CULTURAL HERITAGE SITES IN THE FACE OF EXTREME EVENTS: EMPIRICAL EVIDENCE FROM GILGIT BALTISTAN, PAKISTAN.

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THESIS ACCEPTANCE CERTIFICATE

Certified that final copy of the thesis titled “Cultural Heritage Sites in the face of Extreme Events: Empirical evidence from Gilgit Baltistan, Pakistan.” written by Ms. Arslan Abbas (Registration No. 00000275145), of Urban and Regional Planning (NIT-SCEE) has been vetted by the undersigned, found complete in all respects as per NUST Statutes/Regulations, is free of Plagiarism, errors, and mistakes and is accepted as partial fulfilment for the award of MS degree. It is further certified that necessary amendments as pointed out by GEC members of the scholar have also been incorporated in the said thesis.

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DEDICATION

This research work is dedicated to my beloved parents, who realized the importance of education and made me capable of reaching this level. At the same time, it is dedicated to my dearest brothers and my Wife, who supported and guided me in every field of life. It is their love and support that enabled me not only to complete this task but also to walk every step of life with confidence and commitment.

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ABSTRACT

Natural hazards and climate change pose a serious threat to Cultural Heritage Sites (CHS), which may cause significant damage to these sites. It is important to assess the physical vulnerability of CHS for implementing effective Disaster Risk Reduction strategies. This research evaluates the physical vulnerability of CHS against extreme events using the index-based method. Three major districts of Gilgit Baltistan, which are exposed to various kinds of natural hazards, were selected as a case study area, where 12 sites were purposively chosen. Rapid Visual Screening (RVS) was employed to collect the datasets. The method is a simple, quick, and cost-effective procedure that does not require structural computations. A physical vulnerability index is proposed using the eleven indicators selected after a thorough literature review. The survey revealed that five cultural heritage sites are highly vulnerable and need immediate attention. Therefore, it is recommended that rehabilitation of the CHS, in critically vulnerable conditions, may be carried out on an immediate basis. Furthermore, corrective interventions may be carried out in these CHS to decrease the vulnerability. These may be done by the government, or the site may be handed over to the NGOs related to Cultural Heritage Sites, like in the case of Shigar Fort, Old House, and Khaplu Fort. It is also recommended that a massive and aggressive campaign be initiated to communicate with the locals about the natural hazards, the importance of CHS, and techniques of protection of CHS.

Disasters do not exempt businesses from destruction, damage, and disruption, which can impact their capacity to continue operating. SMEs are particularly sensitive to the negative consequences of disasters. Moreover, due to the location, kind of catastrophe, structural type, and financial sustainability, disasters substantially influence SMEs. SMEs, particularly those in developing countries, are more likely to be located in

hazardous areas, have risky business resources, lack the financial and human resources, and the required fear and understanding of their vulnerability. Disasters have a significant impact on SMEs all around the world. SMEs represent 90% of all private businesses in Pakistan and employ roughly 78% of the non-agricultural work population. The contribution of SMEs to Pakistan's Gross Domestic Product (GDP) is greater than 30%. But these SMEs are vulnerable to natural catastrophes due to limited workforce, geographical location, and limited access to the market. This study explores the preparedness level of SMEs in Gilgit Baltistan, Pakistan, in case of extreme events. The survey was conducted in three major districts of Gilgit Baltistan; Ghance, Shigar, and Skardu. A total of 150 businesses were included in this study through a structured interview. The data collected was then analyzed using frequency tables, descriptive tables, and cross tables. The average value of Disaster Preparedness (DP) suggests the preparedness level of business. The study concludes that only 16% of the businesses were prepared for extreme events.

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CHAPTER 1

INTRODUCTION

1.1 Background and Significance

Article 27 of the United Nation's Universal Declaration of Human Rights described that an essential aspect of social civilization is the right to cultural heritage (Mitsakaki and Laoupi, 2009). Social legacy protection is basic since it shows humankind's set of experiences on Earth just as evidence of their conduct in an assortment of living environments and conditions (Canuti et al., 2009). Global Heritage Fund (2009), in its report, described that cultural heritage disappears globally, particularly in developed countries. Many of the important cultural aspects of human history will be eternally lost if the loss of cultural heritage continues at the same pace.

Over the last decade, the losses include temples, homes, heritage sites even historical ancient cities and townscapes, and many of them existed for centuries or even more than that, as described by Global Heritage Fund (2009). The damage to sites of cultural heritage appears to be extensive and speedy and is an everlasting loss to this world, similar to the loss of species that are in danger of extinction. The ability of present and future generations to learn a lesson from the accumulated wisdom of the past will suffer due to the loss of cultural heritage (De Silva, 2003).

Even though there is still little international as well as a local understanding of this crisis associated with the loss of cultural heritage (Global Heritage Fund, 2009), the fortification of the cultural heritage is a serious concern because it offers valuable tools for the preservation of culture and increases tourism resulting in strengthening the economy (Lollino and Audisio, 2006). Most historic buildings are of great artistic and

cultural significance, although they are immovable structures exposed to various forms of disturbances (Canuti et al., 2009).

Every year, many cultural heritage sites are affected by earthquakes, landslides, and floods by severely damaging the cultural assets in question and even badly destroying them. For instance, disastrous floods in focal Europe in 2002 seriously annihilated various social legacy structures (Taboroff, 2003).

According to the report of BBC News, during the flood in the city of Dresden, the people of the city were worried about their assets as well as about the future of heritage buildings in their city. In 2003, a seismic tremor struck the Iranian city of Bam, obliterating the 2000-year-old fortification, which was remembered on the UNESCO World Heritage Sites list and was accepted to be extraordinary compared to other mud fortresses to withstand the quake (BBC News, 2003).

In addition, during the climate changes now being witnessed on the planet, the amount and severity of natural disasters are expected to increase (World Bank, 2006), damaging impacts on the cultural heritage of the world. With adequate resources and mitigation skills, developing countries can effectively plan to reduce the risk exposure of their cultural heritage sites (Global Heritage Fund, 2009). Currently, risk management plans are ignored over time based on the changing priorities or lack of management enthusiasm, especially in the developed world (De Silva, 2003).

There are already fragmented perspectives and fundamental popular issues in the areas of social inheritance and tragedy organization which must be clarified, such as assessment of risk; the potentials and limitations of technological adaptation in historic buildings to resist the disasters. Ethical issues should also be discussed regarding

possible disputes regarding the fortification of cultural heritage sites and quick guard of human beings (Meier and Will, 2007).

Cultural heritage sites, especially in countries with low incomes, are at risk from natural hazards. It is assumed that due to the non-existence of appropriate risk evaluation, assessment, and mitigation mechanisms, risk increases (Taboroff, 2000). As per Taboroff (2000), the nonexistence of productive social legacy danger association is because of an absence of attention to the legacy assets themselves, a calamity to evaluate the real expense of harm, and the trouble of putting a worth on the non-market nature of numerous social legacy esteems. Abhas (2010) additionally perceives the efficient importance of social legacy places as a strategy to decrease danger before catastrophes strike.

Even threat appraisals are not ordinarily remembered for by and large social legacy the executives plans in 14 developed nations, as indicated by a report by the International Council on Monuments and Sites (ICOMOS), which likewise implies that developing nations are substantially less outfitted to manage the safeguarding of social legacy from tragic events (Taboroff, 2003).

1.2 Justification

According to UNWTO (United Nations World Tourism Organization), on average, international tourism to global heritage sites is rising by 8 to 12 percent per year, with many sites doubling or tripling every 10 years in visits and earnings (Donovan Rypkema, 2011). Global heritage sites can provide developing countries with an annual incentive of $100 billion if a worldwide effort is made to conserve and expand responsibly by the end of 2025 (Global Heritage Fund, 2010). Heritage tourism is

considered a major variable in many nations' economies. In many developing countries, global heritage sites are now producing more foreign exchange revenue than other sectors, including mining, forestry, and agricultural exports. Approximately one-quarter of all international tourism is associated with visits to cultural heritage sites (Global Heritage Fund, 2010). Recently tourism-related infrastructure has amended the superiority of native persons in various parts of the country and has encouraged local arts and crafts. Tourism has helped raise awareness of environmental and cultural heritage conservation. In the modern world, tourism is the fastest-growing industry. People always travel around the world to see monuments, art and culture, taste unique cuisine, and so on.

According to the report of the Global Heritage Fund (2009), cultural heritage disappears globally, and many essential cultural components of human history will be lost forever if this tendency continues, especially in emerging nations. National inheritance is susceptible to the negative effects of ordinary tragedies and weather modification is important to undertaking this problem. In numerous pieces of the globe, social recorded items have gotten more defenseless because of an absence of support and conventional information. Growth also has created pressures, such as land use or zoning changes, which could pose supplementary threats to cultural heritage.

1.3 Problem Statement

Cultural heritage faces different threats, especially in those areas vulnerable to environmental hazards such as flooding, fires, seismic activity, etc. These dangers have caused important cultural property to be destroyed in the past (Rohit, 2018). More than two hundred heritage sites around the world are at risk and need immediate intervention

to prevent irreparable loss and destruction. Of these, 40 to 50 need emergency relief immediately and only a handful are considered stable (Global Heritage Fund, 2010).

In a climate-changing world, our culture must face a range of new challenges that are quite different from those faced in the past. Policies and practices will need to be changed to reduce the effects of new threats and to understand the need to switch from adverse systems such as air pollution to another bio-physical system, resulting in losses likely to vary from the past century. Considering the impacts of global climate change during the 21st century, cultural heritage worldwide, including archeological, historical, and religious sites, will be challenged by traditional knowledge, museums, and archives (Cassar et al., 2006, Leslie A, 2015). In many parts of the globe, cultural and historical entities became more susceptible due to a lack of maintenance and traditional knowledge. Development and business growth also have created pressures, such as changes to zoning or land use which could pose supplementary risks to the cultural heritage. Restitution or renovation is usually possible if a disaster destroys the normal infrastructure, but it could permanently affect cultural heritage and economic losses, including loss of livelihood.

Pakistan is culturally rich, but the traditional inheritance in Pakistan is susceptible to the negative effects of ordinary tragedies. Then weather modification contributes to the importance of tackling this problem. Gilgit Baltistan, the focus of this study, is also culturally rich but exposed to different kinds of extreme events. 25 CHS in Gilgit Baltistan has been included on the UNESCO World Heritage List to protect the cultural and aesthetic significance of cultural heritage artifacts amid an extraordinary alpine terrain. Various studies show that numerous Natural Hazards, such as rockfall, mudflow, debris flows, landslides, flash floods, GLOF, and many other disasters, are

not unusual in this region (Iqbal et al., 2014; Khattak et al., 2010). These extreme events pose a major threat to the CHS of the region, but there is no comprehensive policy or management plan to preserve these CHS. Therefore, there is a need to frame a policy regarding the protection of CHS. For the said purpose, CHS in the region must be identified, and a vulnerability assessment of these sites must be carried out.

1.4 Identification of CHS

In a Conference regarding the Protection of the World Natural and Cultural, cultural heritage is classified into three classes, namely Monuments, Groups of Buildings, and Sites (UNESCO, 1972). The focus of this study is the second class, Groups of Buildings, located in three major districts of Gilgit Baltistan, Pakistan.

1.5 Objectives of the study

The objectives of the study are:

i. To identify cultural heritage sites and their characteristics.
ii. To perform a physical vulnerability assessment of cultural heritage sites.
iii. To evaluate the preparedness level of SMEs related to cultural heritage sites.
iv. To suggest policy measures and strategies for effective Disaster Risk Reduction of cultural heritage sites.

1.6 Scope of the study

The study is specific to the Cultural Heritage Sites in Gilgit Baltistan, Pakistan. Hence, its findings reflect unique conditions prevalent in the GB. Though some similarities are present in the nature of problems in other areas of Pakistan and other parts of the world,

especially their mountains and remote regions, the generalization and conclusions to areas other than GB must be treated with caution.

Research is being done to assess the physical vulnerability of CHS in GB in case of an extreme event. Moreover, this study also assesses the preparedness level of SMEs in Gilgit Baltistan, against the extreme events which depend upon these CHS.

CHAPTER 2

LITERATURE REVIEW

2.1 Cultural Heritage

According to UNESCO (Lázaro Ortiz & Jiménez de Madariaga, 2021), cultural heritage covers a number of distinct types of heritage, which may be defined by an evolution of its notion. Cultural heritage was described by UNESCO in 1972 as "a collection of monuments, groups of buildings, and sites", in other words, work done by men, work done by men and nature, and archeological sites (UNSECO, 1972). This concept was expanded in 1992 and included cultural landscape as an integral part of CHS and mixed natural and human-made works (Loulanski, 2006). The intangible cultural heritage was on the World Heritage list in 2003 (Lázaro Ortiz & Jiménez de Madariaga, 2021).

The meaning of heritage is constantly changing (Loulanski, 2006) and has changed significantly in recent years (Chmutina et al., 2021; Kolesnik & Rusanov, 2020; Sevieri et al., 2020). From making profits from assets (Cohen, 1985; Silberman, 2013) to exhibiting the past physically (Nuryanti, 1996; Polinsky & Scontras, 2020), internationally, the cultural heritage has now included intangible expressions, including memories, cultural practices, beliefs systems, attitudes, and traditional knowledge (Chmutina et al., 2021; Smith, 2006; Vecco, 2010). This is recognized at the global level as internationally recognized documents, such as the "International Charter of Venice" (UNESCO-ICOMOS, 2012), "Convention concerning the Protection of World Cultural and Natural Heritage" (UNESCO, 1972), "Convention for the Safeguarding of the Intangible Cultural Heritage" (UNESCO, 2011), "Convention on the Protection and Promotion of the Diversity of Cultural Expressions" (UNESCO, 2005), and "Nara Declaration on Authenticity" (ICOMOS, 1994), reflects the same. The Cultural

Heritage reflects the existence and continuity of certain groups of people, appearing in the making and preservation of small and large artwork, which seem far more significant and permanent than the procedure used to create them, or even members of that community itself. Buildings and objects shape the relationship between intangible features and social identities from a social point of view (Jigyasu, 2014).

