & Turok, 2021). While useful, the emerging scholarship is yet to attend to the role the varied support residents received from families, friends, non-governmental organizations (NGOs), government agencies, and faith-based organizations (FBOs), among others—hereafter referred to as COVID-19-related support—played in moderating the relationships between COVID-19 impacts and urban livelihoods. In other words, as the implications of COVID-19’s impact on urban livelihoods are gaining momentum (Asante & Mills, 2020; Kansime et al., 2021; Shupler et al., 2021), an important question emerges: *do COVID-19-related support help tackle the pandemic’s impact on urban livelihoods?*

This paper attempts to respond to this question and thus contribute to the emerging literature on the pandemic in urban SSA. It draws on Structural Equation Modelling (SEM) to analyze the moderating role of COVID-19-related support on COVID-19 impacts on urban livelihood capitals in Adenta Municipality of the Greater Accra Region in Ghana—a hotspot of COVID-19 crises, impacts and responses. The moderating role concerns how COVID-19-related support changes the strength of the relationships between COVID-19 impacts and urban livelihoods (Sauer & Dick, 1993; Hair, 2021). In other words, does COVID-19-related support reduce the negative impact of the COVID-19 pandemic on urban livelihood capitals? This paper’s emphasis on moderation, instead of a direct relationship, is context-specific, given the reality that COVID-19-related support programs were aimed at cushioning households to improve their livelihood conditions rather than directly eradicating negative impacts. The paper’s contributions are threefold: (i) it establishes the relationship between COVID-19 and specific forms of livelihood capitals—social, financial, human, and physical—that define urban livelihoods, extending current generalised framings (see Schotte & Zizzamia 2021); (ii) it brings to the fore the performance of COVID-19-related support across different forms of capitals, extricating missing links and raising concerns about the dangers of fragmented and reactive pandemic response and (iii) provides pointers to practitioners on the need for institutionalization of coordinated, integrated, holistic, and place-aware welfare initiatives that speak to the multidimensionality of urban livelihoods (see Okyere et al. 2021; Visagie & Turok 2021) as part of the discourse on engendering resilient people and places. The next section reviews related literature on health pandemics to develop the hypothetical relationships between COVID-19 impacts and urban livelihood capitals. The study setting follows in Section 3. The study methods, results, discussion, and conclusion then proceed respectively.

## 2. Health pandemics and urban livelihood capitals: a review and hypothesis

Health pandemics exert a significant impact on urban livelihoods in multi-scalar and complex ways. While health pandemics are considered

exogenous shocks and thus global (Callegari & Feder, 2021), their extent and severity can be localized depending on endogenous factors that inform local resilience systems. This paper is underpinned by Chambers and Conway’s notion that “a livelihood comprises people, their capabilities and their means of living including food, income, assets. Tangible assets are resources and stores, and intangible assets are claims and access.” (Chambers & Conway, 1992, (ii)). Livelihoods thus enable residents to recover from varied forms of stress and shocks and support them to maintain or improve their capabilities and assets in the present and future. This understanding has inspired several sustainable livelihood approaches (Carney et al., 1999). One of these approaches, employed with some variation by this paper, is the UK’s Department for International Development (DFID) sustainable livelihood framework, which was modeled after Chambers and Conway’s conceptualization of a livelihood (Carney et al. 1999). While the DFID’s framework emphasizes five livelihood capitals (DFID, 1999), this paper emphasizes four capitals namely: financial, social, human, and physical capital—excluding natural capital because of the urban context of this study. From this framework, our vulnerability context is the COVID-19 pandemic which created shocks and stresses in Ghana’s urban environments. The livelihoods comprise the capitals which is the range of assets (either owned or accessed) to cope with or recover from the COVID-19 pandemic. Transforming structures and processes comprises the COVID-19-related support that residents received either from families and friends, the government, NGOs, and FBOs that enabled them to cope with and recover from the COVID-19 pandemic. The livelihood strategies are the specific actions taken by residents to tackle the impacts of the COVID-19 pandemic on their lives. Together with COVID-19-related support, it is expected that these would reduce the negative impact of the COVID-19 pandemic on urban livelihood capitals (Fig. 1). Following this section, we draw on the literature and the sustainable livelihood framework to further elucidate the eight hypotheses that inform the structural equation model (Fig. 2) developed for this study.

### 2.1. Relationship between health pandemics and financial capital

Financial capital is the financial resources such as savings, credits, remittances, income, etc. that are available to and enable residents to acquire and provide different goods and services (DFID, 1999, Carney et al., 1999). Health pandemics often stifle economic activities that enable residents to develop their financial capital. They tend to increase health care costs, reduce savings and capital accumulation which negatively affect residents’ financial capital (Asegie et al., 2021). Although pandemic shocks are heterogeneous among sectors such as health, retail, transport, and tourism (Mahal, 2004; Verikios, 2020), studies confirm that in SSA, long-lived pandemics such as malaria and HIV/AIDS cause physical weakness which in turn reduce income capacity, deplete savings, and worsen credit availability for households—reinforcing existing poverty traps (Gallup & Sachs, 2001; Gustafsson-Wright et al., 2011). In impoverished settings, pandemics also exacerbate inequities in the financial holdings of lower socio-economic groups (Gustafsson-Wright et al., 2011). From these observations, the study hypothesizes that the COVID-19 pandemic negatively impacts financial capital.

**H1.** COVID-19 pandemic impact has a negative relationship with financial capital

### 2.2. Relationship between health pandemics and human capital

Human capital refers to knowledge, skills, training, abilities, and other characteristics people possess and use in the production of goods and services (Carney et al., 1999; DFID, 1999). The extant literature indicates a negative relationship between health pandemics and human capital (Callegari & Feder, 2021; Zinyemba et al., 2020). Percoco (2016) revealed that the outbreak of the Spanish flu reduced

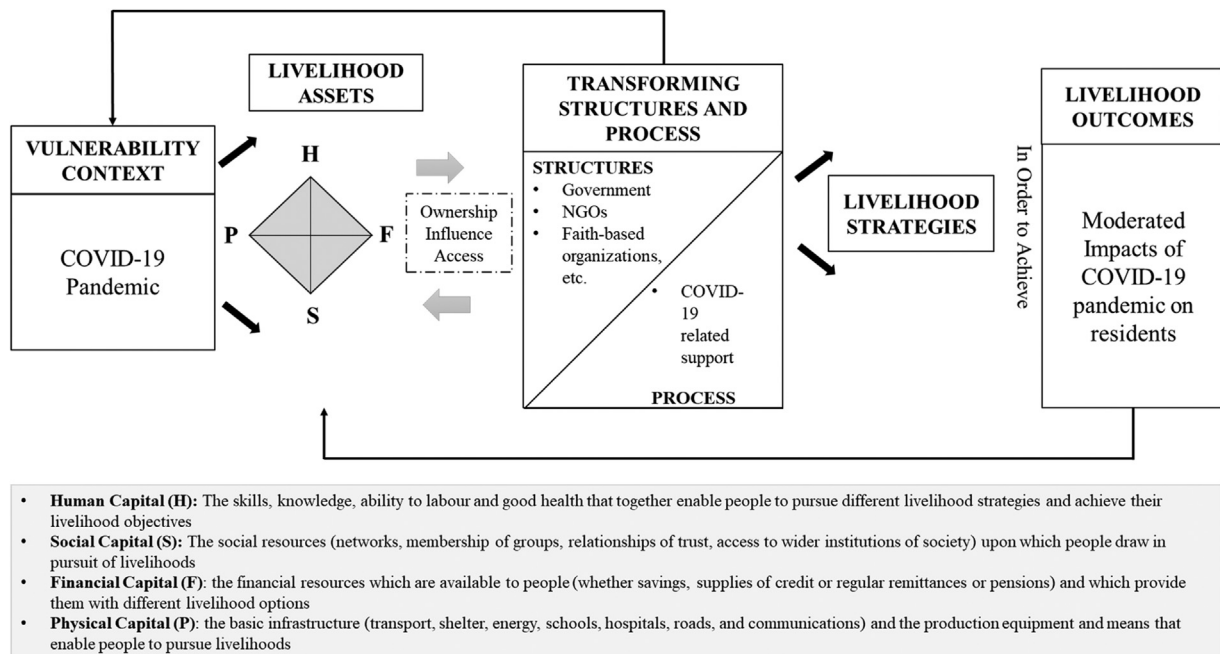


Fig. 1. Sustainable Urban Livelihood Framework on the COVID-19 pandemic.

Source: Developed with inspiration from the DFID’s Sustainable Livelihood Framework (see Carney et al. 1999; DFID 1999)

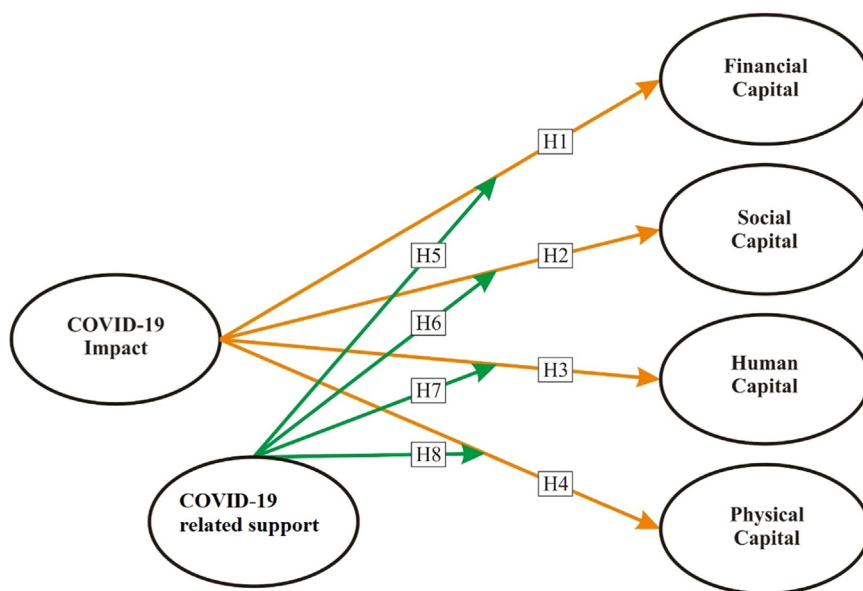


Fig. 2. A Conceptualization of the Structural Equation Model and Hypotheses.

the average years of schooling in Italian regions and generated a persistent effect on human capital accumulation for those born between 1918 and 1920. In low-income settings of global south communities where poverty traps are rampant, studies have shown that previous pandemics such as HIV/AIDS and Poliomyelitis affected individuals and households’ abilities to improve health conditions and access to productive employment, thereby reducing long-term human capital (Gustafsson-Wright et al., 2011). Health pandemic impacts are also evident in trade and business activities, especially when Small and Medium Scale Enterprises (SMEs) are unable to operate normally and thus struggle to invest in their employees (Okediya, 2020). Consequently, personnel may be affected by unmanageable health care issues, unpaid allowances, job loss, and disruptions to children’s schooling. Given that such pandemic uncertainties affect investments in intangible capital (Lorentzen et al.,

2008), we hypothesize that the COVID-19 pandemic has a negative relationship with human capital.

**H2.** COVID-19 pandemic impact has a negative relationship with human capital.

2.3. Relationship between health pandemics and social capital

Social capital typically encompasses networks and the social channels that support the flow of essential resources to sustain and support livelihoods in crisis situations (Carney et al., 1999; DFID, 1999; Morsut et al., 2022). However, scholars have noted that health pandemics impede social capital accumulation due to reduced social communication, community networks and interpersonal relationships,

especially in low-income settings (Makridis & Wu, 2021; Wong & Kohler, 2020). During the Ebola epidemic in Liberia, for example, fear of direct transmission of the Ebola virus restricted everyday social practices and rituals (e.g., handshaking, hosting family and friends and social events), limited access to social networks, eventually forestalling social capital accumulation (Alonge et al., 2019). Such limited access to social networks often results in mistrust, fear, and psychological trauma, especially in urban informal settlements (Alonge et al., 2019). Indeed, health epidemics and pandemics disrupt social capital but also generate cascading effects in long-term economic, social, and cultural dimensions (Aassve et al., 2020). Yet, social networks and resources within communities are essential for coping and recovering from crises situations (Alonge et al., 2019; Fatemi et al., 2020; Abunyewah et al., 2022), including health pandemics (Frimpong et al., 2022; Alfano, 2022; Wong & Kohler, 2020). Nonetheless, this study hypothesizes that the COVID-19 pandemic negatively impacts social capital given the nature of COVID-19 pandemic policies such as social distancing, post-exposure quarantining, shelter-in-place orders, and travel bans that restricted movement and interactions.

