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Contributing Factors of Social Capital Hindering Earthquake Resilience: A Case Study of Quetta City, Pakistan

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Abstract

Social capital, encompassing the networks, relationships, and norms of trust and reciprocity within a community, is widely recognized as a vital resource for disaster preparedness, response, and recovery. However, certain factors within the realm of social capital can present challenges and impediments to effective earthquake resilience. The study aims to examine the role of social capital that creates hurdles for Earthquake Resilience. A questionnaire survey was conducted among 385 respondents in the district of Quetta to achieve the objectives of the study. Results of the study reveal that there are significant variations in community engagement, with differing levels of participation in self-help groups and resource sharing. Some physical infrastructure, like communication tools and roads, remains accessible. The observers also noted a gap in preparedness, such as

limited access to markets and water storage. Financial vulnerability is evident in the community's heavy reliance on credit and daily wage jobs, as well as its low savings and lack of hazard insurance. Inadequate involvement in disaster training, political processes, and simulated exercises reveals gaps in readiness and reaction. According to the findings, increasing earthquake resilience requires fortifying these capitals and enhancing institutional coordination.

Key Words: *Economic capital, Social capital, Earthquake resilience, Disaster Preparedness, Community Engagement.*

1. Introduction

The contributing factors of social capital that create hurdles for earthquake resilience often stem from weak community networks, lack of trust, and unequal participation in decision-making processes. Social cohesion, or the level of solidarity and unity among community members, is one of these elements. (Hanson-Easey et al., (2018); (Ludin, Rohaizat, & Arbon, (2019). While high levels of social cohesion can encourage effective communication, teamwork, and collective action, low levels may hinder disaster response and recovery efforts (Bogdan, McDonald-Harker, Bassi, & Haney, 2023). According to research conducted by D. P. Aldrich & Meyer (2019), communities that have higher levels of social cohesion recover from natural disasters more quickly and successfully. However, elements like social fragmentation, inequality, and exclusion can weaken social cohesion (Fraser et al., 2021). Communities that are marginalized and experiencing socioeconomic disparities, for instance, might have fewer resources and weaker social ties to deal with the effects of earthquakes. A community's cultural and linguistic diversity can also make it difficult to coordinate and communicate during disaster response operations, which further hinders resilience (Chu, Liu, & Yang, 2021).

Low levels of social trust are another component of social capital that can create barriers to earthquake resilience. In reality, social trust is the conviction that people in a community are trustworthy and honest (Fraser et al., 2021). Increased collaboration, information exchange, and group efforts during disaster response and recovery are linked to high levels of social trust (Bernier & Meinzen-Dick, 2014). However, mistrust between authorities and the community can impede efficient decision-making and coordination, which will slow down recovery efforts (Fraser et al., 2021). Communities with higher levels of social trust are more likely to be resilient to disasters, according to empirical evidence from studies like Putnam's¹ research on social capital (2001). On the other hand, in times of crisis, communities that are marked by social isolation and mistrust might find it difficult to organize support systems and resources. Therefore, improving earthquake resilience at the community level requires addressing issues like discrimination, corruption, and perceived injustices that undermine social trust.

Strong social norms, which are a sign of strong social capital, can deter people from acting on their own initiative, even if doing so improves earthquake safety. For instance, a community may feel compelled to preserve cultural heritage by repairing damaged traditional buildings before implementing earthquake-resistant designs. Dudwick, Kuehnast, Jones, & Woolcock (2006) document this phenomenon in their study of post-disaster reconstruction in rural India. They noticed that communities with close-knit social bonds based on traditional

architecture were reluctant to embrace new, seismic-resistant construction methods for fear of social rejection. When an earthquake occurs, this conformity to social norms can have disastrous results (Study, 2023).

2. Review of Literature

Within a community, social hierarchies can limit access to information and resources that are essential for earthquake preparedness and worsen already-existing inequalities. Marginalized groups may be left out of preparedness plans or find it difficult to obtain funding for retrofitting homes or businesses because they frequently lack the social capital to speak up for their needs (Tierney & Oliver-Smith, 2012) highlights this point in her research on post-disaster recovery and social equity. She contends that social capital can exacerbate already-existing disparities and make marginalized groups even more vulnerable in the wake of an earthquake if power dynamics within communities are not addressed.