2.2 Disasters

Disaster means "a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man-made causes, either by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of, property, or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area" (Sarda, R., & Bahadure, 2021). Natural disasters are not the only source of disasters; the social, political, and economic environments also have a role, and all of these elements must be evaluated in connection to one another (Blaikie et al., 1994; Pelling et al., 2002). Disaster is defined by the ISDR (International Strategy for Disaster Reduction) as: “a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources”, (UNISDR, 2009).

According to Parker, D. & Handmer (2013), disaster is defined as a rare natural or human induced event, including one triggered by technological failure, that temporarily cripples the response capability of societies, groups of people, or the natural environment, resulting in massive damage, injury, disruption, economic loss, disruption, and loss of life. According to (Britton, 1986), a catastrophe is a social

occurrence in which the probability of destruction is determined by the interaction among individuals and their usage of the physical and social world, whereas, according to Baumwoll, J. (2008), it is defined as occurrence of any natural or manmade hazard that has the potential to inflict harm, as well as a society's failure to handle the event's effects. Several characteristics of catastrophes were included in these definitions. They are large-scale calamities that bring devastation and loss. They generally happen unexpectedly and have a long-term influence. The descriptions also emphasize that eliminating the effects of disasters needs a lot of time and effort and, in some cases, assistance from others. Baumwoll, J. (2008), explores several disaster-related themes. A disaster is an event that occurs in a specific location.

Disasters have a detrimental influence on human lives as well as economic losses. Natural catastrophes affected 124.5 million people in 2012, resulting in the deaths of 9655 persons, and Lower-middle income nations account for 68.2% of all documented disaster fatalities. Moreover, natural catastrophes such as earthquakes, floods, and hurricanes have resulted in 80 percent of deaths and 90 percent of economic losses in Asian countries during the previous three decades (Guha-Sapir, D., Vos, F., Below, R., & Ponserre, 2012). Increased severity, frequency, and unpredictability in the patterns of those risks will be a result of the current climate change process.

2.3 Hazard and Vulnerability

A “hazard” is a potentially hazardous incident that may result in infrastructure damage and injuries and deaths (S. U. Khan et al., 2019a). A hazard is defined as the likelihood of a potentially harmful event occurring within a specific time frame. It's a circumstance that has the potential to trigger an event with bad repercussions. Whereas, vulnerability relates to a location's susceptibility. It refers to the likelihood of a hazard's influence on

a society's structures, resources, or surroundings, causing harm or disruption. Vulnerability describes the conditions that make an asset, a system, or a community vulnerable to the damaging effects of a disaster. On the other hand, physical vulnerability may be described as the likelihood of a physical component being harmed in the case of an extreme occurrence (S. U. Khan et al., 2019a).

2.4 Small and Medium Enterprises

SMEs (Small and medium-sized enterprises) play a crucial role in the financial gain and in the greater business community. SMEs create more than half of jobs and GDP in most nations, regardless of income levels, when the influence of informal companies is considered (IFC 2010). SMEs development may also help in the diversification and strengthening of the economy. In 1971, the Bolton Committee, was the first group to establish a credible definition of SME (Cook, P., & Nixson, 2000). SME was described by the Committee as "a firm is regarded as small if it meets the following three criteria, such as, it has relatively small share of the marketplace, it is managed by owners in a personalized way management structure, it doesn't form part of a large enterprise".

However, alternative definitions based upon the number of employees and yearly turnover may currently be found in developed, developing, and least developed nations. For instance, the Commission of the European Union and the OECD (Organization for Economic Cooperation and Development) described that SMEs have employees of less than 500 (U.S. International Trade Commission, 2010). In Malaysia, however, the concept of a small business is divided into service providers and manufacturers. As per the SMEs Corp Malaysia, the maximum number of full-time employees for manufacturers is 200, while the maximum number of full-time employees for service providers is 75. Based on the economic growth of a country, the definition as well as

the indicators of SMEs, differ from each other in terms of annual income. For instance, medium businesses in USA is defined as, "an entity with average annual gross revenues for the preceding three years not to exceed $7 million, and very small business as an entity with average annual gross revenues for the preceding three years not to exceed $250,000" (U.S. International Trade Commission, 2010). Small businesses in Ethiopia are defined as those with a paid-up capital of more than $2,500 but less than $62,500(Freeman, 2015).

If we talk about Pakistan, there is no standard definition of a small business. (Dar, M. S., Ahmed, S., & Raziq, 2017; Dasanayaka, 2008; Khan, N. R., Awang, M., & Zulkifli, 2013). Different institutions, like SECP (Securities and Exchange Commission of Pakistan), SBP (State Bank of Pakistan), PBS (Pakistan Bureau of Statistics), SMEDA (Small and Medium Enterprises Development Authority), etc., define SMEs in different ways. For instance, SMEDA classifies a business as a small or medium-sized enterprise (SME) based on the total workforce and quantity of productive assets. For the SME bank, the total quantity of assets is the only criterion, and PBS solely considers the number of workers. SBP, on the other hand, defines an SME based on the nature of the firm, the number of workers, the amount of capital used, and the annual net sales value.

Therefore, a single definition of SME cannot be obtained. Every country, as well as various institutions, defines it according to their own perspective. Each definition is based on different criteria, defined using different indicators. However, the focus of this study is SMEs in Gilgit Baltistan, Pakistan. Therefore, it seems more appropriate that we may use the definition endorsed by SBP (State Bank of Pakistan), which is simplified as "any private economic establishment engaged in manufacturing, trading or service providing business with net annual turnover or sales up to Rs.300 million in

the current fiscal year; or any manufacturing entity having total assets up to Rs.100 million excluding land and buildings with maximum 250 employees or any trading or service concerning total assets up to Rs.50 million excluding land, buildings and with maximum 50 employees".

2.5 Natural Hazards and CHS

Cultural Heritage Sites (CHS) are severely threatened by natural hazards, which may drastically harm these sites (De Masi et al., 2021; Drdácký et al., 2007). When extreme events occur, they may possibly influence every aspect of life. These extreme events damage not only the physical resources but destroy cultural & social assets also, in one way or the other (Chmutina et al., 2020). Due to climatic changes, culturally important sites might face various threats and pressures that were not considered before (Sesana et al., 2020). These threats and pressures may be determined by the events' frequency, duration, magnitude, affected area, and asset vulnerability (Thomas F. Stocker, Dahe Qin, 2013). It has been noticed that CHS, which are exposed after extreme events, need special attention (Stanton-Geddes & Soz, 2017). Climate change is already impacting a wide range of cultural commodities, and it will continue in the coming years. (Colette, 2007).

It has been noticed that globally more than 700 extreme events occur yearly, affecting human lives badly and interrupting the whole community and their livelihood. Specifically, when it comes to natural catastrophes, developing nations are more vulnerable to them owing to a lack of ability and infrastructure to cope with them (Atta-Ur-Rahman & Shaw, 2015). Many Asian countries, including the Philippines, Vietnam, and parts of China, are vulnerable to natural calamities such as tsunamis & cyclones. Whereas Pakistan, India, Nepal, and Bangladesh are more vulnerable to earthquakes,

landslides, and floods. Disasters such as, in Pakistan earthquakes and super-floods (2005 and 2010), In Japan, tsunami (2011), and East Asian countries Typhoon Haiyan (2013) are only a few examples of natural disasters that have wreaked havoc on Asia's population (Caulderwood, 2014; Shah et al., 2019). Due to the Climatic and Environmental conditions (Shah et al., 2019), Pakistan is mentioned as amongst the most susceptible countries to climate change (Eckstein et al., 2020). For the past two decades, Pakistan has been distressed by natural hazards (Shah et al., 2017; Shah, Ye, Abid, et al., 2018; Shah, Ye, Pan, et al., 2018). As per the environment change vulnerability Index ranking, Pakistan is ranked 15th among 170 nations, and as per the Global Climate Risk Index ranking, Pakistan is ranked 8th amongst 180 nations (Eckstein & Kreft, 2020).

Due to the climatic and environmental characteristics, Pakistan and other developing countries are extremely exposed to natural calamities. Among other impacts, extreme events are also one of the reasons for the downfall of cultural heritage due to its high vulnerability (Bosher et al., 2020). The consequences of these extreme events will continue to occur at an unprecedented scale if safety precautions are not adopted. The effects of these disasters are easily noticeable, which may be exacerbated in the case of old and vulnerable assets that cannot be preserved using modern preservation procedures (Padeletti, 2019). Therefore, the intervention strategies must be implemented (Bonazza et al., 2018). At the present time, it seems more important than ever to provide suggestions and guidelines for implementing protection measures that will conserve cultural assets and improve the preparedness level of CHS against extreme events (Dastgerdi et al., 2019). Preservation of CHS, monitoring, and evaluation are a few important activities that may help deal with catastrophic events efficiently to decrease the potential impacts of the probable natural hazards (De Masi

et al., 2021). But before implementing any strategy, we must know the site's vulnerability under consideration, for which the vulnerability assessment must be carried out.

Various studies have documented the threat of natural hazards on cultural assets (Fukuoka et al., 2005; Gizzi, 2008; Iriarte et al., 2010; Lollino & Audisio, 2006; Sánchez et al., 2007). Cultural Heritage Sites may be influenced by various types of Natural Hazards. For instance, the issue that arises due to floods in the ancient city Centre of Genoa, Italy, was investigated by Lanza (Lanza, 2003). Due to a lack of hydrologic and hydraulic data, Lanza uses simple GIS analysis to map out the zones that are more vulnerable to floods solely based on the available historical data. Lanza's method demonstrates that even with limited data, fair and relevant findings may be achieved. According to Bromhead et al., (2006), landslides may pose a significant hazard to cultural assets. Chanuti et al., (2009), studied the effects of Natural Hazards (landslides) on cultural assets, as well as the risks and safety implications. They investigate a number of case studies from throughout the world, including Slovakia, Moscow (Russia), Umbria in Italy, and Machu Pichu in Peru. By following of the 2002 events in the Czech Republic, Holicky and Sykora (Holický & Sýkora, 2010), investigates the consequences of disasters (floods), on Cultural Heritage. In their study, Herle et al. (2010), investigate the geotechnical issues that floods pose to cultural assets. Disasters, as previously noted, are creating a significant effect on CHS.

2.6 Disaster and SMEs

Disasters pose a major hindrance to the functionality of business (Josephson et al., 2017). Natural catastrophes affect a significant portion of the world's population. These catastrophes can reduce household income, damage houses, and destroy productive

investments. The consequences for small enterprises can be serious, and a firm can be entirely destroyed in certain situations. Studies have revealed how catastrophes, such as floods, earthquakes, hurricanes, etc., influence businesses, particularly the effects on SMEs (Wedawatta et al., 2014). Due to a lack of financial knowledge as well as geographic location, both natural and human-induced calamities pose a major threat to SMEs (Falkner & Hiebl, 2015). According to ADRC (Asian Disaster Reduction Centre) (2012), at least 14 disasters strike Asian-Pacific nations each year, including floods, earthquakes, storms, nuclear accidents, terrorism, and pandemics, which is not considered a good sign because SMEs boost up the innovation and portrays a vital role in the economy of a nation. In Bangkok, for instance, more than 2 million workers and at least 550,000 SMEs were affected by the floods in 2011 (Pathak & Ahmad, 2016). Like many other growing nations, the economy of Pakistan is also based on its SMEs (Khalique, 2011). According to the Pakistan Bureau of Statistics (PBS) (2011), SMEs represent 90% of all private businesses across Pakistan and employ more than 70% of the non-agricultural work population. The contribution of SMEs to Pakistan's Gross Domestic Product (GDP) is greater than 30%. In addition, SMEs account for 25% of manufactured product exports and 35% of manufacturing value added. Retail trade, wholesaling, restaurants, and the hotel industry account for over 53% of all SME activity. On the other hand, Industrial SMEs account for 20% of SME activity, while service provider accounts for 22%. But these SMEs are vulnerable to natural catastrophes due to limited workforce, geographical location, and limited access to the market (Alesch et al., 2001; Gary R. Webb, Kathleen J. Tierney, 2011).

2.7 Effect of Tourism on SMEs

Globally, it is observed that tourism has emerged as a key sector for socio-economic development of countries (Wakimin et al., 2018). The tourism sector plays a substantial

role in the well-being of local communities as it provides sources of livelihoods through various tourism sectors (Tang, 2011). It has a trickle-down effect on allied sectors, including transportation, hospitality, food and beverage, entertainment, recreational activity, and shopping (Hwang & Lee, 2019a). In several countries, tourism has remained a primary source of employment and wealth generation across all segments of society (Malik et al., 2010).

For example, Hwang and Lee (2019) argued that in the case of Korea, elderly tourism is a major driver behind the rapid growth of socioeconomic development of the country. Likewise, it is a good opportunity for developing nations to generate foreign exchange as international tourists visit tourism zones which resultantly triggers socioeconomic development of local communities and businesses (Ekanayake, 2012). In most developing countries, tourism industry is considered a major source of economic growth and socioeconomic development (Shahzad et al., 2017). Revenue from the tourism industry compliments the foreign exchange generated through overseas trade. Furthermore, the tourism industry also funds imports of capital goods, accelerating the development of the industrial sector (Mahmoudinia et al., 2011). International tourism appeared to be of paramount importance for global socioeconomic and cultural development (Lea, 2006).

As per the study by World Tourism Organization, globally, international tourists spend $1.3 billion in one day. Internationally, it is recognized that the revenue streams from the tourism industry are major substitutes for remunerations from exports, and it is a substantial factor in the balance of payment (Scheyvens & Russell, 2012). The development and promotion of the tourism sector help governments to improve the socioeconomic status of the residents. There exist numerous examples where the tourism sector has significantly played a positive role in uplifting the economies of

various countries (Camilleri, 2020). In the epoch of globalization and urbanization, most third-world countries have initiated several projects for the advancement of the tourism sectors, which helped to improve their economic conditions and to invest in their local communities for human development and alleviate poverty (Taylor, 1996).