**H3.** COVID-19 pandemic impact has a negative relationship with social capital.

#### 2.4. Relationship between health pandemics and physical capital

Physical capital in this study refers to tangible (e.g., lands, properties, tools) and non-human assets or basic infrastructure (e.g., hospitals, schools, community centers, recreational sites and amenities) to support health, education, recreation and leisure activities (Carney et al., 1999; DFID, 1999; Ulya et al., 2021). A recent systematic review found that health pandemics have a negative relationship with physical capital (Callegari & Feder, 2021). In SSA, scholars have emphasized the impact of health pandemics (Masanjala, 2007; Hunter et al., 2011; Bhandari & Alonge, 2020) on physical capital degradation, highlighting the sequential loss of and disposal of assets such as land, equipment and domestic animals. For instance, during the Ebola epidemic in Liberia (Gatisoet al., 2018; McQuilkin et al., 2017) and Guinea (Delamou et al., 2017), restrictions on domestic and international travel were imposed, resulting in the complete closure of schools and markets, which significantly hampered the livelihoods of individuals and households by limiting their access to various livelihood assets. This persisted during the COVID-19 pandemic where, for instance, school closures persisted for months in Ghana (Wolf et al., 2022). Moreover, the Ebola outbreak disproportionately affected recreation sites and tourist destinations (Nsoesie et al., 2015), with visitors cancelling trips to parts of the SSA region where the virus had not been detected (Maphanga & Henama, 2019). In view of this understanding, we hypothesize that COVID-19 negatively impacts the utilization of physical capital.

**H4.** COVID-19 pandemic impact has a negative relationship with physical capital.

#### 2.5. Role of COVID-19-related support during health pandemics

Wilkinson (2020) suggests that health pandemics control methods tend to be ineffective unless the social and livelihood implications are properly considered. At a broader level, the ensuing scholarship outlined above suggests that health pandemics have a negative relationship with the various capitals—financial, human, social and physical—that compose urban livelihoods. Nevertheless, a strand of the literature also posits that support from families, friends, government agencies, NGOs, FBOs, and CSOs, among others (e.g., safety nets, cash handouts, and food supplies), can potentially weaken the negative relationship between health pandemics and urban livelihood capitals (Aber et al., 2021; Greyling et al., 2016; Devereux, 2021; Ali et al., 2022). For instance, Alonge et al. (2019) report that community-based groups' facilitation

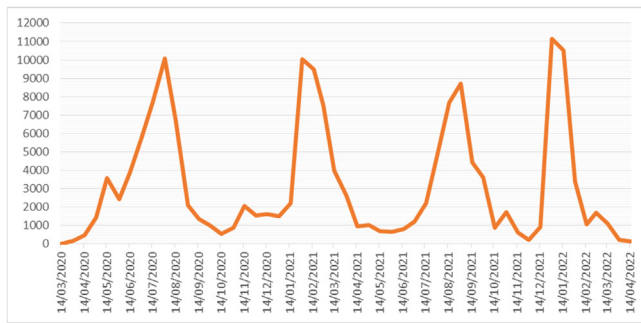
of information dissemination and exchange of economic resources contributed to reducing the impact of the Ebola epidemic on the financial, human, and physical capital of vulnerable communities in Liberia. Moreover, Alonge et al. (2019) and Frimpong et al. (2022) share the view that multisectoral actors, including governments, NGOs, FBOs, and CSOs, can help restore weakened social networks and build better bonds to reignite collective action necessary for social capital accumulation amid health crises. However, these are dependent on the effective collaboration among different levels of actors involved in the implementation of COVID-19-related support to assuage its adverse impacts on residents' livelihoods (Frimpong et al., 2022). A review of support provided during health pandemics in multiple SSA countries found that food and cash transfers, micro-credit initiatives, and psychosocial support by international, national, and local agencies contributed to weakening the negative impacts of health disasters on residents by cushioning residents' financial, human and social capitals at the individual and household levels (Aberman et al., 2014; Devereux, 2021).

Indeed, both COVID-19 impacts and government movement restrictions to curtail transmissions (Brauner et al., 2021) occasioned adverse livelihood impacts on residents. As a result, governments around the world implemented varied support interventions to help their residents assuage these impacts (Devereux, 2021; OECD, 2021; Visagie & Turok, 2021; Akrofi & Antwi, 2020; Osuteye et al., 2020). Family and friends as well as NGOs and FBOs also provided financial and material support to residents (Cloulaud et al., 2023; Gill 2022). However, these were not without challenges. Some studies (Fakhruddin et al., 2020; Daszak et al., 2021; Schmidt-Sane et al., 2021; Devereux, 2021), for instance, note how COVID-19 related support interventions were limited in scope and ad-hoc. Funding of NGOs and governments for humanitarian efforts also declined reducing their capacity to provide consistent and holistic support to residents (Lone & Ahmad, 2020; Wilke et al., 2020; Asogwa et al., 2022). Bisong et al. (2020) also noted how remittances from families and friends declined during the peak periods of the pandemic. In some cases, efforts to restrict transmission meant limited access to support from families and friends (Yu et al., 2021; Wong & Kohler, 2020).

Moderation analysis through structural equation modeling can help understand the influence of interventions (Anwar et al., 2020; Seow et al., 2021; Hair et al., 2021). For instance, Coulaud et al. (2023) using moderation analysis found that financial support from family and friends moderated the negative effect of income loss resulting from the COVID-19 pandemic. Gill et al. (2022) and Coulaud et al., (2023) emphasize how the nature and delivery mode of financial support influence the moderating roles of support during the pandemic. Furthermore, COVID-19-related supports only forms part of the factors influencing the degree to which COVID-19 pandemic impacts residents (Coulaud et al., 2023). This illustrate how COVID-19-related support is another factor influencing the relationship between COVID-19 impacts and livelihood capital. Herein lies the importance of moderation analysis understanding how COVID-19-related support weakens COVID-19 impacts on livelihoods.

Therefore, we hypothesize that COVID-19-related support during pandemics weakens the negative relationship between COVID-19 impact and livelihood capitals (financial, social, human and physical). In other words, COVID-19-related supports reduces the negative impacts of the COVID-19 pandemic on urban livelihood capitals. Based on the moderation literature (Aberman et al., 2014; Anwar et al., 2020; Devereux, 2021; Seow et al., 2021; Hair et al., 2021; Gill 2022; Cloulaud et al., 2023), and the objective of the COVID-19-related support initiatives in the study context (Ministry of Finance, 2020), this paper sought to examine the moderating role of COVID-19 related support instead of its direct effects.

**H5.** COVID-19-related support weakens the negative relationship between the COVID-19 pandemic impact and financial capital



**Fig. 3.** Ghana's COVID-19 reported cases between March 2020 and March 2022 (Our World in Data, 2022).

**H6.** COVID-19-related support weakens the negative relationship between the COVID-19 pandemic impact and social capital

**H7.** COVID-19-related support weakens the negative relationship between the COVID-19 pandemic impact and human capital

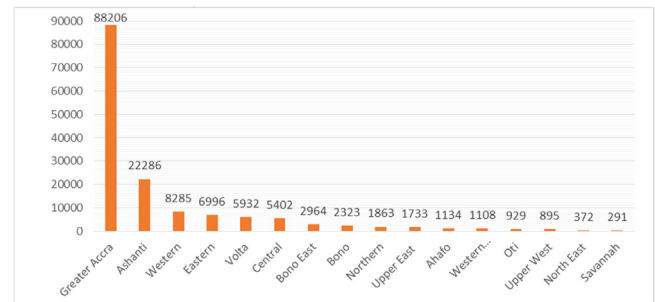
**H8.** COVID-19-related support weakens the negative relationship between the COVID-19 pandemic impact and physical capital

### 3. Profiling greater Accra within the COVID-19 outbreak: cases, impacts and responses

Accra, the capital of Ghana has witnessed a significant transformation, both demographically and spatially over the years. A combination of factors such as migration, net-natural increase, the concentration of economic activities, and interaction with the international market has facilitated this transformation, making it the dominant city in Ghana (Grant, 2009; Owusu & Oteng-Ababio, 2015). Accra has developed into a functional area, which is called the Greater Accra Metropolitan Area (GAMA). The population of GAMA is about 5.4 million (Ghana Statistical Service (GSS), 2021), making it the largest metropolitan area in Ghana. Accra's growth has been accompanied by poor planning, sluggish economic growth, and widening income inequalities (Okyere et al., 2021). This situation has increased household vulnerabilities to various forms of hazards, including environmental health hazards. Many households face health problems in Accra, owing to numerous environmental health risks in the city. However, the ability to deal with the accumulated health risk in Accra depends on where a person resides and their socio-economic status (Weeks et al., 2013). Poor urban communities living either close to the city center or in suburban areas of the city bear a disproportionate share of the major disease burden in the city (Verutes et al., 2012; Weeks et al., 2012), and are the least to cope with and recover from diseases and other health shocks.

The nexus between the health and socio-economic dynamics of Accra has become an important subject of discussion during this period of COVID-19. Ghana recorded its first two cases of COVID-19 on March 12, 2020—and months after, the country recorded more cases, with community spread being the major contributing factor. Fig. 3 shows the monthly reported cases for the country from March 2020 to March 2022, with the highest number of reported cases per month being June 2020, which was just three months after the first two cases. The number of confirmed cases dropped for the next six months and increased significantly in February 2021. There was a drop-in case after February and then picked up again in August 2021 and December 2021 respectively. In terms of the regional distribution, as of February 14, 2022, Greater Accra had 88,206 reported cases of COVID-19, constituting 59% of the total national reported cases since March 12, 2020. Fig. 4 shows the regional distribution of COVID-19 cases in Ghana.

The impacts of COVID-19 on Ghana's economy have been far-reaching as a result of the partial lockdown (April to June 2020) in its major cities of Accra and Kumasi, leading to the halt of major economic



**Fig. 4.** Regional distribution of COVID-19 reported cases as of February 14, 2022 (Source: Our World in Data).

activities. For instance, it was reported that approximately 36% of informal businesses were closed during the partial lockdown which led to about 90% of formal and informal businesses reporting a reduction in sales (GSS, 2020). Particularly in Accra, the lockdown led to a sharp increase in the prices of foodstuff and essential commodities due to limited import and supply from local producers, and panic buying from consumers (Asante & Mills, 2020). Owners of informal businesses, especially those engaged in home-based enterprises, were hard hit by the lockdown leading to worsening economic conditions for many households (Aduhene & Osei-Assibey, 2021). Indeed, Bukari et al. (2021) found that the COVID-19 pandemic significantly increased the poverty levels of households and reduced household consumption for those in the middle and upper-income groups in Ghanaian cities.