One benefit of social capital is the strong sense of duty to assist those in the social network, but during major calamities like earthquakes, this can become a burden (Hanson-Easey et al., 2018). People may become so overwhelmed by the need to support friends and family that they neglect their own needs, which impedes the healing process in the community as a whole (Y. Chen et al., 2024).

Strong social bonds based on common experiences and beliefs may prevent homogeneous communities from having the diversity of viewpoints required for efficient preparedness planning (Hikichi et al., 2011). Within a close-knit social network, new ideas and creative solutions may be suppressed, which could make it more difficult for the community to get ready for various earthquake scenarios (Jia et al., 2020).

Cultural understanding and a common language are often the foundations of social capital (Hanson-Easey et al., 2018). Language hurdles and social exclusion can make it difficult for people in diverse communities to communicate and work together during earthquake preparedness and response. This may result in some population segments being unprepared and ignorant (Uekusa, 2019).

Social capital's advantages frequently diminish with time. As communities recover and daily activities resume, the emphasis on readiness may diminish (Yang & Wu, 2020). It can be difficult to keep people motivated to take long-term preparedness measures and to maintain a sense of urgency, even in strong social networks (Azril, Shaffril, Abu, & Kamarudin, 2021).

Physical social capital, which includes parks, community centers, and common areas and is essential for promoting social cohesiveness, can present challenges for earthquake resilience (Pret & Carter, 2017). Reliance on infrastructure may cause access to necessary services to be disrupted, and the high population density in these areas increases the risks during seismic events. Complicating matters further are limited evacuation space and unequal access to resources, which could worsen casualties and hinder recovery (Cutter & Finch, 2008). In order to overcome these obstacles, strategies must include enforcing seismic-resistant building codes and urban planning, encouraging fair resource distribution, and involving communities in disaster preparedness initiatives (Jovita et al., 2019).

Communities face major obstacles to earthquake resilience due to the economic and social capital indicators. Economic vulnerabilities during and after seismic events can be made worse by a large portion of the population depending on credit for financial support (Mpanje, Gibbons, & McDermott, 2018). Likewise, a low savings rate

indicates a lack of financial reserves to deal with the aftermath of earthquakes, which impedes efforts to recover. Furthermore, many locals are financially vulnerable to property damage and loss due to inadequate hazard insurance coverage, which exacerbates financial strain (H. Crowley & Bommer, 2006; Hallegatte, Vogt-Schilb, Rozenberg, Bangalore, & Beaudet, 2020). Communities with a low proportion of people without multiple sources of income are especially at risk because disruptions in one industry can have a domino effect on livelihoods. (Mahedi, M., Shaili, S. J., & Shihab, 2024). Additionally, a large proportion of the population working for daily wages suggests that there are no reliable sources of income, which exacerbates economic instability during seismic activity. Finally, a large percentage of economically dependent people highlights how intertwined economic vulnerabilities are, which may result in a greater need for outside assistance and longer recovery times (Armaş, 2012). Improving earthquake resilience requires addressing these issues with social and economic capital, which calls for initiatives to encourage financial literacy, savings, insurance, and economic diversification in local communities (Kan, Baoyin, & Jie, 2020).

Communities' ability to withstand earthquakes is greatly influenced by political capital, which is demonstrated by how easily accessible political processes are in times of crisis (Meyer, 2013). The proportion of the population that can access political processes in an emergency indicates how much people can participate in resource allocation and decision-making, which affects how well disaster response and recovery efforts work (Daniel, 2019). Furthermore, the existence of community-based organizations (CBOs) in the neighborhood fosters community empowerment and resilience-building programs, offers forums for group action and advocacy, and increases political capital (Mustasim, 2024). Government agencies that provide earthquake preparedness training help build political capital by equipping people with the information and abilities they need to take an active role in disaster management procedures. By raising public awareness and preparedness and fostering community involvement in disaster response planning, earthquake emergency drills also help to build political capital. Additionally, by promoting cooperation and resource sharing, emergency response coordination across institutions enhances political capital and guarantees a more unified and efficient response to seismic (Shahzad & Omar, 2021). In conclusion, strengthening earthquake resilience and encouraging community empowerment during times of crisis requires increasing political capital through high accessibility to political processes, the presence of CBOs, government training programs, mock drills, and institutional coordination.