South Asia has special recognition in the global landscape due to its distinctive and physical attributes, including grassland, desserts, water bodies, and embracing major mountainous ranges and science zones along with its seasonal climatic conditions (Rasul & Manandhar, 2009). There are 8 countries in the South Asian region which includes: 1) Pakistan; 2) Bangladesh; 3) Sri Lanka; 4) Nepal; 5) Maldives; 6) India; 7) Afghanistan; 8) Bhutan. Economic and human development situation is grave in these aforementioned countries regardless of having huge tourism potential. But still, it is playing a significant role in the economic development of South Asian Countries. In South Asia tourism sector contributed around 8.9 percent to Gross Domestic Product in 2017, and it is projected to grow further 7.2 percent in 2018. The estimates show that it is going to increase up to 9 percent by the year 2028. In 2017, tourism sector has contributed 7.5 percent in jobs creation by 2028 it will reach 7.8 percent (Hwang & Lee, 2019a).

Pakistan has huge tourism potential among South Asian Countries because of its landscape and heritage. Pakistan is emerging as the most beautiful country due to the exploration of its tourism areas and has grown the tourism industry (Chen & Chiou-Wei, 2009). Pakistan is offering great allure because of its vast tourism areas among developing countries. The richness of cultural heritage and deep rooted historical sites make Pakistan attractive for international tourists. Pakistan hosts most of the tourists at Malam Jaba, Swat, Kalam, Balakot, Shangla, Ayubia, Murri, Chitral, Gilgit, Hunza,

Skardu, Shogran, Naran, and Kaghan valleys, and other ancient mountainous ranges (Arshad et al., 2018).

2.8 Rapid Visual Screening

RVS is an endorsed strategy for the assessment of the physical vulnerability of structures due to the reason that it does not require complex computations. The strategy may be performed by collecting information regarding the condition of the building and its probability of damage during any extreme event (Mohamad et al., 2019). RVS is such a survey in which the surveyor observes the facts visually, and the designed tool is filled during a sidewalk surrounding a construction site under study (FEMA, 2017). This technique is much easier than the analytical method, as in-depth structural calculations are not required in RVS techniques (Shah, M. F., Kegyes-B, O. K., Ray, R. P., Ahmed, A., & Al-ghamadi, 2018). This approach can facilitate the government organizations to strengthen the important and extraordinarily vulnerable buildings to minimize the destruction in case of any disaster.

RVS technique provides an overview where a comprehensive observation must be performed, primarily by arranging and prioritizing the vulnerable buildings and advising proper actions for them. RVS survey forms can be customized according to the needs. For instance, both RCC buildings and masonry buildings were screened in India for five vulnerable zones. FEMA (Federal Emergency Management Agency), in the United States, proposes different data collection forms for high, medium, and low vulnerable zones (FEMA, 2017). For the buildings located in Japan, the RVS sheet is totally based on the Seismic parameters, including regularity, ductility, and strength (McGrew & Woodcock, 2001). For the buildings located in Canada, the structural as well as non-structural indicators, including regularity, strength, habitation, etc., were

considered (Rainer, J. H.; Allen, D. E.; Jablonski, 1993). In different kinds of research, the RVS technique has been applied significantly. In the capital of Austria, Vienna, the overall structural parameters of 375 ancient buildings made of bricks were assessed seismically using RVS technique to identify key vulnerable items (Achs & Adam, 2012). In Chennai, for the RVS of buildings more than five stories high, photography on the GIS platform was used (Rajarathnam & Santhakumar, 2015). Moseley and Dritsos rooted ambiguous logic in RVS (Moseley, J., & Dritsos, 2016).

CHAPTER 3

METHODOLOGY

3.1 Description of the Case Study Area

Towards the northern side of Pakistan, Gilgit-Baltistan is located. It encompasses an area of 72,496 Sq.km. The total population of Gilgit Baltistan is 1.49 million (GoGB, 2020). The unique geography of the area encompasses the three mightiest mountain ranges, namely Himalaya, Hindukush, and the Karakorum, which include the five highest peaks of the world.

Figure 3.1: Map of Gilgit Baltistan

Gilgit Baltistan comprises of huge mountainous topography. Approximately 90% of the total area of Gilgit Baltistan is covered by mountains and is at risk of Glacial Lake Outburst Flooding (GLOF), lakes formation, and landslides etc. (Calligaris et al., 2013).

Referring to (B. Khan et al., 2011), the region encompassing the Himalayas, Hindukush, and Karakorum is experiencing expanded flash floods and associated dangers. In addition to their breathtaking geographical splendor, the Hydrological, Geological, and environmental instability caused by human activities, the vulnerability of the community and structures in this mountainous region increases significantly (Abbas et al., 2016). Various studies show that numerous Natural Hazards, such as rockfall, mudflow, debris flows, landslides, flash floods, GLOF, and many other disasters, are not unusual in this region (Iqbal et al., 2014; Khattak et al., 2010). The snow-covered mountains, glaciers, and steep slopes of the region look wonderful; however, sturdy precipitation and excessive seismicity lead to the foundation of unavoidable extreme events (Karim, 2006). There are very limited studies that examine the association between the Physical Vulnerability of Cultural Heritage Sites (CHS) and Natural Hazards.

Gilgit Baltistan is divided into 3 divisions, namely, Gilgit Division, Diamir Division, and Baltistan Division. Considering the significance of the Gilgit-Baltistan region, three major districts, in the Baltistan division have been selected among the 14 districts of Gilgit Baltistan (see figure 1) as the case study area for this contemporary research. The areas include 1) Ghanche, 2) Shigar, & 3) Skardu.

3.1.1 Ghanche

The easternmost district of Pakistan is Ghanche. The capital is Khaplu is, the capital of Ghanche district and one of the coldest places in Pakistan. Xinjiang (China) lies in the north-east of Ghanche, Indian-occupied Ladakh is on its South, Skardu is in the north-west, and Astore is in its west. Wildlife and some beautiful and attractive rivers, including Syoke and Saling, are important features. The total covered area of the district is 8915 square km. Besides some of the world's highest peaks, other attractive places

of district Ghanche are: Chaqchan Mosque, Khaplu Fort, thalley valley, Hushe Valley, etc. The Turks and Tibetans are the earliest settlers of Ghanche, according to Molve Hasmatullah, the author of Tarikh e Jammu. Baig Manthal, a warrior, is said to be the founder of the Yabgo Dynasty, the region's old and strong monarch. Syed Ali Hamdani, also known as Shahe Hamadan, was a Muslim Sufi preacher who arrived from Yarkan in the 14th century and converted people to Sufi Islam. There are three CHS in district Ghanche, i.e. Khanqah Chaqchan, Thoqsi Khar and Khaplu Fort (also known as Yabgo Khar).

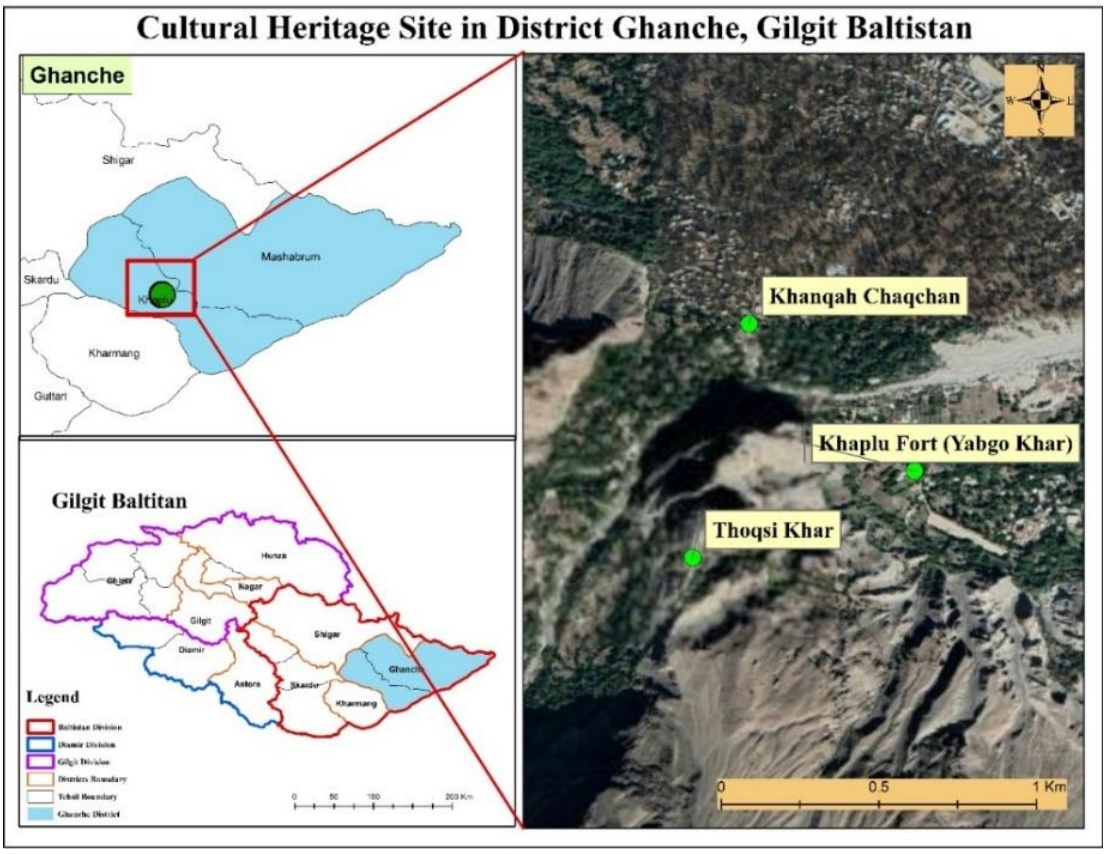

Figure 3.2: Map of District Ghance Showing locations of CHS

3.1.2 Shigar

Shigar Valley is located towards the north of Skardu, on the right bank of the Indus River, and is part of the mountains of the central Karakorum range. It is located at 25° 25′32″ N latitude and 75° 42′59″E longitude, with an area of 4373 square kilometers

with altitudinal amplitudes ranging from 2,260 to 8611 meters above sea level. It shares a border with China, which is walled in by the mighty K-2, also known as Godwin Austin. Shigar is one of Pakistan's most attractive valleys, with several picturesque attractions, including the majestic Karakorum Mountains Range, which includes the world's 2nd highest peak, K-2. From Skardu to Askole, the district's last village, the valley stretches for around 170 km. Shigar's history and landmarks include the Shigar fort, Khanaqah-e-Mullah, Amburiq Mosque, Raja Mosque, Khilingrong Mosque, Old House, and Bara Dari.

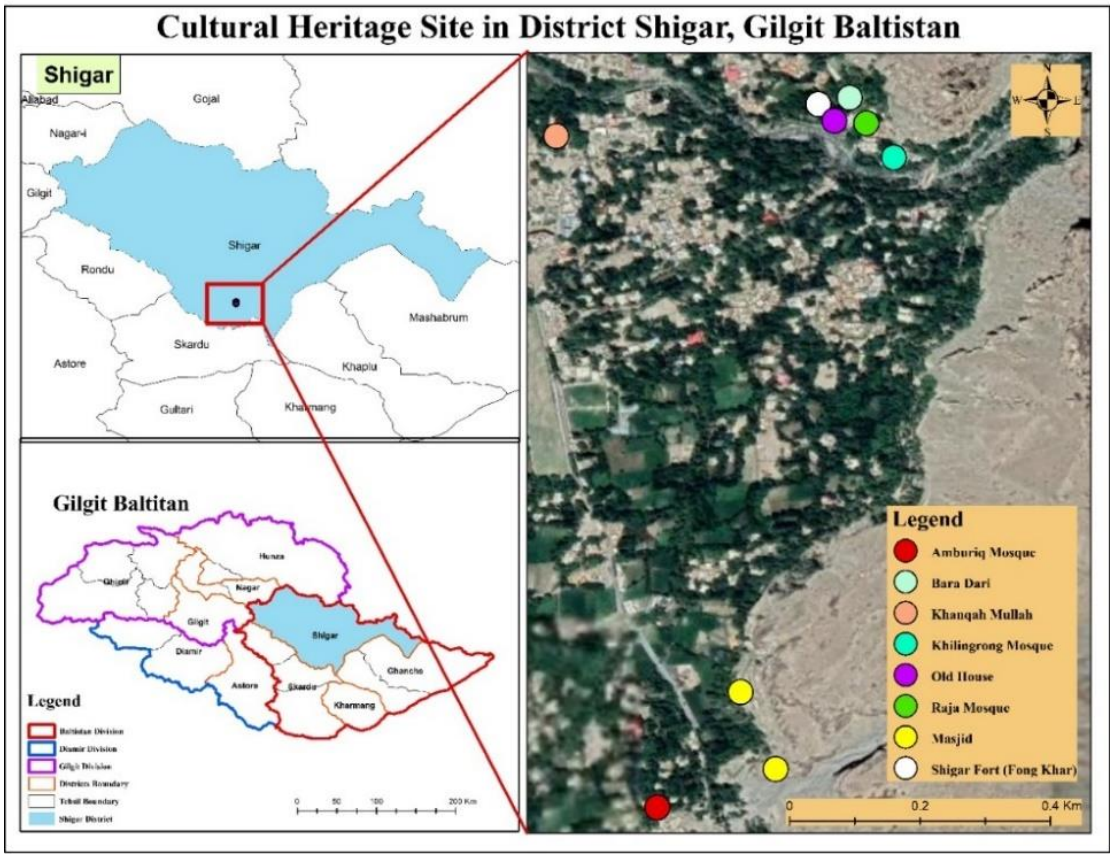

Figure 3.3: Map of District Shigar Showing locations of CHS

3.1.3 Skardu

Skardu is the Baltistan region's capital. It is located on the Indus River's bank at the height of almost 2500 meters. At the meeting point of the Indus and Shigar rivers, it

encompasses a landscape of 40 kilometers long by 10 kilometers broad. The mountain ranges of the Himalayas and Karakoram formed a protective wall around the city, making it safe. Due to its proximity to the tectonically active Suture Line of river Indus, the area is seismically active, and high-magnitude earthquakes and radon levels are possible. The Deosai National Park, Shingrila Resort, Upper Kachura Lake, Cold Desert, Kharpocho, etc., are among the major attractions. The CHS of this district are Kharpocho fort and Masjid Panjitan-e-Pak.