To reduce the impact of COVID-19 on the populace and revitalize the urban economy, the government introduced several interventions aimed at assisting poor households, as well as formal and informal businesses. For instance, the government, in collaboration with FBOs, provided free food and other essential commodities to poor households in Accra during the lockdown (Dadzie & Raju, 2020). The government also absorbed the cost of water and electricity for poor households between March and May 2020 (Dadzie & Raju, 2020). Furthermore, soft loans were given to small and medium-scale businesses through the National Board for Small-Scale Industries (World Bank, 2020). This initiative was part of the Coronavirus Alleviation Program-Business Support Scheme (CAP-BuSS), which aimed to protect jobs, and livelihoods and offer support to micro and SMEs. Indeed, the total amount invested in the program was GHC 600 million (Adams, 2020). Additionally, the government also drew support from existing programs such as the Ghana Productive Safety Net Project, which is a collaborative program between the government of Ghana and international development partners to support households and businesses recover from the pandemic (World Bank, 2020). The government also used existing pro-poor programs to offer support to vulnerable households. For instance, the government provided an additional one-off round of cash transfers to livelihood empowerment against poverty (LEAP) beneficiaries, with an additional top-up benefit of GHC20 to urban beneficiaries and GHC 50 to rural beneficiaries (Dadzie & Raju, 2020). It is worthy of note that the COVID-19-related support programs, like other existing programs such as LEAP, are not intended to directly eradicate poverty or negative livelihood impacts, either in their policy framing or amount or frequency of support (Ministry of Finance, 2020), and as a matter of fact, explains the several philanthropic interventions by civil society organizations to complement state support.

Indeed, there was also philanthropic support from individuals, religious bodies, politicians, and the private sector. Philanthropic support was in two forms. The first was direct support to citizens, mostly in the form of food and cash donations. For instance, many FBOs donated food items to their congregants as well as vulnerable persons living in the communities in which they operated (Prempeh, 2021; WACSI, 2020). The second form of philanthropic support was those made to the COVID-19 National Trust Fund (CNTF) to assist in the fight against COVID-19.

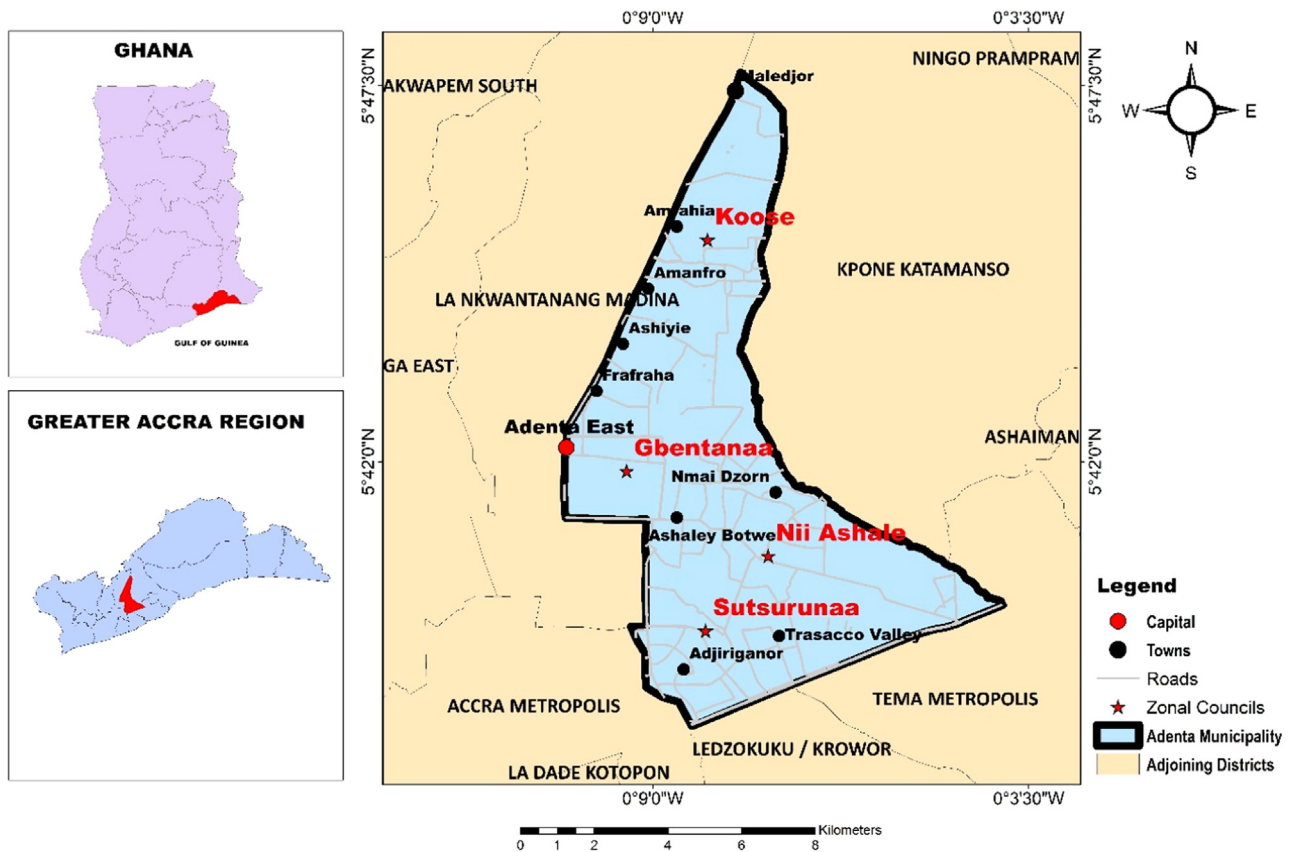


Fig. 5. The study area in national and regional context (Authors' Construct, 2022).

The CNTF was a government vehicle established through an act of parliament to leverage other resources to fight the pandemic. Many organizations and individuals made cash donations to CNTF. As of June 30, 2020, CNTF had mobilized GHC 53,911,249.87 from individuals, churches, and corporate bodies (Ministry of Finance, 2022).

#### 4. Overview of the study area: Adenta municipality

The Adenta municipality is located in the Greater Accra Metropolitan Area (GAMA) (Fig. 5), where Ghana recorded its first COVID-19 cases on March 12, 2020. Since then, GAMA has become a pivot of discussions on the nexus between health and urban socio-economic dynamics and thus provides a fertile ground to explore the pandemic implications on urban livelihoods. Within GAMA, Adenta municipality, the geographical setting for this study, has a poverty incidence below 20%, with an estimated number of poor people of less than 10,000 (GSS, 2015). Further, over the years and as a result of in-migration, there is evidence of a pocket of low-income squatters living in the municipality (Alba & Bruns, 2022). It has a population size of about 237,546 with 117,841 males and 119,705 females. The total number of households in the municipality is about 73,281 and the average household size is 3.2 (GSS, 2021). The informal sector of the municipality employs about 70% of the labour force, with the remaining 30% employed by the formal sector (GSS, 2014). The municipality has, in recent times, witnessed increased physical development and the growth of the informal sector. The majority of these informal sector workers are migrants who come to learn a trade or seek greener pastures in Accra. The municipality's response to the pandemic was heavily reliant on national government interventions (e.g., absorbing utility bills, free delivery of food and daily necessities to poor households, soft loans to small-scale businesses) and civil society COVID-19 relief support. The 2021 Annual Action Plan of the Municipality's Medium-Term Development Plan provides no con-

crete actions for the prevention and mitigation of COVID-19 impacts on urban livelihoods (Adentan Municipal Assembly, 2018).

#### 5. Research methodology

This paper deploys Structural Equation Modelling (SEM) to analyse the moderating role of COVID-19-related support on the effects of COVID-19 impacts on urban livelihood capitals in the Adenta Municipality of the Greater Accra Region in Ghana. Hair et al (2021) explains moderation as describing a situation where the relationship between two constructs is not constant but it is also influenced or shaped by a third variable. This third variable is often termed the moderator variable or construct (Sauer & Dick, 1993; Hair et al., 2021). Indeed, studies on COVID-19 pandemic reveal that its impact on residents is often influenced by support interventions from different actors such as governments, families, friends, NGOs, etc. (OECD, 2021; Visagie & Turok, 2021; Akrofi & Antwi, 2020; Osuteye et al., 2020). Most of these interventions were aimed at cushioning residents and businesses to improve their conditions rather than directly addressing negative impacts (Ministry of Finance, 2020). This shows that the relationship comprises two constructs and a moderating construct or variable. In this study, the two constructs are COVID-19 impacts and urban livelihoods capitals while the moderator variable is COVID-19-related support. Hence in this moderation analysis, the strength or direction of the relationships between COVID-19 impacts and urban livelihoods capitals are examined using COVID-19-related support. This aligns with Hair et al. (2021) recommendation for the appropriate use of moderation analysis.

##### 5.1. Survey design and data collection

To achieve the research aim, the team employed a cross-sectional design. This design was selected because of its ability to link data, hy-

pothesis, model development and generalized results (Barratt & Kirwan, 2009). A structured questionnaire survey was designed through in-depth literature and administered by 10 graduate research assistants between November 2021 and January 2022. In terms of the data collection, the municipality's estimated total number of households of 73,281 was considered as the sample frame. Using the sample size determination table published by Yamane (1967) and Israel (2003), at a confidence level of 95%,  $P=0.5$  and a level of precision of  $\pm 5\%$ , an estimated sample size of 400 was deemed appropriate for the total households. The multistage sampling technique was adopted to ensure that each household head had an equal chance of taking part in the survey. To ensure a representative sample, the stratified sampling technique was used to sample 100 respondents from each of the four (4) zonal councils namely Koose, Gbentanaa, Nii Ashale and Sutsuruna. The data collection tool was a questionnaire designed using the Kobo Collect App. Respondents were given a paper copy of the questionnaire for their perusal before participating in the questionnaire survey. In each of the zonal councils, household heads or in their absence a representative was selected for the survey. The purpose of the study was explained to the respondents and the survey commenced only with their full consent.

The survey questionnaire was made up of 3 parts. The first part provided an introductory letter that highlighted the brief profile of the research team including institutional affiliations, the research purpose, and the voluntariness of participants. The second part of the questionnaire gathered information on respondents' socio-demographic characteristics such as gender, age, level of education, marital status, and household size. Section 3 of the questionnaire contained items (manifest variables) measuring the 6 latent constructs (Covid-19 impact, financial capital, social capital, human capital, physical capital, and COVID-19 related support) used in the study as displayed in Table 1. Each manifest variable was measured using a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

According to Taherdoost (2016), the main purpose of using a questionnaire is to gather relevant data reliably and validly. In ensuring the reliability and validity of the data collected, a 2-stage approach recommended by Abunyewah et al. (2020) and Fatemi et al. (2020) was employed. Firstly, the questionnaire—underpinned by in-depth literature and existing theories—was given to two academic teams (Australia and Ghana) for assessment and review. Suggestions from the academic team were considered and submitted to a team of industry experts for evaluation and additional feedback. The feedback from the team of academics and industry experts enhanced the questionnaire's readability. Secondly, the updated questionnaire was piloted across the four zonal councils of the municipality with 24 participants (6 in each zonal council). The pilot data was analyzed to measure the reliability and validity of the questionnaire. Results from the pilot study showed that the survey instrument was reliable ( $\alpha \geq 0.7$ ) and valid ( $AVE \geq 0.5$ ), as it aligns with recommended reliability and validity values (Ursachi et al., 2015). This was followed by a survey of 400 participants in the study area.

In general, all the demographic characteristics aligned with the patterns in the municipality except for average household size. During the data collection, data collectors observed household heads' inclusion of persons temporarily staying with them due to the COVID-19 pandemic as part of their households. This might be the reason the average household size of the sample is higher than the municipality's average. Nevertheless, other socio-demographic data reported in this study (see Table 2) which conforms to recent census figures (GSS, 2021) demonstrate the reliability and robustness of the survey data.

## 5.2. Data analysis

Data from the study were analyzed with the aid of two statistical software's: SPSS version 28 and AMOS version 28. The SPSS was used to calculate descriptive statistics such as mean, standard deviation and frequency including Exploratory Factor Analysis (EFA) while the AMOS was used to estimate the Confirmatory Factor Analysis (CFA) and struc-

tural model. Baumgartner and Homburg (1996) point out that most researchers employing SEM as an analytical tool often proceed to estimate correlation analysis, EFA, CFA and SEM without paying attention to the raw data. According to them, when this occurs the correlation matrix generates a multitude of factors that may call into doubt the applicability of the statistical procedure. Learning from these occurrences, the team thoroughly checked the questionnaire surveys for errors before, during and after coding. Preliminary data analyses to check for missing variables, outliers, multicollinearity and normality were run as well. An EFA, a CFA and SEM were estimated to evaluate the study's proposed model. To test the proposed model, an EFA was computed to uncover the common factors that are accurately associated with the latent variables. The results from the EFA served as input to run the CFA. The measurement model was assessed and validated using construct validity (standardized factor loadings, average variance extracted, and construct reliability). In addition, the model was also assessed using a combination of absolute fit indices (GFI, AGFI and Chi-square), relative fit indices (IFI, TLI and NFI) and non-centrality-based indices (RMSEA and CFI). As a sequel to the measurement model's validation, the research team estimated the structural model to assess the relationships between the latent constructs and associated manifest variables, path coefficients and model fits using the GOF indices.