3. Methodology

In this research study mixed method used where both qualitative and quantitative data sets were operated. This type of exploratory research aims to identify those powers and strengths that increase the resilience of a community and elucidate the role of social capital for earthquake resilience in Quetta, Balochistan.

3.1. Background of the study area and Sample Size

Quetta is the main city and capital of Balochistan. It is positioned in the northwestern part of the province. The district lies between 29° 48' and 30° 27' north latitudes and 66° 14' and 67° 18' east longitudes. It has a demographic population of 2,275,000 according to the 2017 general census and is 1,680 meters above sea level. The study area is sited in a high seismic zone. In the past, quite a lot of earthquakes have damaged the city.

Furthermore, Quetta city was shattered by immense earthquake tremors in 1935. In this respect, the earthquake magnitude was recorded as 7.7 Mw. As a result of the 1935 earthquake, merely 10,000 people were survivors, and 4,000 people were badly wounded. 24–26°C was the average temperature. On the other hand, the maximum temperature recorded was 42°C in Quetta during previous decades, and in winter the average temperatures were recorded at 4–5°C.

The sample size was determined using data from the 2017 census report. The total population of the district was recorded 2,275,366 with 276,711 household numbers. The scholar used the population size to calculate the overall sample size following the Arkin and Colton (1963) formula:

Where

n = Sample size = 385 N = Population size = 2275366

Z = Confidence Level = 95% = 1.96 P = Degree of Variability = 60%

e = Level of precision or Sampling Error = $\pm 5\%$

Based on the total population size of Quetta district, the derived 385 sample size for the study area was collected. For data collection, a standardized questionnaire was employed.

4. Results and Discussion

4.1. Social Capital

The article's first part sought to examine social capitals' function in relation to earthquake resilience. In this regard, a number of questions were asked from community to assess the level of social capitals based on respondents' perception. The research findings shed light on various dimensions of social capitals within communities, particularly regarding responses to emergencies like earthquakes. Firstly, there is a notable contrast in the participation rates of traditional self-help groups, indicating differing levels of community engagement and mutual support as shown in Figure 7.1.

Moreover, attitudes toward resource-sharing within the community exhibit significant disparities, showing variations in the culture of communal assistance and cooperation. This implies potential differences in the community's capacity to mobilize resources and support one another during times of need. In addition, the social capital in the form of formal and informal conflict resolution mechanisms is comparatively low as compared to participation and attitude towards food sharing as shown in Figure 7.1. This might reflect a distinct approach to managing conflicts or a more harmonious social environment characterized by trust and understanding.

Furthermore, comparable levels of knowledge-sharing suggest that information dissemination may not be heavily influenced by social capital alone. However, subjective perceptions of trust and support during earthquake emergencies significantly favor one group, indicating a higher level of confidence in community networks and solidarity during crisis situations as shown in Figure 7.1.