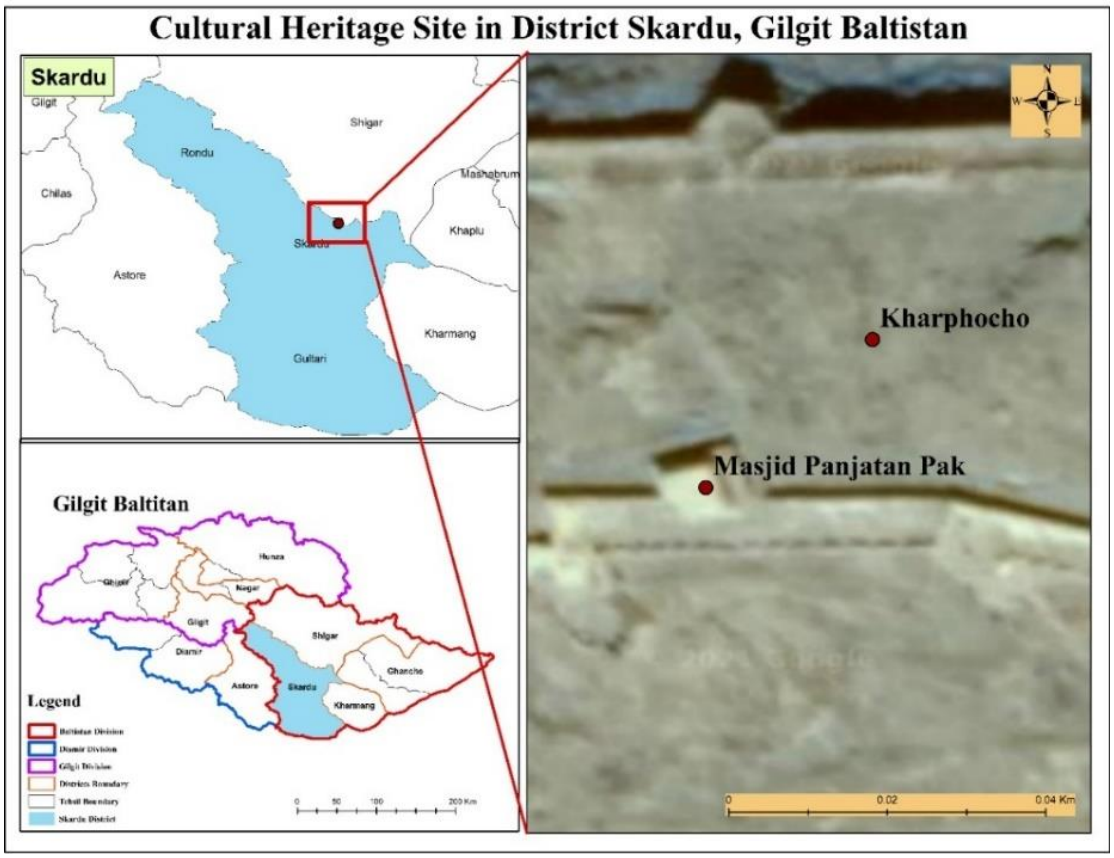

Figure 3.4: Map of District Skardu Showing locations of CHS

3.2 Identification of CHS

Gilgit Baltistan has a diverse cultural legacy that includes many religious buildings, archeological sites, forts, and other historical structures representing the area's rich

culture. Cultural heritage may provide a sense of identity and belonging to local residents while providing economic benefits to those living in the region. The diverse cultural legacy, scenic beauty, and highest mountains of Gilgit Baltistan attract tourists from all over the country and abroad. Although there is the number of CHS in Gilgit Baltistan, for this contemporary research, following 11 CHS located in 3 major districts of Baltistan Division in Gilgit Baltistan were selected:

CHS 1: Thoqsi Khar

The construction of this Masjid was started by Ameer Kabir, Syed Ali, in 1496 and got completed in 1516 by Mir Shams ud Din Iraqi. The site is now looked after and managed by Anjuman-e-Sufia Nurbakshia.

CHS 2: Khanqah-e-Chaqchan

In 1438, Mir Syed Ali Hamdani, built the famous Mosque known as Khanqah-e-Chaqchan. The same was reconstructed by Mir Shams ud Din Iraqi in 1505. According to the local community, the building was converted from gompa to Khanqah (Masjid), when the whole town converted to Islam. It is one of the oldest Masjid in Pakistan. It has stood for more than 700 years, despite being built on a weak base that posed a danger to worshipers. This masjid attracts tourists from all over the world. Recently it is rehabilitated by an NGO.

CHS 3: Khaplu Fort (Yabgo Khar)

The Fort was built by the then Ruler of Khaplu (Ghance), Raja Dolat Ali Khan. Locally it is known as Yabgo Khar, which means “The Fort on the Roof”. As it remained the residence of the ruler of the area, the fort is regarded an architectural treasure and a tourist destination. Previously, the fort was in a highly vulnerable position. However, in 2005, the Aga Khan Trust for Culture restored it as part of the Aga Khan Historic

Cities Programme. In 2011, the renovations were finished. Serena Hotels presently runs a hotel in the fort, as well as a museum portraying Baltistan's history and culture.

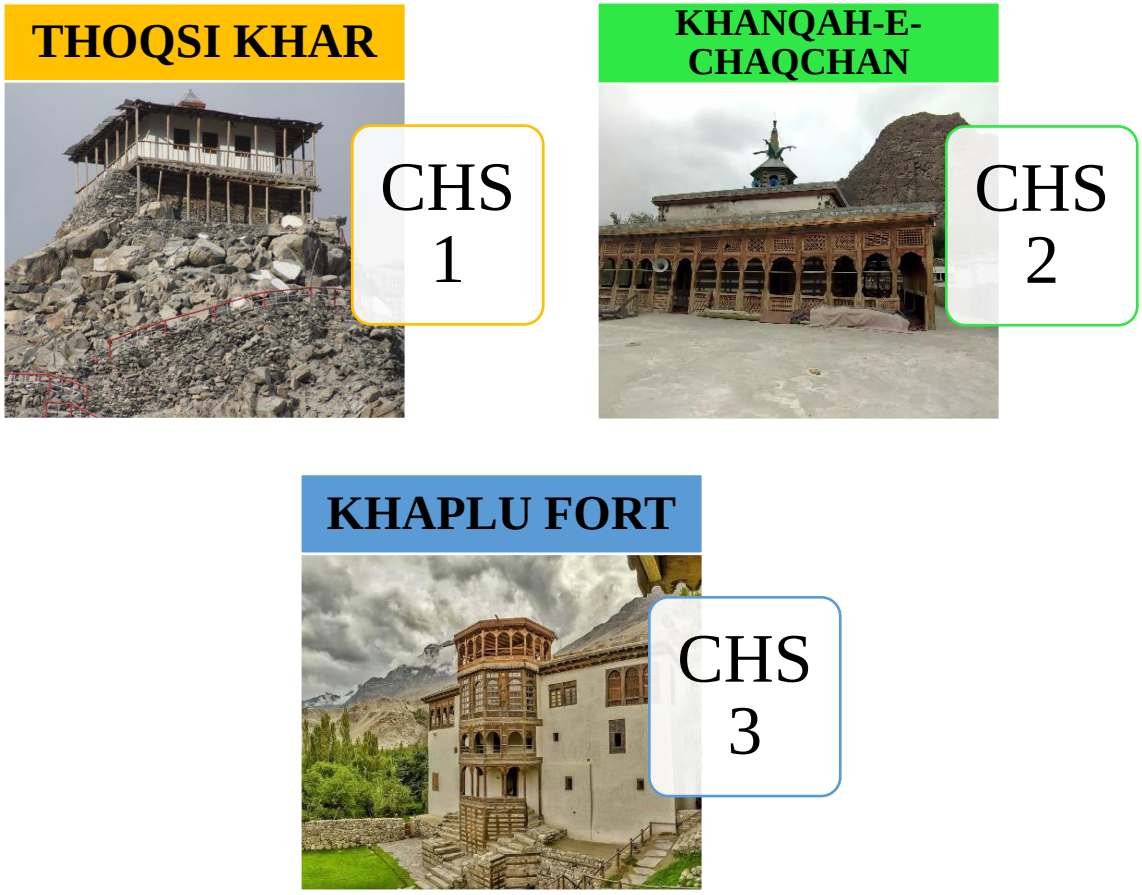

Figure 3.5: CHS in District Ghance

CHS 4: Shigar Fort

The Amacha reign's 20th ruler, Raja Hassan Khan, built the Shigar Fort in the early 17th Century. It is also known as "Yabgo Khar". The Aga Khan Development Network renovated the Shigar fort into a historic hotel, which is presently maintained by Serena Hotels. The Shigar Fort Palace project was awarded the UNESCO "Award of Excellence" for the Asia-Pacific Region in 2006. The media release issued by UNESCO states:

> "The Shigar Fort Palace was commended for setting a high-profile precedent for sustainable modern reuse of heritage structures in Pakistan. The adaptation

into a boutique hotel has strategically capitalized on the complex's authentic local architecture and dramatic setting in the Karakoram mountains to create a unique destination for visitors. Through a holistic community development approach, multiplier effects from the project have benefited the local villagers in the form of job creation, upgrade of shared infrastructure and water supply, and renewed pride in the area's rich crafts and intangible heritage traditions".

CHS 5: Khanaqah-e-Mullah

In the 17th century, a preacher of the Nurbakshi sect, Mir Mukhtar, the famous and historic Khanqah-e-Mullah, in Khaplu (Ghance), Gilgit Baltistan. Wood and mud were used for its construction. It is one of the famous Masjid and tourist attractions of the region.

CHS 6: Amburiq Mosque

The Irani traders built the historic Amburiq Mosque in Shigar while traveling with the Propagator of Religious Knowledge, Syed Ali Hamdani. It is the first religious monument in Shigar. The Mosque, which is lavishly decorated with carved designs, is built with solid structural components employing the ancient "cribbage and cator" techniques.

CHS 7: Raja Mosque

Adjacent to the Shigar Fort, a mosque was built by the raja for the royal family in the 17th century. Later on, it was named Raja Mosque.

CHS 8: Khilingrong Mosque

The historic and attractive Khilingrong Mosque was built some four hundred years ago. It has two floors. The main mosque and its front verandah are on the ground level, while on the first floor, there is another four-sided veranda. The doors open on this veranda. It is ornamented with wooden arches that wrap around each pillar. Tibetan Tower is

located on the roof of the Mosque. According to Raja M. Ali Shah, the design of this mosque was influenced by Chaqchan Mosque in Khaplu (Ghance).

CHS 9: Old House

Towards the south of Shigar Fort, another historic building is located known as the Old House. It contained a horse stable, a cow corral, and an animal feed store on the bottom floor. It appears to have been the royal stable for at least as long as Shigar Fort has existed. When the Shigar Fort (Fong Khar) was vacated in the middle of the twentieth century, the raja added the upper story of this edifice as additional residence space. The building was rehabilitated by the Agha Khan group and is being used as a restaurant by Serena Hotels.

CHS 10: Bara Dari

It is unknown when this magnificent square pool, the garden's focal point, was constructed or what its original look was. In the early 20th century, the Bara Dari was built by the then Raja Muhammad Adam Khan.

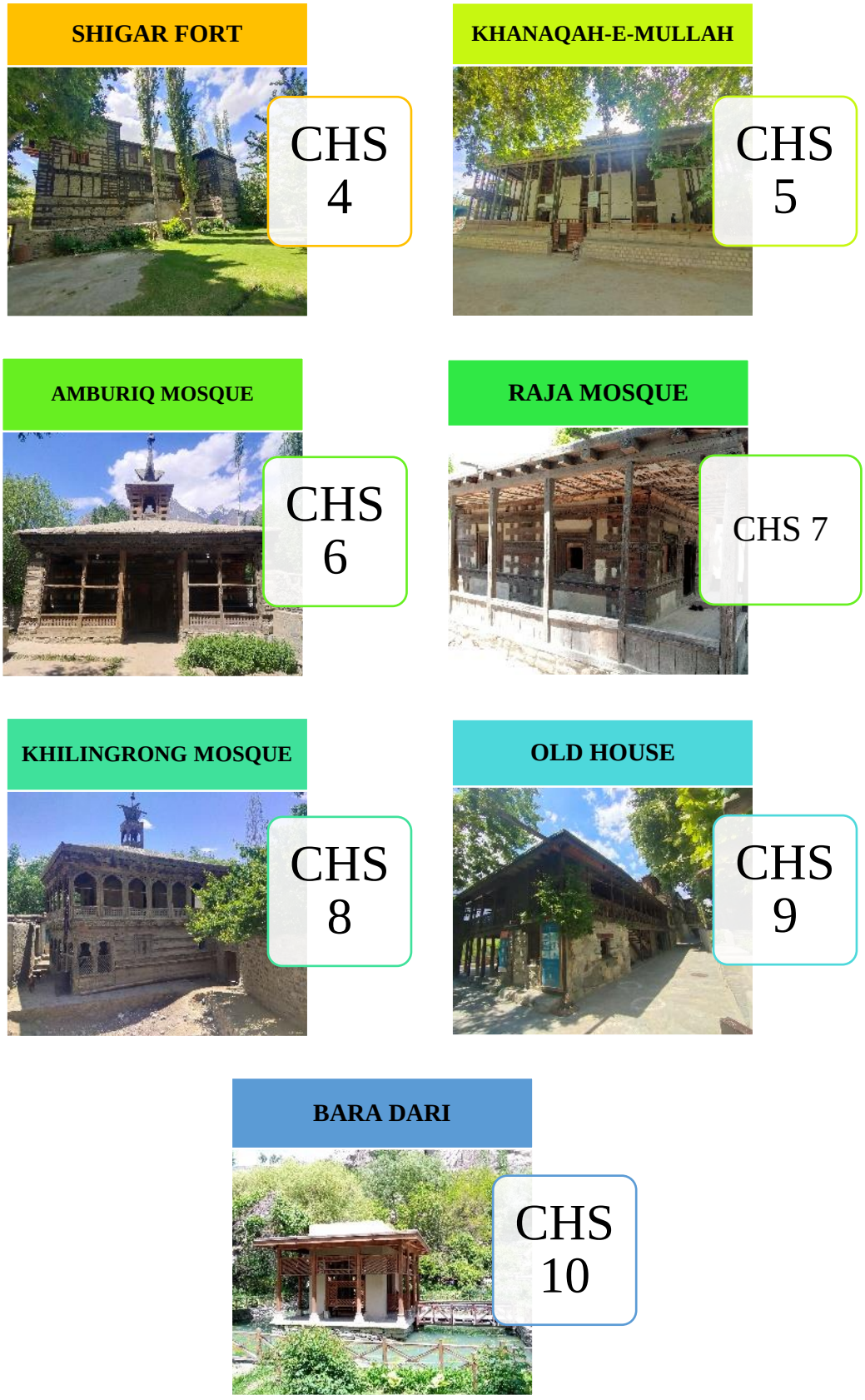

Figure 3.6: CHS in District Shigar

CHS 11: Masjid Panjatan Pak

The Masjid was constructed along with the Karpocho Fort at the end of the 16th Century. The Masjid erected on top of the fort commemorates the region's long-standing religious ties to Islam. After capturing Baltistan, the Dogra kings declared Persian to be the official language. Persian language writings curved on a stone are fixed on a wall in Infront of the Masjid.