## 6. Results

### 6.1. Socio-demographic characteristics of respondents

Data collected from the study respondents shows that 57.2% are males while 42.8% are females. Most respondents (51.7%) are married, and the average household size is approximately 5. In terms of education, 98.2% have some form of formal education (see details in Table 2). All demographic characteristics conformed to the municipality trends except for average household size, possibly hinting at how the COVID-19 pandemic seemingly altered the living arrangements of households in the municipality. Indeed, some studies on the COVID-19 pandemic show that it altered the living arrangement of many households, often bringing families together—albeit amidst increased stress and interpersonal conflicts—thereby increasing household sizes during the pandemic (see Evandrou et al. 2021).

### 6.2. Exploratory factor analysis

To identify the manifest variables that adequately define the latent constructs adopted in the study, the research team estimated an EFA. In running the EFA, we employed the Principal Component Analysis and Promax as the extraction and rotation methods respectively going by Kaiser's eigenvalue of greater than 1 criterion, 6 factors were identified as depicted in Table 3. In addition to this criterion, we adopted the Howard (2016) approach which excludes factors that load below 0.4. These results also align with the number of variables identified *a priori*. Component 1, 2 and 3 (retained 5 items each) and component 4 and 5 (retained 4 items each), component 6 (retained 3) had eigenvalues greater than 1 respectively ( $\lambda=5.69$ ;  $\lambda=4.46$ ;  $\lambda=3.87$ ;  $\lambda=3.21$ ;  $\lambda=1.93$ ,  $\lambda=1.23$ ). Specifically, item 4 for social capital (Social interactions were broken down as a result of Covid-19), item 1 for human capital (I have not been able to acquire and utilize my knowledge as a result of Covid-19), item 1 for physical capital (As a result of Covid-19, my household assets depreciated in value) and item 6 for COVID-19 related support (I received support from local government representatives/politicians during Covid-19) were deleted. These items were excluded from further discussion because their factor loadings were less than 0.4 (Howard, 2016) and eigenvalues were less than 1.

Overall, the 6 components identified explained 78.36% of the total variance which meets the recommended threshold of 60% (Hair et al., 2012). Using Harman's One-Factor test showed an absence of common method bias since the first extracted factor did not account for more than

**Table 1**  
Constructs for the study.

Latent Construct	Item	Source	Code
Covid-19 Impact	My accessibility to food was impacted by Covid-19	Asante & Mills (2020)	CI1
	My accessibility to clean water was impacted by Covid-19	Ojogiwa & Akinola (2020)	CI2
	Covid-19 widened the inequality in accessing all forms of basic needs	Bukuluki et al. (2020)	CI3
	As a result of Covid-19, I have sold some of my household assets	Aragie et al. (2021)	CI4
	As a result of Covid-19, my standard of living significantly fell	Schotte & Zizzamia (2021)	CI5
Financial Capital	Covid-19 has reduced my ability to save money	Carney et al. (1999)	FC1
	Covid-19 has impacted my creditworthiness from banks/friends	DFID (1999)	FC2
	Covid-19 has reduced remittances received from family and friends	Asegie et al. (2021)	FC3
	Covid-19 has reduced the amount of money or monetary assistance I can give to family/friends	Gallup & Sachs, (2001)	FC4
	Covid-19 has reduced the amount of money I spend on other personal things I need	Gustafsson-Wright et al. (2011)	FC5
Social Capital	Covid-19 disorganized community meetings and gatherings	Masanjala (2007)	SC1
	Covid-19 affected opportunities for social networking and bonding	Carney et al. (1999)	SC2
	Covid-19 affected travel schedules and plans	DFID (1999)	SC3
	Social interactions were broken down as a result of Covid-19	Morsut et al. (2021)	SC4
		Makridis & Wu (2021)	SC5
Human Capital	I have not been able to acquire and utilize my knowledge as a result of Covid-19	Alonge et al. (2019)	HC1
	I have not been able to utilize my skill sets because of Covid-19	Wong & Kohler (2020)	HC2
	My health condition was impacted by Covid-19	Yu et al. (2021)	HC3
	I lost my job as a result of Covid-19	Masanjala (2007)	HC4
	I have taken on an additional job as a result of Covid-19	Hunter et al. (2011)	HC5
		Bhandari & Alonge (2020)	HC6
		Carney et al. (1999)	HC7
		DFID (1999)	HC8
		Callegari & Feder, (2021)	HC9
		Zinyemba (2021)	HC10
Physical Capital	As a result of Covid-19, my household assets depreciated in value	Gustafsson-Wright et al. (2011)	PC1
	As a result of Covid-19, I changed my place of residence or abode	Myers & Thomasson (2021)	PC2
	As a result of Covid-19, my children cannot go to school	Okediya (2020)	PC3
	As a result of Covid-19, my family cannot visit recreational sites	Masanjala (2007)	PC4
	As a result of Covid-19, members of my household that are sick cannot access certain hospital services	Hunter et al. (2011)	PC5
		Bhandari & Alonge (2020)	PC6
		Carney et al. (1999)	PC7
		DFID (1999)	PC8
		Ulya et al. (2021)	PC9
		Callegari & Feder (2021)	PC10
COVID-19 related support	I received support from families during Covid-19	Nsoesie et al. (2015)	CS1
	I received support from the central government during Covid-19	Maphanga & Henama (2019)	CS2
	I received support from friends during Covid-19	Hunter et al. (2011)	CS3
	I received support from religious bodies during Covid-19	Bhandari & Alonge (2020)	CS4
	I received support from NGOs during Covid-19	Masanjala (2007) Hunter et al. (2011)	CS5
	I received support from local government representatives/politicians during Covid-19	Bhandari & Alonge (2020)	CS6
	Visagie & Turok (2021)	CS7	
	Akrofi & Antwi (2020)	CS8	
	Otsuteye et al. (2020)	CS9	
	Dadzie & Raju (2020)	CS10	
	Adams (2020)	CS11	
	World Bank (2020)	CS12	
	Prempeh (2021)	CS13	
	WACSI (2020)	CS14	

**Table 2**  
Socio-demographic characteristics of respondents.

Socio-demographic factors	Components	Percentage (%)
Gender	Male	57.2
	Female	42.8
Household Size	1-5	20.3
	6-10	77.5
	10+	2.2
Age	18-26	17.8
	27-35	48.2
	36-44	20.0
	45-53	9.0
	54-62	3.8
	63+	1.2
Marital Status	Single	44.0
	Married	51.7
	Divorced	2.3
	Separated	2.0
Education Level	No Formal Education	1.8
	Primary/Middle/JHS	32.7
	Senior High School	39.3
	Tertiary	26.3

50% of the total variance (Podsakoff & Organ, 1986; Podsakoff et al., 2003). In addition, we used the determinant score of the correlation matrix approach recommended by Samuels (2017) to test for multicollinearity. The result showed a determinant score greater than the recommended threshold of 0.00001 (Field, 2013), suggesting an absence of multicollinearity issues. The Kaiser-Meyer-Olkin and Bartlett’s tests were used to test the appropriateness of the factor analysis. The Kaiser-Meyer-Olkin sampling adequacy coefficient for the dataset was 0.81, whereas the Bartlett test of Sphericity was statistically significant ( $\chi^2 = 6031.26$ ,  $df = 325$ ,  $p = 0.000$ ). This indicates that the factor analysis is justified, and the data suits the analysis carried out.

**6.3. Confirmatory factor analysis (CFA)**

A CFA was performed to assess the manifest variable relationship with the latent constructs. Results shows an adequate fit ( $\chi^2/df = 1.45$ ,  $p = 0.000$ ; GFI = 0.89; AGFI = 0.86; CFI = 0.98; IFI = 0.98; NFI = 0.94; TLI=0.98 and RMSEA = 0.04). The Cronbach’s Alpha was employed to assess the reliability of the constructs. This helped to assess the internal consistency of the scale items used in the study. As shown in Table 5, the latent variables showed a Cronbach alpha that meets the recommended

**Table 3**  
Exploratory Factor Analysis.

Items	Financial Capital	Covid-19 Impact	COVID-19 Related Support	Human Capital	Physical Capital	Social Capital
FC1	.938					
FC2	.967					
FC3	.962					
FC4	.938					
FC5	.960					
CI2		.936				
CI3		.947				
CI4		.931				
CI5		.838				
CS1			.933			
CS2			.956			
CS3			.855			
CS4			.873			
CS5			.888			
HC2				.900		
HC3				.910		
HC4				.921		
HC5				.880		
PC2					.814	
PC3					.751	
PC4					.726	
PC5					.818	
SC1						.786
SC2						.758
SC3						.673

**Table 4**  
Correlation matrix and the square root of AVE.

Components	1	2	3	4	5	6
Financial Capital	<b>0.94</b>					
Covid-19 Impact	0.07	<b>0.89</b>				
COVID-19 Related Support	0.11	0.02	<b>0.88</b>			
Human Capital	-0.09	-0.01	-0.08	<b>0.87</b>		
Physical Capital	0.08	-0.09	0.29	-0.17	<b>0.72</b>	
Social Capital	0.19	-0.20	-0.40	-0.13	0.29	<b>0.72</b>

Diagonal values in bold are the AVE of each construct

threshold of equal to or greater than 0.7 (FC=0.97, CI=0.95, CS=0.94, HC= 0.93, PC=0.77, SC=0.77). A convergent validity test was conducted using the criteria suggested by Hair et al. (2006). The CFA showed a statistically significant factor loading, between 0.65-0.98, composite reliability was ranging from 0.77-0.97, and all the constructs’ AVE was greater than 0.5 as depicted in Table 5. Based on Fornell and Larcker (1981) approach of assessing the discriminant validity, our results showed that the square root of the constructs’ AVE was greater than the inter-correlation with other constructs in the model (shown as diagonal values in Table 4).

6.4. Structural equation model (SEM)

Following acceptable reliability and validity tests, a structural model was estimated to test the hypotheses of the study. This is examined using the standardized factor estimates and the significance level. Overall, results from the SEM analysis showed an adequate fit ( $\chi^2/df = 1.54$ ,  $p = 0.000$ , GFI = 0.91; AGFI = 0.89; CFI = 0.98; IFI = 0.98; NFI = 0.94; TLI=0.98 and RMSEA = 0.05). Fig. 6 shows the statistically significant estimates of the latent constructs and the hypotheses tested.

6.5. Moderation effects of COVID-19 related support

In this study, we used the step-by-step approach recommended by Aikens and West (1991) and Dawson (2014) to test the moderation effects of COVID-19 related support on the relationship between COVID-19 impact and livelihood capitals. This approach was selected because it centers data and mitigate the collinearity of the main effect variables

with the interaction terms (Aikens and West, 1991). Using this approach involves three stages. In the first place, data for the independent variable, moderator, and dependent variables were standardized (z-scores). Following this, we multiplied the z-scores of the independent variable (COVID-19 impact) with the moderator (COVID-19 related support). Lastly, the model was run and the resultant output was plotted on a two-way interaction excel sheet, as depicted in Fig. 7.