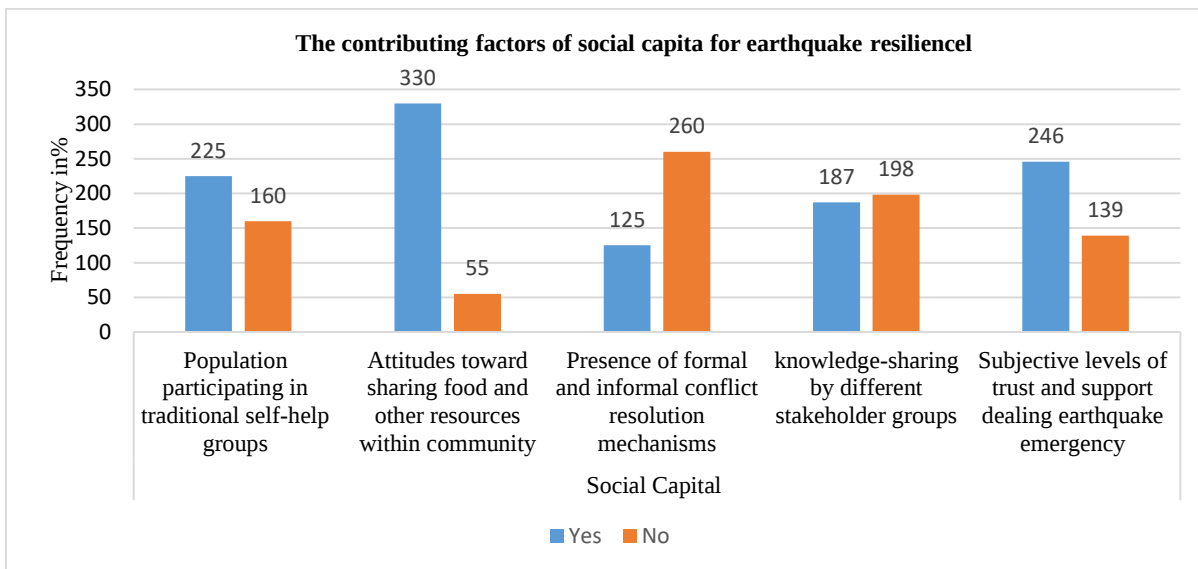


Figure 1. Social Capitals

4.2. Physical Capitals

The second section of the article aimed to analyze the role of physical capitals in the context of earthquake resilience. In this regard, a total of ten questions were asked from respondents to assess the level of physical capital in the study area. The analysis of physical capital assets reveals significant disparities between the two groups across various categories.

On the positive side, a significant portion of the community has access to crucial communication tools in the form of physical capitals. 357 people are reported to have cell phones, radios, and internet, enabling them to stay informed and connected during emergencies. Additionally, most residents (310) have access to roads, facilitating transportation of people and supplies as shown in Figure 7.2. Furthermore, a large number of people have access to some safe havens. Nearly all (307) have access to safe electricity, and many (270) have a fire brigade within a two-kilometer radius. Schools, while not designed specifically for disasters, could potentially serve as shelters, with 146 people reporting access to them. However, some gaps in preparedness are evident. Less than half (153) have access to markets, which could be critical for obtaining food and supplies after a disaster. Additionally, while most have access to electricity (273), a smaller portion (273) have access to water storage tanks, which is crucial if running water is disrupted. Open spaces, important for earthquake preparedness, are only accessible to slightly more than half (231) of the population, as shown in Figure 7.2.