CHS 12: Kharpocho Fort

By the end of the 16th Century, Karpocho Fort was constructed by a famous Balti king, Ali Sher Khan Anchan, General Zorawar Singh of the Dogra Rajput dynasty, who served under Maharaja Gulab Singh, recognized the fort's importance in the town and conquered it. It was one of his numerous military efforts to expand the princely state of Jammu and Kashmir to the territories of Baltistan. Aurangzeb, the Mughal emperor, also attempted to take the fort but failed.

Figure 3.7: CHS in District Skardu

3.3 Data Collection

The primary data was collected through desktop study by going through different research papers, newspaper articles, books etc. While the secondary data was collected

in two parts. The data regarding the physical condition of the CHS was collected by the researcher using the RVS technique. For the said purpose, a tool was designed using 11 physical vulnerability indicators selected by thoroughly going through previous research. The second set of secondary data was regarding the preparedness level of local businesses associated with CHS. A detailed questionnaire was designed for the said purpose, and the researcher and his team collected the data using the designed questionnaire by visiting the businesses operating within the vicinity of the selected CHS.

3.4 Data Analysis

The data collected using the RVS technique was then analyzed using index-based method. For that purpose, an appropriate value between 0 and 1 was assigned to all the selected indicators. The PV for all of the CHS could be calculated using the equation given below:

$$PV = (\sum W_1 + W_2 \ldots\ldots\ldots W_{11})/n$$

The second part of data related to the preparedness level of SMEs in case of an extreme event was analyzed using descriptive analysis, frequency analysis, and cross-tabulations.

CHAPTER 4

PHYSICAL VULNERABILITY ASSESSMENT OF CULTURAL HERITAGE SITES

The CHS plays an important role in promoting tourism in Gilgit Baltistan and providing employment opportunities to the local community. Being centuries years old, these constructions are weak and fragile and have become more vulnerable to climatic and environmental changes. Therefore, protection measures must be taken to conserve these sites and enhance their preparedness level of these sites. But before implementing of any protective measure, we must know the actual physical vulnerability of these sites.

To analyze the physical vulnerability of structures, a variety of methodologies and approaches have been devised, which were used by different researchers. These processes range from the most basic, such as walking around the site, to the most complicated, such as non-linear finite element analysis. Researchers in Egypt (El-Kholy et al., 2012) and Jordan (Al-Nimry et al., 2015) used a complicated non-linear process to evaluate the seismic risk of structures; however, this method is a time taking process, and it can only be used on a limited number of structures. Similarly, for the assessment of the vulnerability of buildings, the RVS approach was utilized in Turkey (Inel et al., 2008), Bangladesh (Sadat et al., 2010), Portugal (Vicente et al., 2011), Austria (Achs & Adam, 2012), and India (Joshi et al., 2019). In light of prior research on RVS techniques throughout the world, this study uses the RVS procedure based on eleven selected indicators to determine the physical vulnerability of CHS.

4.1 Methodology

Among the several methods used for the vulnerability assessment of buildings, Rapid Visual Screening (RVS) was employed to collect the first datasets since it is a simple, quick, and cost-effective procedure that requires no structural computations. This study primarily uses the index-based method to determine the Physical Vulnerability of CHS. Primary data was collected by using the Rapid Visual Screening (RVS) technique. The survey was organized during the month of May-June 2021. To attain the goal, the following 12 Cultural Heritage Sites, situated in 3 districts of Gilgit Baltistan, have been targeted:

4.2 Physical Vulnerability Assessment of CHS

The expected magnitude of destruction to a building due occurrence of an extreme event like earthquakes, floods, landslides, etc., may be called the Physical Vulnerability (PV) of that building and can be evaluated on a scale of zero (0) to one (1). Physical Vulnerability Index (PVI) is primarily developed on the basis of eleven selected indexes using in-depth records assessment. These indexes have been chosen from previous research carried out on physical vulnerability assessment related to Natural Hazards like an earthquake, floods, and so forth. An appropriate value between 0 and 1, was assigned to all the selected indicators. Therefore, generally, the value of PVI, lies in between the range of 0 and 1. The PV for all of the CHS could be calculated using the equation given below:

$$PV = (\sum W_1 + W_2 \ldots\ldots\ldots W_{11})/n$$

4.3 Data Analysis

In this inspection, data was gathered through RVS technique. For this purpose, a survey sheet was designed, which was filled by the researcher through visual observation from

the exterior, and if possible, the interior. Accordingly, 12 CHS, spread over 3 selected districts of Gilgit Baltistan, Pakistan, were surveyed based on eleven vulnerability parameters, namely, Year of Construction, No. of Stories, Ground Terrain, Type of Construction Material, Width of Street/ Approach Road, Rehabilitation/ Conservation, Current Condition of Building, Cracking, Floating/ Hanging Columns, Corrective Interventions and Type of Roof. To determine the Physical Vulnerability of CHS, the selected indicators were classified into different categories, and an appropriate value between 0 and 1 were assigned to each category. The selected indicators along with is justification, categories of each indicator, and values assigned to each indicator is detailed in table 4.1.

Table 4.1: Physical Vulnerability Indicators (PVI)

Sr. No.	**Indicators/ Factors**	**Categories**	**Values**	**Justification**	**Evidence by research**
1	Year of Construction (Age of Building)	Before 16th Century 16th Century 17th Century 18th Century or later	1.00 0.75 0.50 0.25	With the passage of time, the strength of building decreases due to aging & environmental degradation, thus vulnerability increases	(Aliabadi et al., 2015; Inel et al., 2008; S. U. Khan et al., 2019b; Salami et al., 2017; Stephenson & D'Ayala, 2014)

2	Building Height (No. of Stories)	≥ 3 2 1	1.00 0.66 0.33	High-rise buildings are considered more vulnerable as compared to low rise.	(Aliabadi et al., 2015; Inel et al., 2008; Joshi et al., 2019; S. U. Khan et al., 2019a; Salami et al., 2017; Stephenson & D'Ayala, 2014)
3	Ground Terrain	Hilly Plain	1.00 0.50	Hilly areas are more vulnerable as compared to Plan areas	(Dai et al., 2002; van Westen et al., 2008)
4	Type of Construction Material	Brick or stone masonry walls Wooden Cribbage with Infill of Mud & Stone wood or metal (light structure)	1.00 0.66 0.33	Heavy mass and poor interlocking of stone masonry make it more vulnerable.	(Aliabadi et al., 2015; S. U. Khan et al., 2019a; Salami et al., 2017)
5	Accessibility [Width of Street/ Approach Road (feet)]	< 10 10 – 20 > 20	1.00 0.66 0.33	Less width or No Vehicular access makes the buildings more vulnerable in case of any extreme event	(Aliabadi et al., 2015; Salami et al., 2017)

6	Rehabilitation/ Conservation	Yes No	1.00 0.50	Rehabilitation/ Conservation decreases the vulnerability of buildings	(Canuti et al., 2009; Gandini et al., 2018; Lazzari et al., 2009; Paupério et al., 2012)
7	Current Condition of Building	Poor Average Good	1.00 0.66 0.33	Proper maintenance increases the life of buildings by decreasing the vulnerability	(Joshi et al., 2019; S. U. Khan et al., 2019a; Stephenson & D'Ayala, 2014)
8	Cracking	Structural Non-Structural No Cracking	1.00 0.66 0.33	Cracks in walls, pillars, columns, etc., decreases the strength of the building, and hence vulnerability increases	(Ferreira et al., 2013; Maqsood et al., 2016; Sucuoglu & Yazgan, 2003)
9	Floating/ Hanging Columns	Yes No	1.00 0	They have a discontinuous load (Vertical & seismic) transfer pattern.	(Ningthoujam & Nanda, 2018)
10	Corrective Interventions	Yes No	0.50 1.00	Corrective interventions decrease the vulnerability of the buildings	(Saretta et al., 2021; Vettore et al., 2022)

11	Type of Roof	Flat Pitched	1.00 0.50	As compared to pitched roofs, flat roofs are more vulnerable during the snow.	(Gandini et al., 2018)

The sidewalk scene survey, data gathering, and analysis occurred at respective Cultural Heritage Sites (CHS) and took a few hours for each site. After inserting data into the form, the evaluator computes a score representing the building's expected vulnerability. The vulnerability of each CHS is then grouped into 4 different categories of vulnerability based upon the final scores obtained by RVS; < (M – SD = Low, (M - SD) – M = Medium, M – (M + SD) = High and > (M + SD) = Critical. The number of CHS falling in each category of vulnerability based upon the final RVS Score is given in Table 4.2.

Table 4.2: Statistics and classification of CHS based on the RVS Score

Categories/ RVS Score	**Vulnerability**	**No. of CHS**	**Statistics**
< (M - SD) <0.42	Low	1	Min = 0.35 Max = 0.89 Mean (M) = 0.58 SD = 0.16
(M - SD) – M 0.42 - 0.58	Medium	6	
M – (M + SD) 0.59 - 0.74	High	2	
> (M + SD) > 0.74	Critical	3	

4.4 Results

4.4.1 Year of Construction

As the deterioration in building strength is connected to its age, the time of construction is a significant factor in the RVS technique (Joshi et al., 2019). During the survey, the CHS were assessed based on their year of construction, and it was observed that all the CHS were centuries old. The oldest CHS was constructed in the 14th Century, i.e., about 700 years old, while the newest was constructed in the early 20th Century. The figure given below explains which CHS was constructed in which century (See figure 4.1).

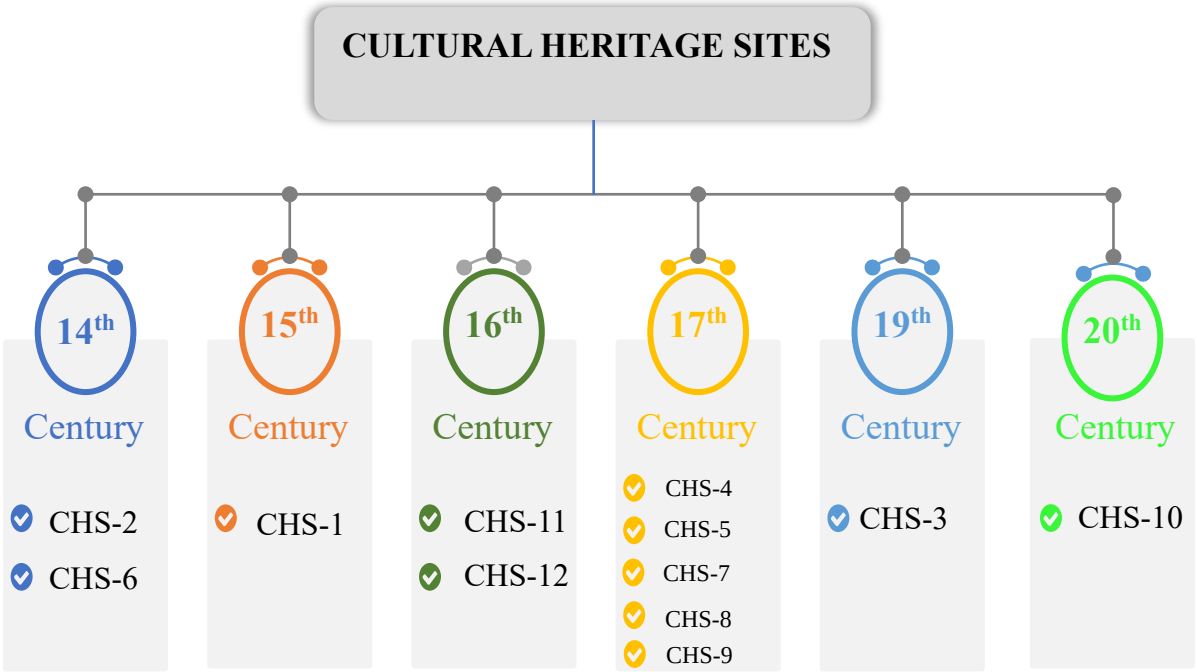

Figure 4.1: Year of Construction of CHS

4.4.2 No. of Stories

There is a strong link between the number of stories in a building and the seriousness of the destruction. With the increase in the height of the building, the vulnerability increases, and thus, the damage may be (Inel et al., 2008), and the height can easily be

determined by knowing the number of stories of that building (Rojahn, C., Poland, C. D., & Scawthorn, 1988). The normal height of CHS surveyed was 10 to 15 feet per story. In this research, out of 12 CHS surveyed, only 1 CHS was 4-storey, and 1 was 3-storey. The remaining 4 CHS were double-story, and 6 were single-story.

4.4.3 Ground Terrain

The ground terrain is an important component of Physical Vulnerability, as the falling of loose material is closely connected to the slope gradient (Dai et al., 2002; van Westen et al., 2008). The vulnerability of buildings in the Plain area is less than those in the hilly area. Although Gilgit Baltistan is considered a hilly area, to assess the physical vulnerability of CHS, we only considered the plot area of the building, whether it is at any slop or Plain area. The survey revealed that 33% of the CHS surveyed were constructed on slopes making them more vulnerable than the rest of the sites.