The results showed a statistically significant correlation between COVID-19 impact ( $\beta=-0.04$ ,  $p = 0.000$ ) and financial capital. Also, there was a statistically significant relationship between the interaction terms [ $\beta$  (COVID-19 impact) = 0.02,  $p = 0.000$ ] and financial capital. However, there was no statistically significant relationship between COVID-19 impact and social capital, physical capital and human capital (Table 6). This means that the relationship between COVID-19 impact, and financial capital is moderated by COVID-19-related support. The GOF and other parameters also proved that the model is good ( $\chi^2/df = 5.43$ , GFI = 1.00, NFI = 1.00, IFI = 1.00, CFI = 1.00, RMSEA = 0.06).

7. Discussion

The COVID-19 pandemic has had significant impacts on humanity and continues to be a growing threat to people’s livelihoods. To deal with this threat, it is imminent to have knowledge and information on the level and extent of COVID-19 impacts on livelihood to design appropriate interventions. Using Ghana as a case study, this study hypothesized that the COVID-19 pandemic has a negative relationship with urban livelihood capitals namely: financial, human, social, and physical capitals. The results show statistically significant negative relationships between COVID-19 impacts and the livelihood capitals. This confirms the observation from the literature that health pandemics like COVID-19 often have negative impacts on residents’ livelihoods (Braam et al., 2021; Rahman et al., 2021). Specifically, the study reveals that the COVID-19 pandemic reduced residents’ household expenditure and ability to save money, lowered their creditworthiness, reduced the remittances they received from and give to family and friends. This finding confirms other studies that found that malaria and HIV/AIDS pandemics reduce income capacity, deplete savings, and worsen credit availability for households (Gallup & Sachs, 2001; Gustafsson-Wright et al., 2011).

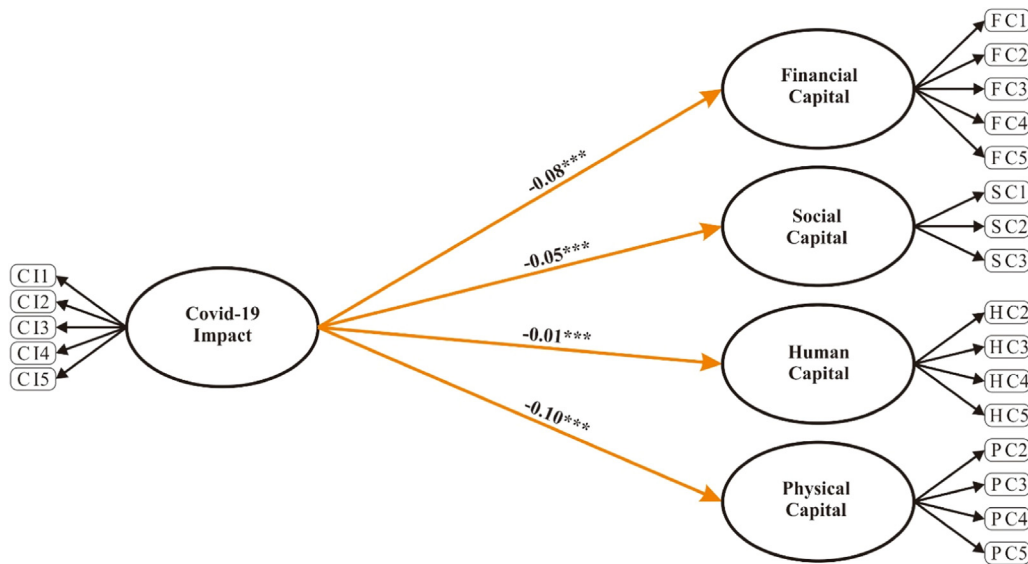


Fig. 6. Structural Model.

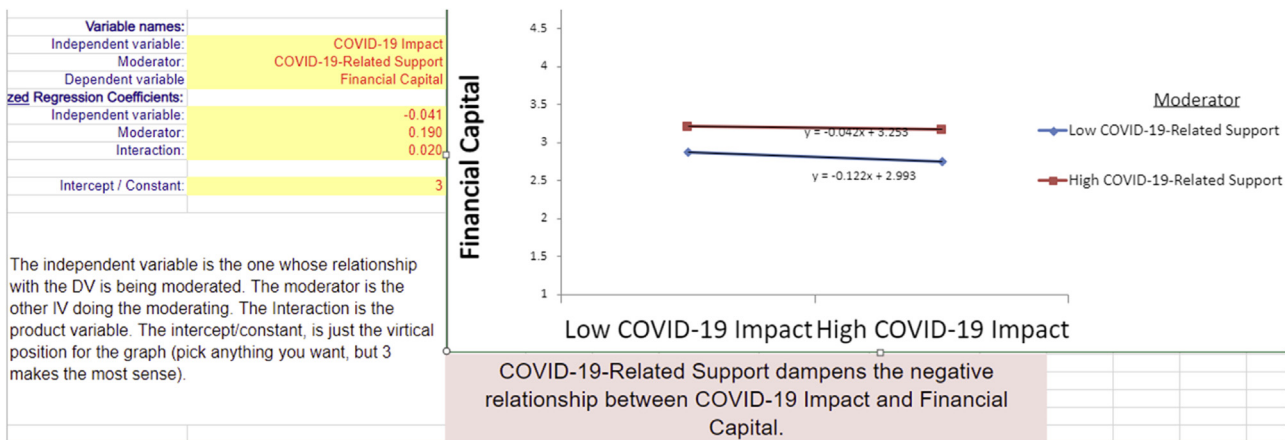


Fig. 7. Moderation effect of COVID-19-related support.

With the social impact of COVID-19, our study revealed that the COVID-19 pandemic reduced social interactions and networking among residents and even truncated budding relationships necessary for building their social capital. Moreover, some residents also changed their place of residence with many unable to send their children to school or visit recreation sites and access certain hospital services. Collectively, these demonstrate how the COVID-19 pandemic has engendered an extensive disruption to residents’ everyday activities (Haleem et al., 2020; Applebaum et al., 2021) and in other cases destructed urban residents’ livelihoods, thereby leading to severe hardships (Adam et al., 2020). These livelihood disruptions and destructions make efforts toward building community sustainability and resilience challenging as the COVID-19 pandemic has seemingly truncated many signs of progress made by residents and government actions to reduce poverty and improve livelihood outcomes (Bukari et al., 2021; Diop & Asongu, 2021).

Additionally, the need for a structural response to health pandemics (Fakhruddin et al., 2020; Daszak et al., 2021; Schmidt-Sane et al., 2021) is supported by this study’s findings. Despite, the COVID-19 pandemic triggering support initiatives to help residents cope with and adapt to this health disaster (Wilkinson et al., 2020; OECD, 2021), the findings show how COVID-19-related support did not minimize the impact of the pandemic on all livelihood capitals. Aside from reducing the impacts of the pandemic on residents’ financial capital, this paper reveals how support from families and friends, FBOs, NGOs and local government representatives/politicians were unable to weaken the

COVID-19 pandemic impacts on social, human, and physical capitals, thereby unable to improve overall urban residents’ livelihood outcomes. Indeed, this finding underscores the call by Wilkinson et al. (2020) to be mindful of the pandemic response strategies, as some can be ineffective and further undermine the livelihood capabilities of residents.

Some reasons can be attributed to these. Firstly, the pervasiveness of the COVID-19 pandemic means that family and friends who might have been in a position to help during disaster events were also impacted and thus were not capable of providing adequate support to more vulnerable residents. For instance, residents confirmed reductions in the amount of money or monetary assistance they can give to family and friends. As observed by Bisong et al. (2020), declines in remittances to developing countries are undermining efforts to tackle the impacts of the COVID-19 pandemic and disrupting countries’ efforts in building sustainable communities. Hence, findings from this study suggest that interventions improving residents’ financial capital can have more impact in reducing the negative impacts of COVID-19 on residents. This aligns with findings from Coulaud et al. (2023), who observed financial support can weaken the adverse impacts of the COVID-19 pandemic, but emphasized that financial support only contributes to a broader set of factors that can help reduce the pandemic’s impacts. Again, significant reductions in the funding of NGOs and governments to support their humanitarian and socio-economic development projects and programs (Lone & Ahmad, 2020; Wilke et al., 2020; Asogwa et al., 2022) resulted

**Table 5**  
CFA factor loadings, reliability and validity of constructs.

Items	Financial Capital	Covid-19 Impact	COVID-19 related support	Human Capital	Physical Capital	Social Capital
FC1	0.90					
FC2	0.97					
FC3	0.98					
FC4	0.91					
FC5	0.95					
CI1		0.89				
CI2		0.92				
CI3		0.78				
CI4		0.93				
CI5		0.92				
CS1			0.92			
CS2			0.96			
CS3			0.71			
CS4			0.87			
CS5			0.93			
HC2				0.87		
HC3				0.87		
HC4				0.90		
HC5				0.84		
PC2					0.78	
PC3					0.69	
PC4					0.68	
PC5					0.72	
SC1						0.79
SC2						0.81
SC3						0.65
AVE	0.88	0.79	0.78	0.76	0.52	0.52
CR	0.98	0.95	0.95	0.93	0.81	0.76
IR	0.97	0.95	0.94	0.93	0.77	0.77

in reduced capacities to provide a broad range of interventions to help minimize and tackle the impacts of the pandemic on residents’ livelihood capitals. Here, [Aberman et al. \(2014\)](#) argues that while support such as safety nets from governments, NGOs, FBOs, etc. can be helpful in assuaging the negative impacts of health pandemics, funding availability often constrains their effective implementation and comprehensiveness. Again, this re-echoes our findings that addressing the adverse impacts of the COVID-19 pandemic on residents’ livelihoods requires a structural and multipronged response.

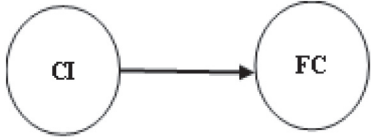
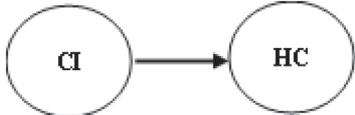
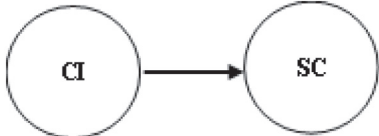

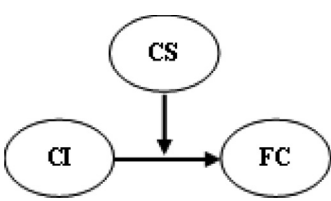
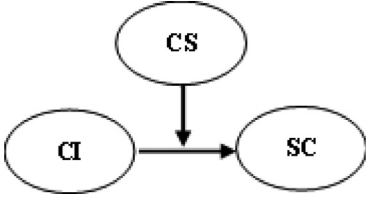
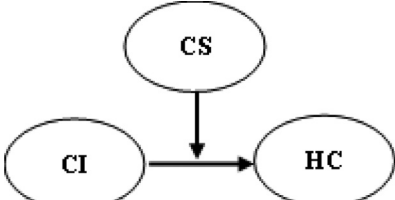
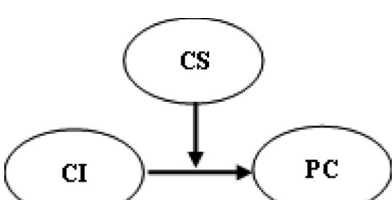
Secondly, a reason why COVID-19-related support seemed unresponsive to social, human, and physical capital outcomes can be attributed to government bans on residents’ movements to mitigate transmission. These bans constrained accessibility and mobility to school, family and friends, recreation sites, and even certain hospital services rather than improved them ([Brauner et al., 2021](#)). Consequently, we find that during the COVID-19 outbreak in Ghana, government enforcement of lockdown restricted residents’ movements and banned activities such as weddings, church services, parties, and other entertainment events that brought people together to socialize and network. These restrictions inhibited peoples’ face-to-face contact with their friends, families, and the community and the support that results from these interactions. This is likely the reason why the COVID-19-related support was unresponsive to improving residents’ social capital, as residents noted in the affirmative that COVID-19 disorganized community meetings and gatherings and disagreed that COVID-19 strengthened their social networks. Similar findings were observed in China ([Yu et al., 2021](#)), where COVID-19 lockdown restrictions limited movements, thus negatively affecting residents’ social capital. [Wong and Kohler \(2020: \(2\)](#), therefore, argue a need to transcend a one-size-fits-all approach to “social capital-centric public health approach” to health pandemics such as COVID-19 since social distancing policies such as post-exposure quarantining and shelter-in-place orders significantly interrupts residents everyday social interactions and limits their access to traditional channels of social support. Furthermore, the pandemic induced spontaneous reactions from governments, NGOs, FBOs, etc. whose efforts were mostly uncoordinated and often without recourse to community-based organizations and sys-

tems that can help with the effectiveness of the interventions. Hence, although [Alonge et al. \(2019\)](#) and [Frimpong et al. \(2022\)](#) emphasize the immense roles of these actors in restoring and strengthening social capital during health pandemics, the spontaneous and ad-hoc nature of many of these interventions limited community partnerships which seem to have not supported social capital enhancement. Indeed, [Frimpong et al. \(2022\)](#) observed this with COVID-19 interventions in Freetown, Sierra Leone, and called for a structural response to how COVID-19-related support can be effectively implemented by using existing community support systems and partnerships.