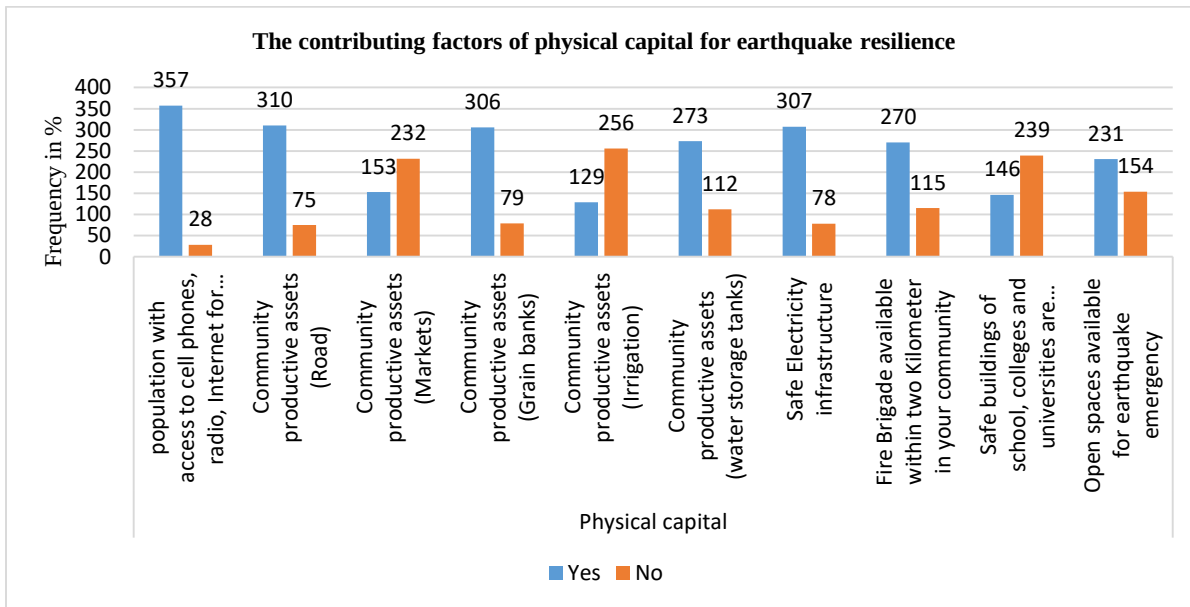


Figure 2. Physical Capitals

4.3. Economic Capitals

In the third section of the article, economic capitals of the community are assessed. Nearly half of the community is accessing some form of credit for financial assistance. This shows a significant reliance on borrowed funds, which could indicate both opportunities for economic growth through investment and potential risks associated with debt.

Similarly, a relatively small portion of the community has savings. This could indicate challenges in building financial security or a lack of access to resources for saving, potentially leaving many vulnerable to financial shocks or emergencies specifically during earthquake disaster as shown in Figure 7.3. Furthermore, a very low percentage of the community is covered by hazard insurance. This highlights a significant gap in risk management and preparedness for unexpected events such as earthquakes or accidents, leaving the majority of the population potentially exposed to financial losses in such situations.

Moreover, only a fifth of the community has income from multiple sources. Diversification is often associated with increased resilience to economic downturns or job loss, suggesting that a large portion of the population may be at risk of financial instability if their primary source of income is disrupted.

Finally, a substantial majority of the community is engaged in daily wage occupations. While these jobs provide immediate income, they often lack stability and benefits, leaving workers vulnerable to fluctuations in demand and income insecurity, as shown in Figure 7.3.

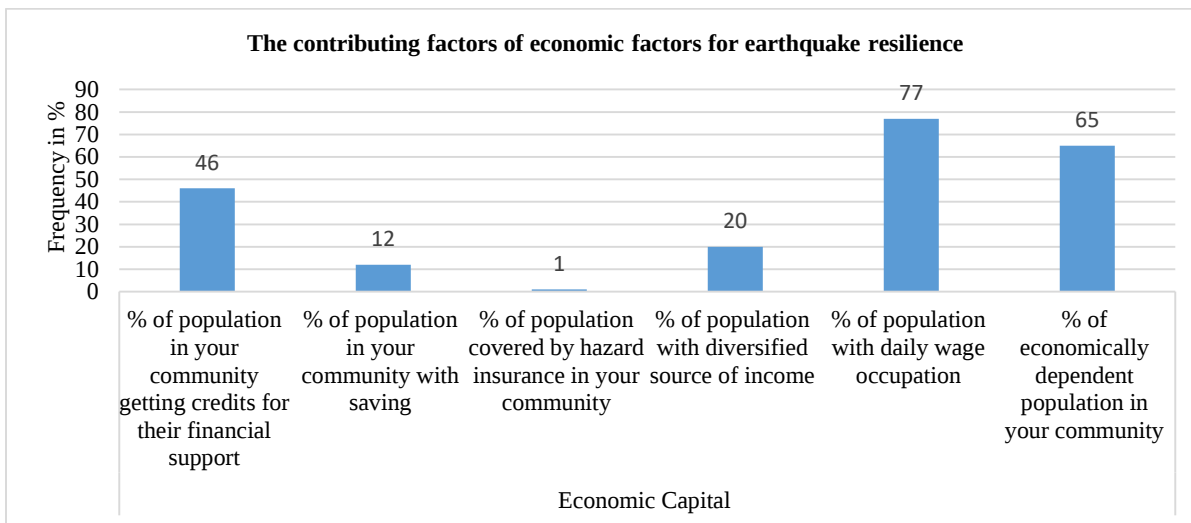


Figure 3. Economic Capitals

4.4. Political Capitals

Results regarding the population having accessibility to political processes during an emergency (Yes: 135, No: 250) indicate that a portion of the community has access to political processes during emergencies, while a larger portion does not. Access to political processes during emergencies is crucial for ensuring effective response and recovery efforts, as it enables affected individuals to have a voice in decision-making and resource allocation.