4.4.4 Accessibility

The buildings with no vehicular or narrow access are considered more vulnerable than those with easy vehicular access because, in case of any extreme event, the emergency vehicles may not reach them (Aliabadi et al., 2015). The results of the survey depict that one CHS located in Ghanche and 2 CHS located Skardu districts were more vulnerable in terms of accessibility as compared to others due to the reason that were located on a hill top and they had only pedestrian access through a path of above 5 feet wide. The research further portrays that three CHS had narrow access with an access/approach road of 10 – 20 feet wide, and the remaining 6 sites had vehicular access, so the vulnerability of these sites was less as compared to others.

4.4.5 Type of Construction

The material used for the construction of a building is an important indicator to determine the vulnerability of that building. The physical vulnerability of a building is

much dependent upon the details of construction quality, including actual details of reinforcement, materials used, etc. (Al-Nimry et al., 2015). The survey statistics reveal that the most common type of construction of ancient buildings in Gilgit Baltistan is "Wooden Cribbage with Infill of Mud and Stone", which is considered the safest for large buildings like Forts. 08 CHS surveyed in this research had Wooden Cribbage structure with Infill of Mud and Stone. Others had Brick/ Stone masonry walls and wood/ metal (light structures).

4.4.6 Conservation/ Rehabilitation

Buildings of cultural importance must be conserved, and with the passage of time, an old structure demands rehabilitation. Knowing the CHS's current level of Conservation/ Rehabilitation is crucial for assessing the physical vulnerability of the site (Canuti et al., 2009; Lazzari et al., 2009). Rehabilitation of Buildings decreases their vulnerability to any Extreme Event. Analysis of the dated collected shows that although 10 out of a total of 12 CHS surveyed during this research were Rehabilitated years ago. But the current situation was different, and the conditions of most of the CHS again deteriorated. They demanded immediate rehabilitation to decrease their vulnerability to extreme weather events and natural hazards.

4.4.7 Current Condition of Building

The current condition of a building depends upon the care given to it. The apparent condition of the building shows how badly the sites under study have degraded and how little they have been maintained. The sites with the worst conditions will have the highest vulnerability scores (Sevieri et al., 2020). A good observer may classify the current condition of buildings as Poor, Average and Good. Poor material strength and details are likely found in buildings with the poor apparent condition. The survey results

show that 5 CHS were rehabilitated and in good condition, while others are in average or poor condition.

4.4.8 Cracking

Climate & environmental changes, thermal expansion, exposure to atmospheric pressure, and aging are a few reasons that can cause non-structural cracking in the building. For instance, cracks in the plaster and near the edge of the door and windows. These cracks are less aggressive and are not a greater threat to the building's integrity. However, the cracks in the stairs, pillars & beams, and any crack measuring 0.125 inches wide, are called structural cracking. These may be caused due to inadequate building locations, overloading, and poor soil bearing. Among the CHS assessed during this research, buildings with a Good Conservation state had no cracking or minor non-structural cracking. 5 sites were found to have structural cracking, and 03 of them demanded very immediate action, namely: 1) Thoqsi Khar; 2) Kharphocho Fort; 3) Masjid Panjatan e Pak.

4.4.9 Floating/ Hanging Columns

Because of the floating/hanging columns, lateral forces are not properly transmitted to the foundation (Ningthoujam & Nanda, 2018). Due to the discontinuation of the load path, the Floating/ Hanging Columns may increase the vulnerability of Buildings against Extreme Events, especially in case of an earthquake. 03 out of 12 CHS assessed during this research had Floating/ Hanging Columns.

4.4.10 Corrective Interventions

Corrective Interventions in existing buildings will reduce their vulnerability to Extreme Events. The researcher's professional opinion is mostly responsible for determining interventions (Vettore et al., 2022). Most of the CHS were rehabilitated, and corrective interventions were made in them to reduce their vulnerability.

4.4.11 Type of Roof

In case of heavy rain or snow, pitched roofs are considered safer as compared to flat roofs. When it rains, the rainwater runs down a sloped roof swiftly and uniformly, but it can accumulate on a flat roof, putting structural strain on the building. Similarly, in the case of snow, the pitched roofs can easily shed off the snow. However, snow tends to accumulate or puddle at various points on flat roofs, causing leaks when the snow melts and water lingers there for an extended period of time. Moreover, the weight of snow exerts increased pressure on the foundations of a building.

Snow-clad mountains entirely cover most of the regions in the north of Pakistan, including Gilgit Baltistan. Therefore, the most popular roof type in these areas is Pitched to reduce the effect of snow during winters. The RVS of the area revealed that out of 12 CHS surveyed during this survey, 07 CHS had Pitched Roofs, and the other 05 had Flat Roofs making them more vulnerable.

Table 4.3: Physical Condition of CHS

Sr. No.	Name of Site	Year	No. of Stories	Ground Terrain	Type of Construction Material	Width of Street (feet)	Rehabilitation/ Conservation	Current Condition of Building	Cracking	Floating/ Hanging Columns	Corrective Interventions	Type of Roof
1	Masjid Panjatan Pak	16th Century	2	Hilly Area	wood or metal (light structure)	Less than 10	No	Poor	Structural	Yes	No	Flat
2	Thoqsi Khar	16th Century	1	Hilly Area	Brick or stone masonry walls	Less than 10	Yes	Poor	Structural	Yes	No	Pitched
3	Kharphocho	16th Century	1	Hilly Area	Brick or stone masonry walls	Less than 10	No	Poor	Structural	No	No	Flat
4	Shigar Fort (Fong Khar)	17th Century	3	Plan Area	Wooden Cribbage with Infill of Mud & Stone	21-30	Yes	Good	No Cracking	Yes	Yes	Flat
5	Khanqah Chaqchan	14th Century	2	Hilly Area	Wooden Cribbage with Infill of Mud & Stone	11-20	Yes	Average	Non-Structural	No	Yes	Pitched
6	Khanqah Mullah	16th Century	1	Plan Area	Wooden Cribbage with Infill of Mud & Stone	11-20	Yes	Average	Structural	No	Yes	Pitched

Sr. No.	Name of Site	Year	No. of Stories	Ground Terrain	Type of Construction Material	Width of Street (feet)	Rehabilitation/ Conservation	Current Condition of Building	Cracking	Floating/ Hanging Columns	Corrective Interventions	Type of Roof
7	Khaplu Fort (Yabgo Khar)	19th Century	4	Plan Area	Wooden Cribbage with Infill of Mud & Stone	21-30	Yes	Good	No Cracking	No	Yes	Flat
8	Amburiq Mosque	14th Century	1	Plan Area	Wooden Cribbage with Infill of Mud & Stone	11-20	Yes	Good	Structural	No	Yes	Pitched
9	Raja Mosque	18th Century	1	Plan Area	Wooden Cribbage with Infill of Mud & Stone	21-30	Yes	Average	Non-Structural	No	Yes	Pitched
10	Khilingrong Mosque	17th Century	2	Plan Area	Wooden Cribbage with Infill of Mud & Stone	21-30	Yes	Average	Non-Structural	No	Yes	Pitched
11	Old House	18th Century	2	Plan Area	Wooden Cribbage with Infill of Mud & Stone	21-30	Yes	Good	No Cracking	No	Yes	Flat
12	Bara Dari	18th Century	1	Plan Area	wood or metal (light structure)	21-30	Yes	Good	No Cracking	No	Yes	Pitched

4.5 Discussion

The Rapid Visual Screening (RVS) technique is a fast and widespread technique for the physical vulnerability assessment of buildings. In this study, the RVS technique was used for the vulnerability assessment of 12 Cultural Heritage Sites (CHS), located in 3 major districts of Gilgit Baltistan, Pakistan. All the CHS surveyed were centuries years old, and no data regarding their vulnerability were available. To determine the Physical Vulnerability of CHS, data was gathered through RVS technique. For this purpose, a survey sheet was designed based on eleven vulnerability parameters, namely, Year of Construction, No. of Stories, Ground Terrain, Type of Construction Material, Width of Street/ Approach Road, Rehabilitation/ Conservation, Current Condition of Building, Cracking, Floating/ Hanging Columns, Corrective Interventions and Type of Roof, selected after a detailed review of previous studies. An appropriate value between 0 and 1, was assigned to all the selected indicators. Therefore, the value of Physical Vulnerability (PV) generally lies between the range of 0 and 1. Based upon the overall score of CHS calculated using the RVS technique, the physical vulnerability of 12 selected CHS was categorized into four groups, ranging from low to critically vulnerable. The survey statistics revealed that the minimum value of RVS was 0.35, and the maximum was 0.89. The results further revealed that only one site fell in the category of Low Vulnerability, while 6 sites in the medium category, 2 sites in the High category, and 3 sites were critically vulnerable. The CHS with High or Critical vulnerability needs immediate action like rehabilitation, corrective interventions including structural repairs, etc.

During the survey, it was observed that there were mainly two types of CHS in these three districts, i.e., Religious Places and Forts, all of which were centuries old. The

oldest CHS was constructed in 14th Century, i.e., about 700 years old, while the newest was constructed in the early 20th Century. The Shigar Fort, Old House, and Khaplu Fort were being rehabilitated and managed by an NGO, Agha Khan Cultural Support Program (AKCSP), and were being used as a hotel and restaurant. A part of the generated income was spent on renovating and conservating the sites. The religious sites are also rehabilitated years ago by NGOs and managed by the local community, and they are not generating any income.

The analysis of the survey data demonstrates that the RVS technique provides an overview where a comprehensive observation must be performed, primarily by arranging and prioritizing the vulnerable buildings and advising proper actions for them. This approach can facilitate the authorities to strengthen the important and extraordinarily vulnerable buildings to minimize the destruction in case of disaster. Moreover, Conservation/ Rehabilitation and Corrective interventions are the two main indicators through which we can increase the stability of the CHS. Therefore, at present, it seems more important than ever to provide suggestions and guidelines for implementing protection measures that will conserve CHS and improve the preparedness level of these CHS against extreme events.

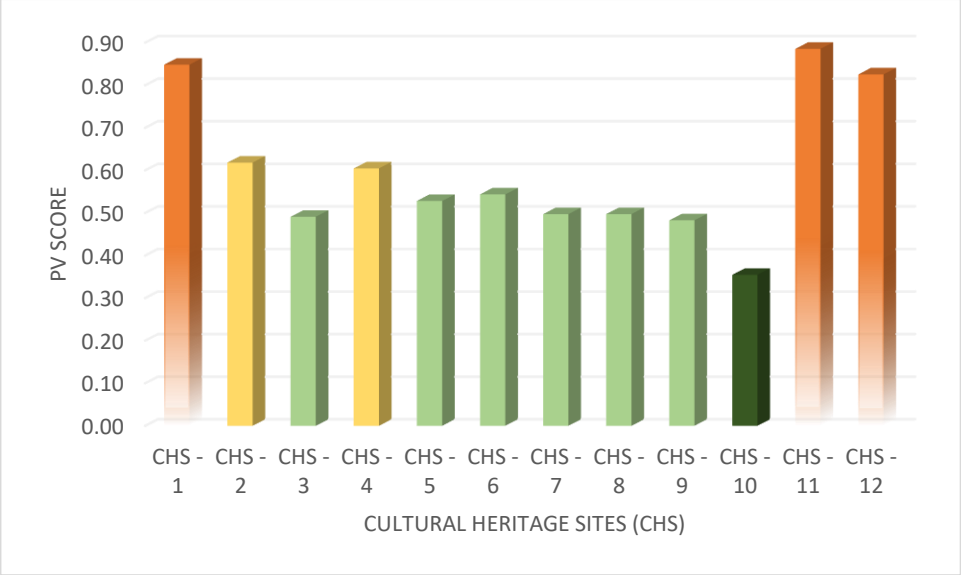

Figure 4.5: Physical Vulnerability Scores of CHS

4.6 Summary of the Chapter

Natural hazards and climate change pose a serious threat to Cultural Heritage Sites (CHS), which may cause significant damage to these sites. It is important to assess the physical vulnerability of CHS for implementing effective Disaster Risk Reduction strategies. This research evaluates the physical vulnerability of CHS against extreme events using the index-based method. Three major districts of Gilgit Baltistan, which are exposed to various kinds of natural hazards, were selected as a case study area, where 12 sites were purposively chosen. Rapid Visual Screening (RVS) was employed to collect the datasets. The method is a simple, quick, and cost-effective procedure that does not require structural computations. A physical vulnerability index is proposed using the eleven indicators selected after a thorough literature review. The survey revealed that five cultural heritage sites are highly vulnerable and need immediate attention. Therefore, it is recommended that rehabilitation of the CHS in critically vulnerable conditions may be carried out on an immediate basis. Furthermore,

corrective interventions may be carried out in these CHS to decrease the vulnerability. The government may do these, or the site may be handed over to the NGOs related to Cultural Heritage Sites, like in the case of Shigar Fort, Old House, and Khaplu Fort. It is also recommended that a massive and aggressive campaign be initiated to communicate with the locals about the natural hazards, the importance of CHS, and techniques of protection of CHS.

CHAPTER 5

ASSESSMENT OF PREPAREDNESS LEVEL OF SMALL & MEDIUM ENTERPRISES

5.1. Introduction

Disasters do not exempt businesses from destruction, damage, and disruption, which can impact their capacity to continue operating (Josephson et al., 2017). The SMEs (Small Business Enterprises) are particularly sensitive to the negative consequences of disasters. Moreover, due to the location, kind of catastrophe, structural type, and financial sustainability, disasters substantially influence SMEs (Alesch et al., 2001). They engage a large number of people and play an important role in both urban and rural areas, but catastrophe losses frequently result in businesses going bankrupt and failing to reopen, resulting in increased unemployment and inequality (Khalid & Khaver, 2020). Furthermore, destruction of infrastructure, electricity breakdowns, and disruption in water supply, communication, and transport linkages, compel small businesses to close (Asgary & Naini, 2011). Climate extremes have a significantly greater influence on small enterprises than they do on large businesses (Zhang et al., 2009). Most SMEs are located in an area far from Urban areas and lack stable structures, hazard management programmes, financial resources, and access to government rehabilitation programmes. Furthermore, because their market share is limited, they are sluggish to respond to the negative impacts of disasters compared to large enterprises, which often have huge savings (Khalid & Khaver, 2020). Regardless of the size and the resources, disasters pose many threats to all businesses (Samantha, 2018).