Also, we find that the partial lockdown that resulted in about 90% of formal and informal businesses reporting negative effects on their businesses ([GSS, 2020](#)) can be attributed to the fact that many residents remained economically unproductive during the lockdown. With many informal businesses, which employ the majority of urban residents, closed during the pandemic ([GSS, 2020; Aduhene & Osei-Assibey, 2021](#)), it is not surprising that residents were unable to utilize their knowledge and skillsets during the partial lockdowns—with some residents losing their jobs and others unable to take up employment even if they wanted to. Since COVID-19-related support was in the form of utility subsidies, food supplies, and cash transfers ([Dadzie & Raju, 2020](#)), this made it difficult for residents to use and augment their knowledge and skillset to enhance their livelihoods. This could be the reason why H7 was not supported in the analysis.

In relation to physical capital, COVID-19 restrictions limited movements and access to infrastructure services unless it was an emergency, such as health care services in Ghana. Also, the academic calendar was put on hold for ten months, starting in March 2020, and students could not attend school ([World Bank, 2022](#)). Attempts to encourage distance or online learning were also constrained by poor internet connectivity and equipment and the general unpreparedness of Ghana’s education system to deploy remote learning ([Aurino et al., 2021](#)). Furthermore, the support received by residents was simply inadequate, causing some to sell part of their household assets to sustain themselves during the lockdown. For example, while food items were shared, not every household received them, and these were also not consistent throughout the

**Table 6**  
Summary of findings.

Hypotheses	Path	Outcome
H1: Covid-19 pandemic impact has a negative relationship with financial capital	 <p><math>\beta = -0.08</math> <math>p = 0.000</math></p>	Supported
H2: Covid-19 pandemic has a negative relationship with human capital	 <p><math>\beta = -0.05</math> <math>p = 0.000</math></p>	Supported
H3: Covid-19 pandemic impact has a negative relationship with social capital	 <p><math>\beta = -0.01</math> <math>p = 0.000</math></p>	Supported
H4: Covid-19 pandemic impact has a negative relationship with physical capital	 <p><math>\beta = -0.1</math> <math>p = 0.000</math></p>	Supported
H5: COVID-19-related support weakens the negative relationship between covid-19 pandemic impact and financial capital		Supported
H6: COVID-19-related support weakens the negative relationship between covid-19 pandemic impact and social capital		Unsupported
H7: COVID-19-related support weakens the negative relationship between covid-19 pandemic impact and human capital		Unsupported
H8: COVID-19-related support weakens the negative relationship between covid-19 pandemic impact and physical capital		Unsupported

lockdown period. Thus, we find that the nature of the COVID-19-related support did not lead to the reopening of schools or opportunities for on-line learning, opportunities to access healthcare, and/or increased access to food, thus resulting in H8 not being supported by the analysis.

Indeed, while the implementation of COVID-19 restrictions is not surprising given the need to contain the spread of the COVID-19 virus (Brauner et al., 2021), our study reveals how certain necessary health pandemic interventions engender negative livelihood outcomes, particularly for low-income residents, for which complementary support interventions are needed to counter their negative effects (Devereux, 2021). These observations consolidate and justify the use of SEM in this study. It enabled this research to unravel the structural interconnections among COVID-19, urban livelihoods capitals, and COVID-19-related support, demonstrating that any response to addressing vulnerabilities and building resilience can be effective with structural health pandemic responses. Akin to other studies (Couland et al., 2023; Wong & Kohler, 2020; Fakhruddin et al., 2020; Daszak et al., 2021; Schmidt-Sane et al., 2021), this study confirms that structural health pandemic responses reveal that no individual COVID-19-related supports can moderate all livelihood outcomes. This demonstrates the limits to some COVID-19-related support in providing sustainable livelihood outcomes necessitating an intentional move towards developing and implementing holistic, multipronged, and integrated approaches that speak to the multi-dimensionality of urban livelihoods as this is an effective way of providing sustained and long-term relief from the COVID-19 pandemic and future health pandemics.

## 8. Conclusions

The onslaught of the COVID-19 pandemic unraveled the vulnerabilities of urban livelihoods—financial, human, social, and physical capitals. For already vulnerable urban areas, many of which are global south cities characterized by poverty, unemployment, inadequate access to education and health services, poor sanitation infrastructure, and governance systems, the onslaught indicates an aggravation of the already precarious impoverishment of urban residents. As this study has illustrated through the study of COVID-19 impacts on urban livelihoods capitals in suburban Accra, residents were impacted negatively at all levels of their livelihoods—with the pandemic disrupting their everyday socio-economic endeavors. Like development actors across the globe, the Government of Ghana, NGOs, FBOs, and families and friends stepped in to help residents impacted by the pandemic. Such COVID-19-related support, however, had limited impacts on urban livelihoods capitals. From this research, the support was only able to minimize the negative impact of the COVID-19 pandemic on financial capital and not the other capitals. This necessitates a move towards a holistic and integrated response to the negative impacts of the COVID-19 pandemic and future health disasters on residents' livelihoods capitals. Using SEM provided a means to establish the structural interrelations among COVID-19 impacts, support received by urban residents, and the degree to which the support received by residents affected the pandemic's impacts on urban livelihoods capitals. While this study affirms many previous studies of how the health pandemic negatively impacts livelihoods, it also advances the argument that the resulting support that emanates from such health pandemics can minimize negative impacts when approached from a comprehensive perspective. For this reason, governments, NGOs, and FBOs at the forefront of initiating support interventions for those impacted by health disasters such as the COVID-19 pandemic need to provide comprehensive support interventions and coordinate their activities so that their efforts are complementary.

A limitation of this study is that beyond establishing the structural underpinnings of COVID-19 impacts and COVID-19-related support on urban livelihoods capitals, it does not account for differences in COVID-19 impact across different socio-economic groups and communities. It does not also detail the moderating roles of the specific kinds of COVID-19-related support on urban livelihood capitals. These are vital for fu-

ture research to help inform governments, NGOs, family and friends and FBOs to understand which support initiatives would be more effective in minimizing the negative impacts of COVID-19 on urban livelihoods capitals.

## Declaration of Competing Interest

The authors declare that they have no conflict of interest.

## CRediT authorship contribution statement

**Seth Asare Okyere:** Conceptualization, Data curation, Formal analysis, Supervision, Writing – original draft. **Louis Kusi Frimpong:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing – original draft. **Matthew Abunyewah:** Conceptualization, Formal analysis, Methodology, Supervision, Writing – original draft. **Stephen Kofi Diko:** Conceptualization, Data curation, Formal analysis, Methodology, Supervision, Writing – original draft. **Md. Nawrose Fatemi:** Conceptualization, Data curation, Supervision, Writing – original draft. **Stephen Leonard Mensah:** Data curation, Formal analysis, Investigation, Writing – review & editing. **Seth Barnie Enning:** Investigation, Methodology, Writing – review & editing. **Michihiro Kita:** Conceptualization, Methodology, Supervision, Writing – review & editing.

## References

- Aassve A., Alfani G., Gandolfi F., & Le Moglie M. (2020). Pandemics and social capital: From the Spanish flu of 1918-19 to COVID-19. *VoxEU*.
- Aber J.L., Aurino E., Behrman J.R., Tsinigo E., and Wolf S. (2021). The Impact of COVID-19 on children's learning and development in Ghana. *Innovations for poverty action*. <https://www.poverty-action.org/study/impact-covid-19-children%E2%80%99s-learning-and-development-ghana>
- Aberman, N. L., Rawat, R., Drimie, S., Claros, J. M., & Kadiyala, S. (2014). Food security and nutrition interventions in response to the AIDS epidemic: Assessing global action and evidence. *AIDS and Behavior*, 18(5), 554–565. [10.1007/s10461-014-0822-z](https://doi.org/10.1007/s10461-014-0822-z).
- Abunyewah, M., Gajendran, T., Maund, K., & Okyere, S. A. (2020). Strengthening the information deficit model for disaster preparedness: Mediating and moderating effects of community participation. *International Journal of Disaster Risk Reduction*, 46, Article 101492.
- Abunyewah, M., Okyere, S. A., Diko, S. K., Kita, M., Erdiaw-Kwasie, M. O., Gajendran, T., Eslamian, S., & Eslamian, F. (2022). Flooding in informal communities: Residents' response strategies to flooding and their sustainability implications in Old Fadama, Accra. In *Disaster Risk Reduction for resilience: Disaster risk management strategies* (pp. 435–461). Switzerland, Cham: Springer.
- Adam, C., Henstridge, M., & Lee, S. (2020). After the lockdown: macroeconomic adjustment to the COVID-19 pandemic in sub-Saharan Africa. *Oxford Review of Economic Policy*, 36(Supplement\_1), S338–S358.
- Adams C.N. (2020). Ghana: President launches Gh¢ 600 million COVID-19 alleviation programme today. *Ghanaian Times*. Retrieved from <https://allafrica.com/stories/202005190844.html>
- Adenta Municipal Assembly. (2018) Medium term development plan 2018-2021. Adentana, Ghana
- Aduhene, D. T., & Osei-Assibey, E. (2021). Socio-economic impact of COVID-19 on Ghana's economy: Challenges and prospects. *International Journal of Social Economics*, 48(4), 543–556. [10.1108/IJSE-08-2020-0582](https://doi.org/10.1108/IJSE-08-2020-0582).
- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. London, England: SAGE.
- Akrofi, M. M., & Antwi, S. H. (2020). COVID-19 energy sector responses in Africa: A review of preliminary government interventions. *Energy Research & Social Science*, 68, Article 101681.
- Alba, R., & Bruns, A. (2022). First-class but not for Long: Heterogeneous infrastructure and water bricolage in Accra's Kiosk compounds. *Urban Forum*, 33, 129–151 (2022). [10.1007/s12132-021-09435-7](https://doi.org/10.1007/s12132-021-09435-7).
- Alfano, V. (2022). Does social capital enforce social distancing? The role of bridging and bonding social capital in the evolution of the pandemic. *Economia Politica*, 1–21.
- Ali, S. H., Fallah, M. P., McCarthy, J. M., Keil, R., & Connolly, C. (2022). Mobilizing the social infrastructure of informal settlements in infectious disease response—the case of Ebola Virus Disease in West Africa. *Landscape and Urban Planning*, 217, Article 104256.
- Alonge, O., Sonkarlay, S., Gwaikolo, W., Fahim, C., Cooper, J., & Peters, D. (2019). Understanding the role of community resilience in addressing the Ebola virus disease epidemic in Liberia: A qualitative study (community resilience in Liberia). *Global Health Action*, 12(1), Article 1662682. [10.1080/16549716.2019.1662682](https://doi.org/10.1080/16549716.2019.1662682).
- Anwar, M., Tajeddini, K., & Ullah, R. (2020). Entrepreneurial finance and new venture success—the moderating role of government support. *Business Strategy & Development*, 3(4), 408–421.
- Applebaum, J. W., Ellison, C., Struckmeyer, L., Zsembik, B. A., & McDonald, S. E. (2021). The impact of pets on everyday life for older adults during the COVID-19 pandemic. *Frontiers in Public Health*, 9, 292.