Similarly, the result related to the indicator of the presence of community-based organizations in the community (Yes: 170, No: 215) shows a satisfactory level to some extent, as CBOs play a vital role in disaster preparedness, response, and recovery by mobilizing resources, providing support to vulnerable populations, and fostering community resilience.

Furthermore, only 25 out of 385 respondents got training from government organizations for earthquake preparedness, as shown in Figure 7.4. The low number of individuals who have received training from government organizations for earthquake preparedness indicates a potential gap in disaster risk reduction efforts. Training programs are essential for equipping individuals with the knowledge and skills needed to effectively respond to earthquakes and mitigate their impact.

In addition, only 30 individuals among the sampled population have got mock drills for earthquake emergencies. Such low participation in mock drills for earthquake emergencies shows a lack of preparedness and awareness within the community. Mock drills are valuable exercises for testing emergency response plans, identifying gaps, and building community resilience by familiarizing individuals with proper safety procedures.

Finally, a very high level of coordination among institutions for emergency response has been observed, as shown in Figure 7.4; the numbers indicate room for improvement. Effective coordination among governmental, non-governmental, and community-based organizations is essential for ensuring a comprehensive and timely response to emergencies, maximizing available resources, and minimizing duplication of efforts.

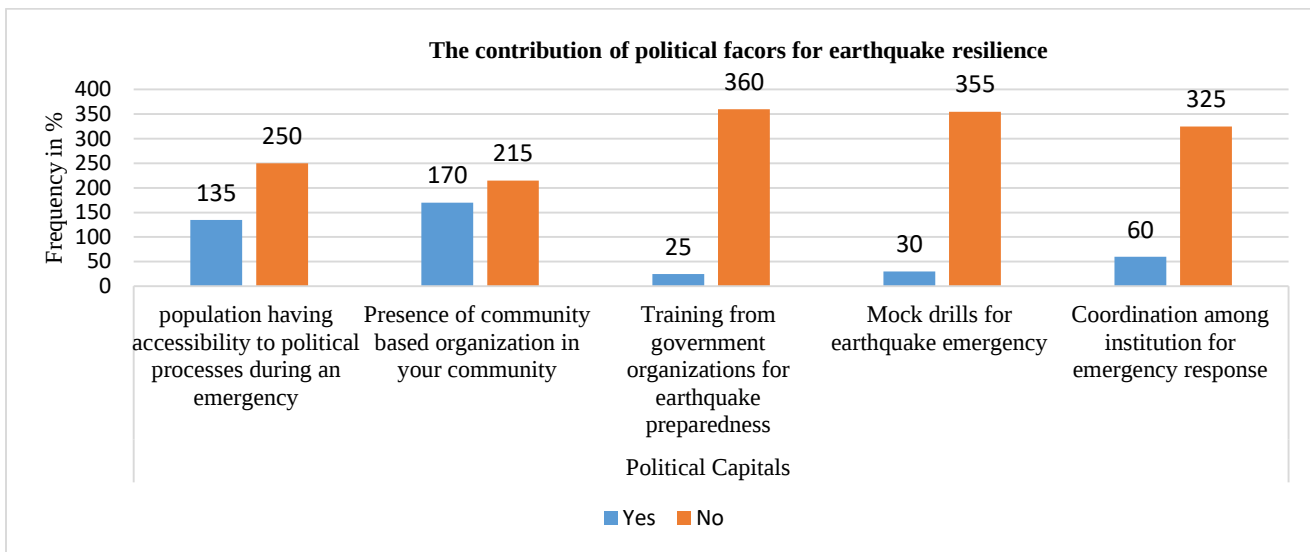


Figure 4. Political Capitals

5. Conclusion

Although social capital is a valuable resource for communities, it is important to recognize any potential drawbacks when considering earthquake resilience. In conjunction with other social support systems, communities can endeavor to fortify their social networks in ways that foster readiness. This could entail promoting diversity in planning, being receptive to outside knowledge, and making sure that everyone in the community is included. In conclusion, people must carefully cultivate and preserve social capital while simultaneously encouraging diversity, acceptance, and receptivity to different viewpoints. This is because social capital can be a very useful tool for earthquake resilience. It is only feasible to prepare a highly effective and comprehensive resilience plan if communities are fully aware of these components.

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