It has been noticed that globally more than 700 extreme events occur yearly, affecting human lives badly and interrupting the whole community and their livelihood.

Specifically, when it comes to natural catastrophes, developing nations are more vulnerable to them owing to a lack of ability and infrastructure to cope with them (Atta-Ur-Rahman & Shaw, 2015). When extreme events occur, they may influence every aspect of life (Chmutina et al., 2020), including local businesses. Most of Asian countries, including the Philippines, Vietnam, and parts of China, are vulnerable to natural hazards such as tsunamis and cyclones. Whereas Pakistan, India, Nepal, and Bangladesh are more vulnerable to earthquakes, landslides, and floods. Disasters such as, in Pakistan earthquakes and super-floods (2005 and 2010), In Japan, tsunami (2011), and in East Asian countries Typhoon Haiyan (2013) are only a few examples of disasters that have wreaked havoc on Asia's population (Caulderwood, 2014; Shah et al., 2019). In terms of local employment and enhancing the living standards of the local community, SMEs perform a critical role in the economies of the nations (). They are normally unable to absorb risks and the effects of disasters since they operate in a single location with a small number of people and cannot distribute and transfer their hazards (Alesch et al., 2001; Asgary et al., 2012). SMEs, particularly those in developing countries, are more likely to be located in hazardous areas, have risky business resources, and lack the financial and human resources, and also the required fear and understanding of their vulnerability (Lindell, M. K., & Perry, 1998; Whitney et al., 2001).

Due to the Climatic and Environmental conditions (Shah et al., 2019), Pakistan is mentioned as one of the most susceptible countries to climate change (Eckstein et al., 2020). For the past two decades, Pakistan has been affected by natural hazards (Shah et al., 2017; Shah, Ye, Abid, et al., 2018; Shah, Ye, Pan, et al., 2018). As per the environment change vulnerability Index ranking, Pakistan is ranked 15th among 170 nations, and as per the Global Climate Risk Index ranking, Pakistan is ranked 8th

amongst 180 nations (Eckstein & Kreft, 2020). Due to the climatic and environmental characteristics, Pakistan and other developing countries are extremely exposed to natural calamities (Bosher et al., 2020). Humans' negligence and exploitation have resulted in several calamities, demanding extra work to cope with them (Sarda, R., & Bahadure, 2021).. Preparedness is required regardless of the kind of disaster risk to prevent negative consequences such as casualties, destruction of property, and some other damages (Dastgerdi et al., 2019). Preparedness and mitigation strategies can reduce the losses in business while also ensuring the long-term viability of operational hazards (Shah et al., 2017; Shah, Ye, Abid, et al., 2018; Shah). Pakistan is a developing country and depends on its SMEs for economic development. But due to its geographical location and climatic conditions, the SMEs in Pakistan are exposed to various disasters.

Therefore, the main aim of this study was to evaluate the preparedness level of SMEs located in Gilgit Baltistan, Pakistan, in case of an extreme events like floods, earthquakes, etc. For this purpose, 3 major districts namely, 1) Ghanche, 2) Shigar and 3) Skardu, were selected as a case study area. The SMEs within the periphery of Cultural Heritage Sites in these three districts were targeted for the said purpose. A structured questionnaire was designed, and primary data was collected from 150 SMEs located in the case study area. The data collected were then analyzed using the frequency tables and descriptive statistics.

5.2. Methodology

5.2.1 Data Collection

The primary data was collected through a structured questionnaire during the month of June 2021, for the assess the preparedness level of businesses located in the vicinity of Cultural Heritage Sites. The researcher has conducted interviews with 150 business

owners in the vicinity of Cultural Heritage Sites (CHS). All the respondents were Muslims and Balti (a local language) speaking. The researcher briefed the purpose of this research work in the local language as well as in Urdu and executed the interviews based on the structured questionnaire.

5.2.2 Data Analysis

The data analysis was performed in software named IBM SPSS Statistics 26. The data analysis is mainly based on 3 major sections. The first section is primarily based on the socio-economic profile of the local business owners, the second section of analysis covers the types of disaster events in the study area, and the last section of the analysis is majorly based on an assessment of the preparedness level of local business owners in case of an extreme event. The data analysis includes frequency tables, descriptive tables, and cross tables. The average value of Disaster Preparedness (DP) is calculated using the average value of thirteen indicators selected using an extensive literature review.

5.3 Results

5.3.1 Socioeconomic Profile of Respondents

During the survey, it was observed that business among women is not common in Gilgit Baltistan, Pakistan. Although there are exceptional cases where women are in the field of business to earn their livelihood. Therefore, these women were also interviewed during this research. 90% of the respondents interviewed in all three districts during this research were male, and only 10% were women. Almost every age of respondents was interviewed during this research. The youngest respondent was at the age of 14 years, and the eldest was 75 years old. The average age of the respondents was 41 years. There were mainly 4 major types of businesses in the proximity of the heritage sites. Around 38 % percent of businesses exist in the form of shopkeepers, and 28 % are

related to driving. Moreover, the data analysis further highlighted that 18 % of businesses were associated with the hospitality sector. Some of the hawkers (9%) were selling local handicrafts, fruits, etc., on the carts. Some other businesses (6%) were also focused on during this research, where some young age boys were found selling tickets for parking, some were working as tour operators and travel guides, and some were cleaning the vehicles of tourists to earn some livelihood. The survey further reveals a huge difference in the monthly income of different businesses. It was observed that the per month income of the respondents ranges between PKR 10,000 to 200,000, making the average earning of the respondents PKR 42,186 per month. The socioeconomic profile of the owners running their businesses near heritage sites is detailed in table 5.1.

Table 5.1: Socio-economic profile of respondents

Characteristics		**Ghanche**		**Shigar**		**Skardu**	
		f	**%**	**f**	**%**	**f**	**%**
Gender	Male	38	88.4%	50	87.7%	47	94.0%
	Female	5	11.6%	7	12.3%	3	6.0%
Age	< 20	2	4.7%	3	5.3%	0	0.0%
	20 - 39	16	37.2%	26	45.6%	27	54.0%
	40 - 59	15	34.9%	20	35.1%	17	34.0%
	60+	10	23.3%	8	14.0%	6	12.0%
Type of Business	Shopkeeper	13	30.2%	20	35.1%	25	50.0%
	Hawkers	2	4.7%	6	10.5%	5	10.0%
	Hotel Owner	5	11.6%	11	19.3%	11	22.0%
	Driver	18	41.9%	15	26.3%	9	18.0%
	Other	5	11.6%	5	8.8%	0	0.0%
	< 25000	22	51.2%	25	43.9%	10	20.0%

Monthly Earning (PKR)	25000 - 49999	16	37.2%	18	31.6%	21	42.0%
	50000 - 74999	1	2.3%	6	10.5%	7	14.0%
	75000 - 99999	2	4.7%	2	3.5%	3	6.0%
	> 100000	2	4.7%	6	10.5%	9	18.0%

5.3.2 Tourism and Local Economy

It is a fact that Pakistan has experienced huge growth in internal tourism. There were around 0.8 million tourists from various tourist places. These states highlight the 24.4 percent increase in tourists. According to one report, around 1.75 million tourists have visited Pakistan, and Pakistan Tourism Development Corporation (PTDC) certified that around 30 percent of the tourists were domestic, and the rest were from abroad (Camilleri, 2020). According to World Travel and Tourism Council, Pakistan has $19.4 billion in revenue from the tourism sector, which contributes 6.9 percent to the GDP of Pakistan. The accomplishment of the tourism sector in Pakistan aims to alleviate poverty in Pakistan and improve the standard of living of the lower segments of society by investing in their human development (Rahman, 2016). Northern Areas of Pakistan are considered great splendor and magnificence of natural beauty and landscape. These regions have heirlooms of unique landscapes and associated heritage with an amazing assemblage of numerous eye-catching rivers, water bodies, mountain ranges, beautiful lakes, and valleys (Adnan Hye & Ali Khan, 2013).

Due to the increase in tourism, the socioeconomic condition of the area in improving at a rapid pace. The analysis of the data collected during the survey represents that almost

that 40% of the respondents replied that they interact with more than 45 tourists per week, which significantly affects their business (see fig 5.1).

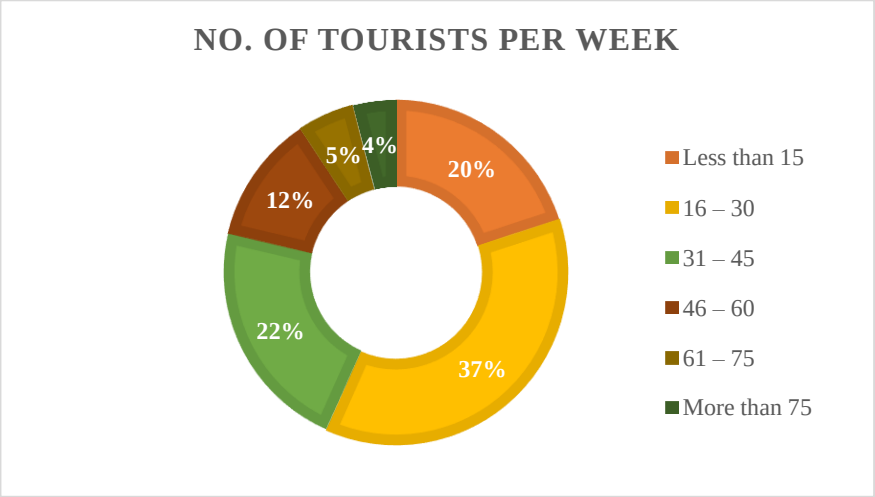

Figure 5.1: No. of Tourists per week

The comparison of the tourists' visits and the monthly income of the local businesses show that there is a direct relationship between both. With the increase in the number of tourists, the monthly income of the business increase. Only 38% of the respondents were earning less than PKR 25,000 per month, where the tourist flow is less than 30 visitors per week. In the other case, 11% of the respondents were earning more than PKR 100,000 per month, where the flow of tourists is more than 50 visitors per week.

Table 5.2: No. of Tourists per week VS Monthly Income

Monthly Earning (PKR)	**No. of Visitors (Per Week)**						**Total**	**Percentage**
	Less than 15	16-30	31-45	46-60	61-75	More than 75		
< 25,000	28	21	8	0	0	0	57	38%
25,000 – 49,999	2	32	21	0	0	0	55	37%
50,000 – 74,999	0	2	3	8	1	0	14	9%

75,000 – 99,999	0	0	0	5	2	0	7	5%
> 100,000	0	0	1	5	5	6	17	11%
Total	**30**	**55**	**33**	**18**	**8**	**6**	**150**	**100%**

5.3.3 Types of Disaster

In Gilgit-Baltistan, Pakistan, there are various types of natural hazards. The most common types of natural hazards are earthquakes, landslides, rock falls, floods, GLOF, etc. (Iqbal et al., 2014; Khattak et al., 2010, Atta-Ur-Rahman & Shaw, 2015). The analysis of the dates collected during the field survey depicts that flood is the most common disaster affecting the local businesses, followed by land sliding and earthquakes (see Figure 5.2).

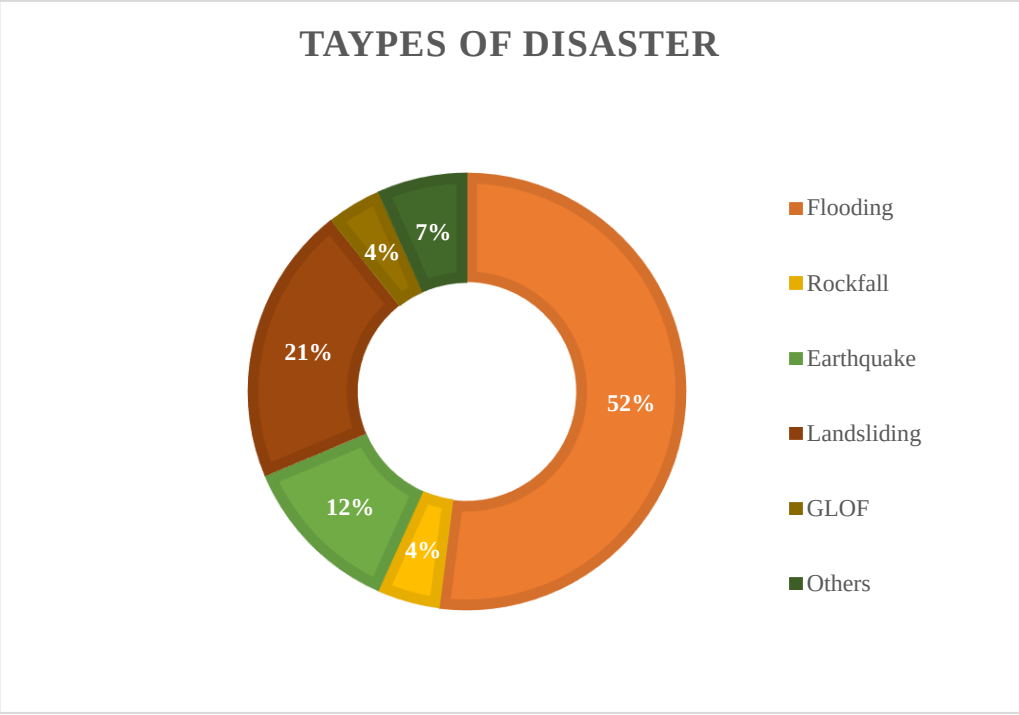

Figure 5.2: Types of disasters

5.3.4 Risk Perception

Among 150 respondents, 63% of them considered that an extreme event might have a critical impact on their businesses, 21% considered that an extreme event might have a medium impact on their business. In contrast, other 16% were of the view that above mentioned common types of disasters may have minor impact on their business. They may shift their business to some other place, in case the area is affected by any extreme event (see Figure 5.3).