- Aragic, E., Taffesse, A. S., & Thurlow, J. (2021). The short-term economywide impacts of COVID-19 in Africa: Insights from Ethiopia. *African Development Review*, 33, S152–S164.
- Asante, L. A., & Mills, R. O. (2020). Exploring the socio-economic impact of COVID-19 pandemic in marketplaces in urban Ghana. *Africa Spectrum*, 55(2), 170–181. [10.1177/0002039720943612](https://doi.org/10.1177/0002039720943612).
- Asegi, A. M., Adisaalem, S. T., & Eshetu, A. A. (2021). The effects of COVID-19 on livelihoods of rural households: South Wollo and Oromia Zones, Ethiopia. *Heliyon*, 7(12), e08550.
- Asogwa, I. E., Varua, M. E., Datt, R., & Humphreys, P. (2022). The impact of COVID-19 on the operations and management of NGOs: Resilience and recommendations. *International Journal of Organizational Analysis*. [10.1108/IJOA-12-2021-3090](https://doi.org/10.1108/IJOA-12-2021-3090).
- Balde, R., Boly, M., & Avenyo, E. K. (2020). *Labour market effects of COVID-19 in sub-Saharan Africa: An informality lens from Burkina Faso, Mali and Senegal* (pp. 1–36). UNU-MERIT Working Papers.
- Barratt H., & Kirwan M. (2009). Confounding, interactions, methods for assessment of effect modification. In *HealthKnowledge*.
- Bhandari, S., & Alonge, O. (2020). Measuring the resilience of health systems in low-and middle-income countries: A focus on community resilience. *Health Research Policy and Systems*, 18(1), 1–19. [10.1186/s12961-020-00594-w](https://doi.org/10.1186/s12961-020-00594-w).
- Bisong, A., Ahairwe, P. E., & Njoroge, E. (2020). *The impact of COVID-19 on remittances for development in Africa*. The Netherlands: Maastricht Retrieved from.
- Braam, D. H., Srinivasan, S., Church, L., Sheikh, Z., Jephcott, F. L., & Bukachi, S. (2021). Lockdowns, lives and livelihoods: the impact of COVID-19 and public health responses to conflict affected populations—a remote qualitative study in Baidoa and Mogadishu, Somalia. *Conflict and Health*, 15(1), 1–11.
- Brauner, J. M., Mindermann, S., Sharma, M., Johnston, D., Salvatier, J., Gavenčiak, T., ... Kulveit, J. (2021). Inferring the effectiveness of government interventions against COVID-19. *Science*, 371(6531), eabd9338. [10.1126/science.abd9338](https://doi.org/10.1126/science.abd9338).
- Bukari, C., Essilfie, G., Aning-Agyei, M. A., Otoo, I. C., Kyeremeh, C., Owusu, A. A., ... Bukari, K. I. (2021). Impact of COVID-19 on poverty and living standards in Ghana: A micro-perspective. *Cogent Economics & Finance*, 9(1), Article 1879716. [10.1080/23322039.2021.1879716](https://doi.org/10.1080/23322039.2021.1879716).
- Bukuluki, P., Mwenyango, H., Katongole, S. P., Sidhva, D., & Palattiyil, G. (2020). The socio-economic and psychosocial impact of Covid-19 pandemic on urban refugees in Uganda. *Social Sciences & Humanities Open*, 2(1), Article 100045.
- Callegari, B., & Feder, C. (2021). The long-term economic effects of pandemics: Toward an evolutionary approach. *Industrial and Corporate Change*, 1–21. [10.1093/icc/dtab064](https://doi.org/10.1093/icc/dtab064).
- Carney, D., Drinkwater, M., Rusinow, T., Neeffes, K., Wanmali, S., & Singh, N. (1999). *Livelihoods approaches compared: A brief comparison of the livelihoods approaches of the UK department for international development (DFID), CARE, Oxfam and the United Nations development programme (UNDP)*. Department for International Development.
- Chambers, R., & Conway, C. (1992). *Sustainable rural livelihoods: Practical concepts for the 21st century, IDS discussion paper 296*. Brighton: IDS <https://opendocs.ids.ac.uk/opendocs/bitstream/handle/20.500.12413/775/Dp296.pdf?sequence=1>.
- Coulaud, P. J., Salway, T., Jesson, J., Bolduc, N., Ferlatte, O., Bertrand, K., ... Knight, R. (2023). Moderation of the association between COVID-19-related income loss and depression by receipt of financial support: Repeated cross-sectional surveys of young adults in Canada and France (2020–2021). *SSM-Population Health*, Article 101340.
- Dadzie C.E., & Raju D. (2020). Economic relief through social safety nets during the COVID-19 crisis: The case of Ghana. Retrieved from <https://blogs.worldbank.org/nasikiliza/economic-relief-through-social-safety-nets-during-covid-19-crisis-case-ghana>
- Daszak, P., Keusch, G. T., Phelan, A. L., Johnson, C. K., & Osterholm, M. T. (2021). Infectious disease threats: A rebound to resilience: Commentary reviews the US approach to pandemic preparedness, its impact on the response to COVID-19, and offers policy options to strengthen US pandemic resilience. *Health Affairs*, 40(2), 204–211.
- Dawson, J. F. (2014). Moderation in management research: What, why, when, and how. *Journal of Business and Psychology*, 29(1), 1–19.
- Delamou, A., Delvaux, T., El Ayadi, A. M., Beavogui, A. H., Okumura, J., Van Damme, W., & De Brouwere, V. (2017). Public health impact of the 2014–2015 Ebola outbreak in West Africa: Seizing opportunities for the future. *BMJ Global Health*, 2(2), Article e000202.
- Devereux, S. (2021). Social protection responses to COVID-19 in Africa. *Global Social Policy*, 21(3), 421–447.
- DFID. (1999). *Sustainable livelihoods guidance sheets*. The Department for International Development (DFID) <https://www.livelihoodscentre.org/documents/1144097690/114438878/Sustainable+livelihoods+guidance+sheets.pdf/594e5ea6-99a9-2a4e-f288-cbb4ae4bea8b?t=1569512091877>.
- Diop, S., & Asongu, S. A. (2021). The Covid-19 pandemic and the new poor in Africa: The straw that broke the camel's back. In *Proceedings of the forum for social economics*.
- Evandrou, M., Falkingham, J., Qin, M., & Vlachantoni, A. (2021). Changing living arrangements and stress during Covid-19 lockdown: Evidence from four birth cohorts in the UK. *SSM-Population Health*, 13, Article 100761.
- Fakhruddin, B. S., Blanchard, K., & Ragupathy, D. (2020). Are we there yet? The transition from response to recovery for the COVID-19 pandemic. *Progress in Disaster Science*, 7, Article 100102.
- Fatemi, M. N., Okyere, S. A., Diko, S. K., Abunyewah, M., Kita, M., & Rahman, T. (2020). Flooding in mega-cities: Using structural equation modeling to assess flood impact in Dhaka. *International Journal of Disaster Resilience in the Built Environment*. [10.1108/IJ-DRBE-08-2020-0094](https://doi.org/10.1108/IJ-DRBE-08-2020-0094).
- Field A. (2013). *Discovering statistics using IBM SPSS statistics*: California, USA.
- Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research*, 18(3), 382–388. [10.1177/002224378101800313](https://doi.org/10.1177/002224378101800313).
- Frimpong, L. K., Okyere, S. A., Diko, S. K., Abunyewah, M., Erdiaw-Kwasie, M. O., Comodore, T. K., ... Kita, M. (2022). Actor-network analysis of community-based organisations in health pandemics: Evidence from the COVID-19 response in Freetown, Sierra Leone. *Disasters*, 46(4), 903–927.
- Gallup, J. L., & Sachs, J. D. (2001). The economic burden of malaria. *American Journal of Tropical Medicine and Hygiene*, 64(2 (Supplement 2001)), 85–96.
- Gatso, T. T., Ordaz-Németh, I., Grimes, T., Lormie, M., Tweh, C., Kühn, H. S., & Junker, J. (2018). The impact of the Ebola virus disease (EVD) epidemic on agricultural production and livelihoods in Liberia. *PLoS Neglected Tropical Diseases*, 12(8), Article e0006580.
- Gbedemah, S. F., Eshun, F., Frimpong, L. K., & Okine, P. (2022). Domestic water accessibility during COVID-19: Challenges and coping strategies in Somanya and its surrounding rural communities of Ghana. *Urban Governance*, 2, 305–315. [10.1016/j.urgj.2022.08.001](https://doi.org/10.1016/j.urgj.2022.08.001).
- Ghana Statistical Service. (2015). Ghana poverty mapping report. Accra, GSS. <https://www2.statsghana.gov.gh/docfiles/publications/POVERTY%20MAP%20FOR%20GHANA-05102015.pdf>
- Ghana Statistical Service. (2020). How COVID-19 is affecting firms in Ghana. Retrieved from [https://statsghana.gov.gh/covidtracker/Business%20Tracker%20Brief%20Report\\_GSS\\_web.pdf](https://statsghana.gov.gh/covidtracker/Business%20Tracker%20Brief%20Report_GSS_web.pdf)
- Ghana Statistical Service. (2021). *Ghana population and housing census. General report volume 3A: Population of regions and districts*. Accra: Ghana Statistical Service [https://statsghana.gov.gh/gssmain/fileUpload/presserelease/2021%20PHC%20General%20Report%20Vol%203A\\_Population%20of%20Regions%20and%20Districts\\_181121.pdf](https://statsghana.gov.gh/gssmain/fileUpload/presserelease/2021%20PHC%20General%20Report%20Vol%203A_Population%20of%20Regions%20and%20Districts_181121.pdf).
- Gill, P. K., Du, C., Khan, F., Karimi, N., Sabharwal, K., & Agarwal, M. (2022). The psychological effects of COVID-19 spread in young Canadian adults. *International Journal of Social Psychiatry*, 68(1), 216–222. [10.1177/0020764020988878](https://doi.org/10.1177/0020764020988878).
- Grant, R. (2009). *Globalizing city: The urban and economic transformation of Accra, Ghana*. Syracuse: Syracuse University Press.
- Greyling, C., Maulit, J. A., Parry, S., Robinson, D., Smith, S., Street, A., & Vitillo, R. (2016). Lessons from the faith-driven response to the West Africa Ebola epidemic. *The Review of Faith & International Affairs*, 14(3), 118–123.
- Gustafsson-Wright, E., Janssens, W., & Van Der Gaag, J. (2011). The inequitable impact of health shocks on the uninsured in Namibia. *Health Policy and Planning*, 26(2), 142–156. [10.1093/heapol/czq029](https://doi.org/10.1093/heapol/czq029).
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis (Vol. 6)*. Upper Saddle River, NJ: Pearson Prentice Hall.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). Moderation analysis. J. F. Hair Jr, G. T. M. Hult, C. M. Ringle, M. Sarstedt, N. P. Danks, & S. Ray. *Partial least squares structural equation modeling (PLS-SEM) using R: A workbook*. Springer Nature.
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2012). Partial least squares: the better approach to structural equation modeling? *Long Range Planning*, 45(5-6), 312–319. [10.1016/j.lrp.2012.09.011](https://doi.org/10.1016/j.lrp.2012.09.011).
- Haleem, A., Javadi, M., & Vaishya, R. (2020). Effects of COVID-19 pandemic in daily life. *Current Medical Research and Practice*, 10(2), 78.
- Howard, M. C. (2016). A review of exploratory factor analysis decisions and overview of current practices: What we are doing and how can we improve? *International Journal of Human-Computer Interaction*, 32(1), 51–62. [10.1080/10447318.2015.1087664](https://doi.org/10.1080/10447318.2015.1087664).
- Hunter, L. M., Reid-Hresko, J., & Dickinson, T. W. (2011). Environmental change, risky sexual behavior, and the HIV/AIDS pandemic: Linkages through livelihoods in rural Haiti. *Population Research and Policy Review*, 30(5), 729–750.
- Israel, G. D. (2003). *Determining sample size (Tech. Rep. No. PEOD-6)*. Florida: University of Florida, Institute of Food and Agricultural Sciences.
- Kansiime, M. K., Tambo, J. A., Mugambi, I., Bundi, M., Kara, A., & Owuor, C. (2021). COVID-19 implications on household income and food security in Kenya and Uganda: Findings from a rapid assessment. *World Development*, 137, Article 105199.
- Lone, S. A., & Ahmad, A. (2020). COVID-19 pandemic—an African perspective. *Emerging Microbes & Infections*, 9(1), 1300–1308.
- Lorentzen, P., McMillan, J., & Wacziarg, R. (2008). Death and development. *Journal of Economic Growth*, 13(2), 81–124. [10.1007/s10887-008-9029-3](https://doi.org/10.1007/s10887-008-9029-3).
- Mahal, A. (2004). Economic implications of inertia on HIV/AIDS and benefits of action. *Economic and Political Weekly*, 1049–1063.
- Makridakis, C. A., & Wu, C. (2021). How social capital helps communities weather the COVID-19 pandemic. *PLoS One*, 16(1), Article e0245135.
- Maphanga, P. M., & Henama, U. S. (2019). The tourism impact of Ebola in Africa: Lessons on crisis management. *African Journal of Hospitality, Tourism and Leisure*, 8(3), 1–13. <https://www.ajhtl.com>.
- Masanjala, W. (2007). The poverty-HIV/AIDS nexus in Africa: A livelihood approach. *Social Science & Medicine*, 64(5), 1032–1041.
- McQuillin, P. A., Udhayashankar, K., Niescierenko, M., & Maranda, L. (2017). Health-care access during the Ebola virus epidemic in Liberia. *The American Journal of Tropical Medicine and Hygiene*, 97(3), 931.
- Meyers, K., & Thomasson, M. A. (2021). Can pandemics affect educational attainment? Evidence from the polio epidemic of 1916. *Cliometrica*, 15(2), 231–265. [10.1007/s11698-020-00212-3](https://doi.org/10.1007/s11698-020-00212-3).
- Ministry of Finance (2020). Statement to parliament on economic impact of the covid-19 pandemic on the economy of Ghana. [https://mofep.gov.gh/sites/default/files/news/MoF-Statement-to-Parliament\\_20200330.pdf](https://mofep.gov.gh/sites/default/files/news/MoF-Statement-to-Parliament_20200330.pdf)
- Ministry of Finance. (2022). *MOF covid-19 updates*. Accra, Ghana: Ministry of Finance.
- Morsut, C., Kuran, C., Kruke, B. I., Nævestad, T. O., Orru, K., & Hansson, S. (2022). A critical appraisal of individual social capital in crisis response. *Risk, Hazards & Crisis in Public Policy*, 13(2), 176–199. [10.1002/rhc3.12236](https://doi.org/10.1002/rhc3.12236).
- Nsoesie, E. O., Kluberg, S. A., Mekaru, S. R., Majumder, M. S., Khan, K., Hay, S. I., & Brownstein, J. S. (2015). New digital technologies for the surveillance of infectious

- diseases at mass gathering events. *Clinical Microbiology and Infection*, 21(2), 134–140. 10.1016/j.cmi.2014.12.017.
- OECD. (2021). What have countries done to support young people in the COVID-19 crisis?. Issue July <https://www.oecd.org/coronavirus/policy-responses/what-have-countries-done-to-support-young-people-in-the-covid-19-crisis-ac9f056c/>.
- Ojogwa, O. T., & Akinola, A. (2020). The impact of government responses to COVID-19 on the urban poor in Lagos State, Nigeria. *African Journal of Governance & Development*, 9(1.1), 367–381.
- Okediya, P. (2020). Impact of COVID-19 in the Nigerian commercial community: A roadmap for agencies. SSRN. 10.2139/ssrn.3547639.
- Okyere, A. S., & Kita, M. (2015). Rethinking urban informality and informal settlements growth in urban Africa: A literature discussion. *Journal of Sustainable Development in Africa*, 17(2), 101–124.
- Okyere, S. A., Frimpong, L. K., Diko, S. K., Abunyewah, M., Kita, M., Cobbinah, P. B., & Addaney, M. (2021). Situating everyday urban struggles within the context of the SDGs in an informal settlement in Accra, Ghana. In *Sustainable Urban Futures in Africa* (pp. 265–287). New York, USA: Routledge.
- Osuteye, E., Koroma, B., Macarthy, J. M., Kamara, S. F., & Conteh, A. (2020). Fighting COVID-19 in Freetown, Sierra Leone: the critical role of community organisations in a growing pandemic. *Open Health*, 1(1), 51–63. 10.1515/openhe-2020-0005.
- Owusu, G., & Oteng-Ababio, M. (2015). Moving unruly contemporary urbanism toward sustainable urban development in Ghana by 2030. *American Behavioral Scientist*, 59(3), 311–327. 10.1177/0002764214550302.
- Percoco, M. (2016). Health shocks and human capital accumulation: The case of Spanish flu in Italian regions. *Regional Studies*, 50(9), 1496–1508. 10.1080/00343404.2015.1039975.
- Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management*, 12(4), 531–544.
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879.
- Prempeh, C. (2021). Religion and the state in an episodic moment of COVID-19 in Ghana. *Social Sciences & Humanities Open*, 4(1), Article 100141. 10.1016/j.ssho.2021.100141.
- Rahman, M. S., Majumder, M. K., Sujon, M. H. K., & Manjira, S. (2021). Livelihood status of coastal shrimp farmers in Bangladesh: Comparison before and during COVID-19. *Aquaculture Reports*, 21, Article 100895.
- Samuels P. (2017). Advice on exploratory factor analysis.
- Sauer, P. L., Dick, A., McAlister, L., & Rothschild, M. L. (1993). Using moderator variables in structural equation models. In *NA - Advances in Consumer Research* (pp. 636–640). Minnesota, USA: Association for Consumer Research. Vol. 20.
- Schmidt-Sane, M., Leach, M., MacGregor, H., Meeker, J., & Wilkinson, A. (2021). Local Covid-19 syndemics and the need for an integrated response. *IDS Bulletin: Transforming Development Knowledge*, 52(1), 19–36.
- Schotte, S., & Zizzamia, R. (2021). *The livelihood impacts of COVID-19 in urban South Africa: A view from below (9292569945)* Retrieved from Helsinki, Finland.
- Seow, A. N., Choong, Y. O., & Ramayah, T. (2021). Small and medium-size enterprises' business performance in tourism industry: The mediating role of innovative practice and moderating role of government support. *Asian Journal of Technology Innovation*, 29(2), 283–303.
- Shupler, M., Mwitari, J., Gohole, A., de Cuevas, R. A., Puzzolo, E., Čukić, I., ... Pope, D. (2021). COVID-19 impacts on household energy & food security in a Kenyan informal settlement: The need for integrated approaches to the SDGs. *Renewable and Sustainable Energy Reviews*, 144, Article 111018.
- Smit, W. (2020). The challenge of COVID-19 in African cities: An urgent call for informal settlement upgrading. *Cities & Health*, 1–3. 10.1080/23748834.2020.1816757.
- Taherdoost, H. (2016). Validity and reliability of the research instrument; how to test the validation of a questionnaire/survey in a research. *International Journal of Academic Research in Management (IJARM)*, 5(3), 28–36.
- Ulya, N., Waluyo, E., Lestari, S., & Martin, E. (2021). The community livelihoods strategy as a response to peat swamp forest ecosystem change and Covid-19 pandemic in Ogan Komering Ilir Regency, Indonesia. Paper presented at the. *IOP Conference Series: Earth and Environmental Science*.
- UN-Habitat. (2020). COVID-19 in African cities: Impacts, Responses and Policy Implications. Retrieved from Nairobi, Kenya:
- Ursachi, G., Horodnic, I. A., & Zait, A. (2015). How reliable are measurement scales? External factors with indirect influence on reliability estimators. *Procedia Economics and Finance*, 20, 679–686.
- Verikios, G. (2020). The dynamic effects of infectious disease outbreaks: The case of pandemic influenza and human coronavirus. *Socio-Economic Planning Sciences*, 71, Article 100898.
- Verutes, G. M., Fiocco, M. B., Weeks, J. R., & Coulter, L. L. (2012). Health, poverty, and place in Accra, Ghana: Mapping neighborhoods. *Journal of Maps*, 8(4), 369–373. 10.1080/17445647.2012.744365.
- Visagie, J., & Turok, I. (2021). Rural–urban inequalities amplified by COVID-19: Evidence from South Africa. *Area Development and Policy*, 6(1), 50–62. 10.1080/23792949.2020.1851143.
- WACSI. (2020). *Local Giving During COVID-19 in Ghana: Uncovering the Potential of Domestic Resource Mobilisation in Ghana*. Accra, Ghana: West Africa Civil Society Institute <https://wacsi.org/wp-content/uploads/2021/04/Local-Giving-During-COVID-19-in-Ghana-Uncovering-the-Potential-of-Domestic-Resource-Mobilisation-in-Ghana-1.pdf>.
- Weeks, J. R., Getis, A., Stow, D. A., Hill, A. G., Rain, D., Engstrom, R., ... Lopez-Carr, A. C. (2012). Connecting the dots between health, poverty and place in Accra, Ghana. *Annals of the Association of American Geographers*, 102(5), 932–941. 10.1080/00045608.2012.671132.
- Weeks, J. R., Hill, A. G., & Stoler, J. (2013). *Spatial inequalities: Health, poverty, and place in Accra, Ghana*. New York, USA: Springer.
- Wilke, N. G., Howard, A. H., & Pop, D. (2020). Data-informed recommendations for services providers working with vulnerable children and families during the COVID-19 pandemic. *Child Abuse & Neglect*, 110, Article 104642.
- Wilkinson, A., Ali, H., Bedford, J., Boonyabanacha, S., Connolly, C., Conteh, A., ... Dias, S. (2020). Local response in health emergencies: key considerations for addressing the COVID-19 pandemic in informal urban settlements. *Environment and Urbanization*, 32(2), 503–522.
- ... & Wolf, S., Aurino, E., Suntheimer, N. M., Avornyo, E. A., Tsinigo, E., Jordan, J., & Behrman, J. R. (2022). Remote learning engagement and learning outcomes during school closures in Ghana. *International Journal of Educational Research*, 115, Article 102055. 10.1016/j.ijer.2022.102055.
- Wong, A. S., & Kohler, J. C. (2020). Social capital and public health: Responding to the COVID-19 pandemic. *Globalization and Health*, 16(1), 1–4. 10.1186/s12992-020-00615-x.
- World Bank (2022). Ghana: Online education for delivering learning outcomes during the COVID-19 school closure. <https://www.worldbank.org/en/results/2022/05/16/afw-ghana-online-education-for-delivering-learning-outcomes-during-the-covid-19-schoolclosure#:~:text=Schools%20in%20Ghana%20closed%20for,0.5%20million%20tertiary%20education%20students>.
- World Bank. (2020). COVID-19 forced businesses in Ghana to reduce wages for over 770,000 workers, and caused about 42,000 layoffs - research reveals. Retrieved from <https://www.worldbank.org/en/news/press-release/2020/08/03/covid-19-forced-businesses-in-ghana-to-reduce-wages-for-over-770000-workers-and-caused-about-42000-layoffs-research-reveals>
- Yamane, T. (1967). *Statistics: An introductory analysis* (2nd ed.). New York: Harper and Row.
- Yu, B., Luo, M., Liu, M., Zhou, J., Yang, S., & Jia, P. (2021). Social capital changes after COVID-19 lockdown among youths in China: COVID-19 impact on lifestyle change survey (COINLICS). *Frontiers in Public Health*, 9.
- Zinyemba, T. P., Pavlova, M., & Groot, W. (2020). Effects of HIV/AIDS on children's educational attainment: A systematic literature review. *Journal of Economic Surveys*, 34(1), 35–84. 10.1111/joes.12345.