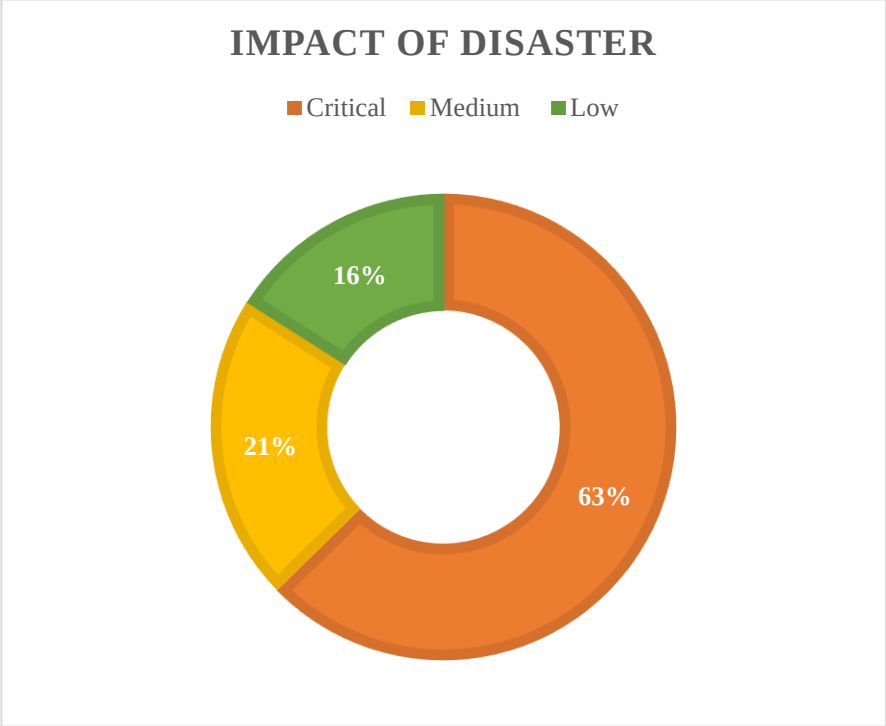

Figure 5.3: Impact of Disasters on Businesses

5.3.5 Affected by an extreme event

The data further reveals that 63% of the respondents have already experienced an extreme event in their life, due to which they suffered a huge loss in their business (see Figure 5.4), and most of the respondents indicated that it was a flood, followed by land sliding and earthquake, as already mentioned that the most common and disastrous type of extreme event in the area is Flooding.

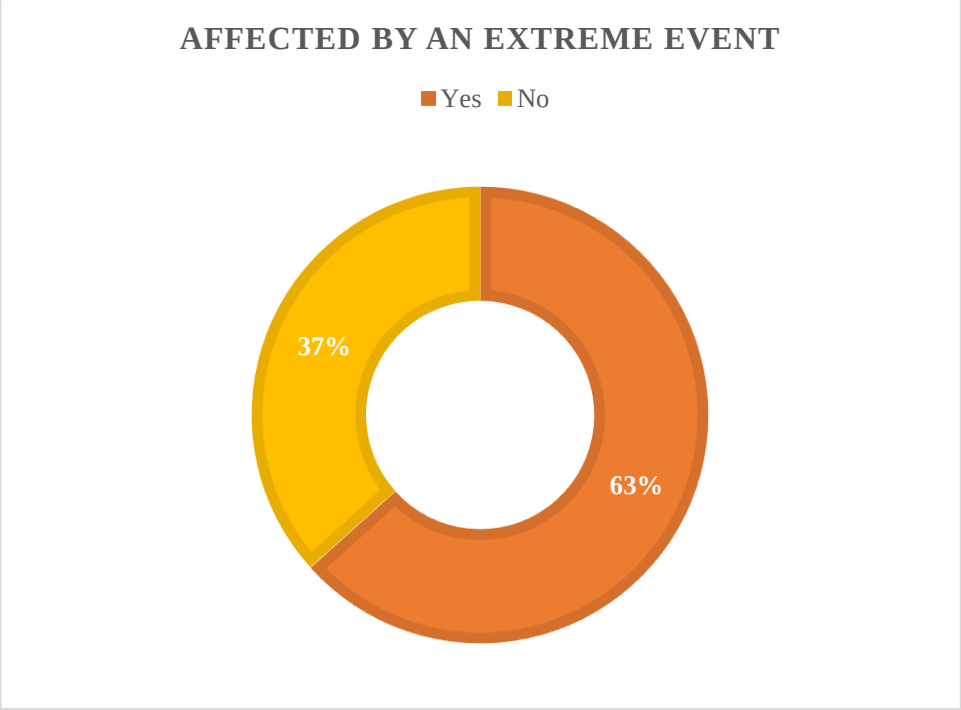

Figure 5.4: Businesses affected by Extreme Events

5.3.6 Damages

Disasters may directly impact the local businesses in the shape of damage to the built-up structures, electricity breakdowns, disruption in water supply, and blockage of transport linkages, and indirectly in the form of disrupted supply of goods and commodities which force the small businesses to shut down. The analysis of the data collected during the field survey reveals that the majority of businesses were affected due to Structural Damage (32%), Blockage of Transport Linkages (22%), Disruption in the Supply Chain (21%), and Damage to Stored Items (15%).

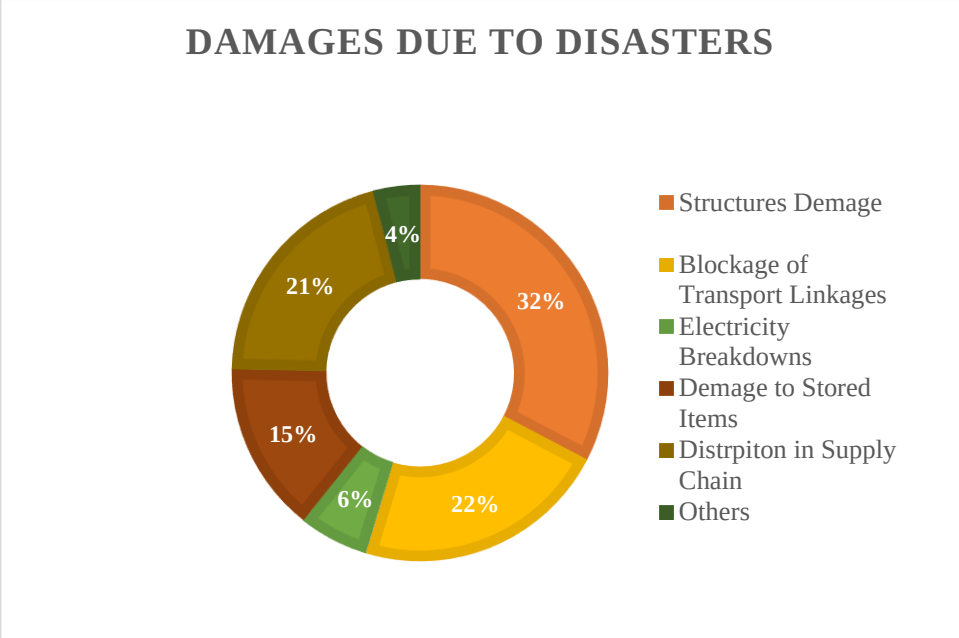

Figure 5.5: Damages to Businesses due to Disasters

5.3.7 Time of Recovery

Among the business impacted due to an extreme event, only 16% of them recovered and were functional again within 6 months after the disaster. 20% of the business took 7 months to 1 year to recover, while the remaining 64% of business took more than 1 year to recover and became functional again.

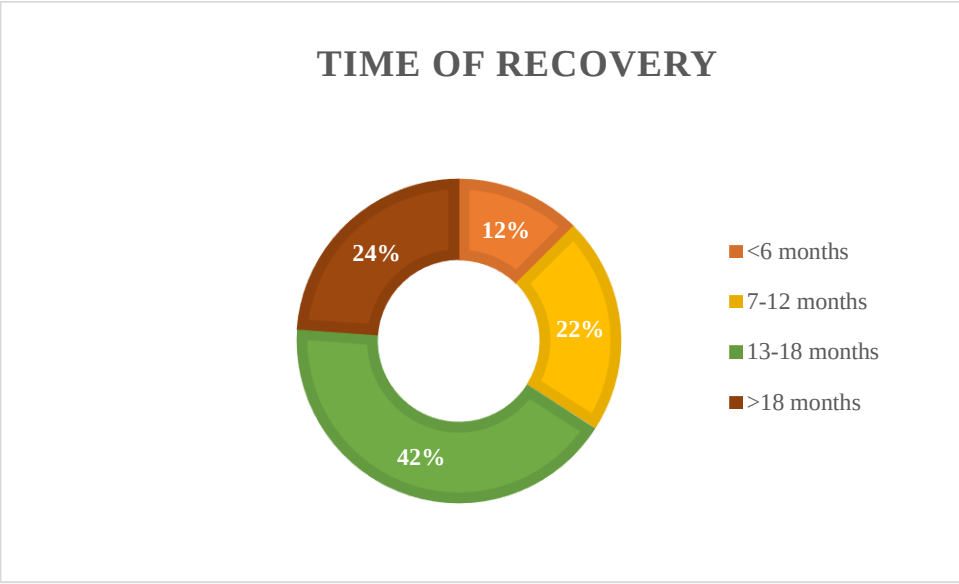

Figure 5.6: Time taken by Businesses to recover after disasters

5.3.8 Disaster Preparedness

The preparedness level of Businesses was evaluated using thirteen indicators chosen from previous research carried out on the Preparedness level of SMEs in case of an extreme event like an earthquake, floods, and so forth. The selected indicators were; Information Regarding Local Disasters, Disaster Survival Kits, First Aid Kits, Special Training, Signed Up with news/alert system, Stored goods at various locations, Arrangements/Plan for shifting valuable items to a safe place, Light Sources not dependent upon electricity, Cell Phones with good battery along with power banks, Money, Emergency Operational Plan, Evacuation Plan, Insurance Coverage. The Disaster Preparedness was measured based on a two-point scale, i.e., No (0) and Yes (1). Therefore, generally, the value of Disaster Preparedness (DP), lies in between the range of 0 and 1. The DP for all of the Businesses was calculated using the equation given below:

$$DP = (\sum W_1 + W_2 \ldots\ldots W_{13})/n$$

After inserting data into the form, the evaluator computes a score that represents the disaster preparedness of the respective business. To differentiate between the level of DP of each business, the average score is then grouped into 4 different categories of preparedness, such as; < (M – SD = Very Low, (M - SD) – M = Low, M – (M + SD) = Medium, and > (M + SD) = Good. The number of businesses falling in each category of preparedness based upon the final Score of DP, is given in Table 5.3.

Table 5.3: Disaster Preparedness Level of SMEs

Categories/ DP Score	Disaster Preparedness (DP)	No. of Businesses	Percentage	Statistics
< (M - SD) <0.42	Very Low	18	12%	Min = 0.15
(M - SD) – M 0.42 - 0.58	Low	46	31%	Max = 0.85
M – (M + SD) 0.59 - 0.74	Medium	62	41%	Mean (M) = 0.51
> (M + SD) > 0.74	Good	24	16%	SD = 0.14
TOTAL		**150**	**100%**	

The data analysis shows that the DP level of 12% of SMEs was very low and that of 31% SMEs was low, making them more vulnerable to extreme events. As the statics in table no. 00 show, the DP level of 41% of the Businesses was medium. Based on previous experiences, some of the business tried to prepare themselves for extreme events. Only 16% of the total 150 surveyed SMEs were somehow prepared for the extreme events.

5.3.9 Information

During interviews, the researcher also asked the respondents about their preference for getting information about various disaster events. Around 25% of respondents were interested in getting information through social media platforms, and 24% of respondents were willing to get information about extreme events through cell phone calls or alerts, followed by Television (19%), Public Meetings (16%), Brochures (10%) and Hoardings or Billboards (6%).

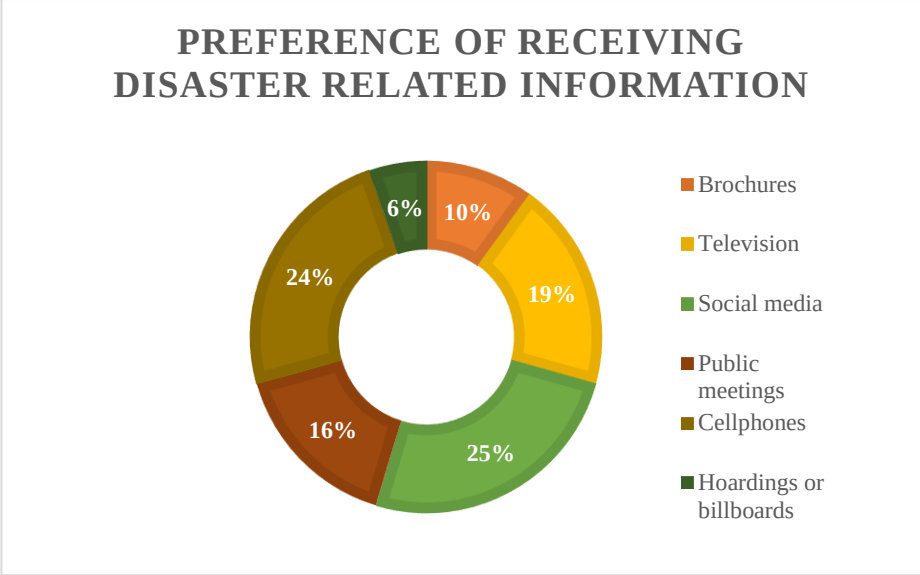

Figure 5.7: Preference of source to receive disaster related information

5.6 Summary of the Chapter

Disasters do not exempt businesses from destruction, damage, and disruption, which can impact their capacity to continue operating. SMEs are particularly sensitive to the negative consequences of disasters. Moreover, due to the location, kind of catastrophe, structural type, and financial sustainability, disasters substantially influence SMEs. SMEs, particularly those in developing countries, are more likely to be located in hazardous areas, have risky business resources, lack the financial and human resources, and the required fear and understanding of their vulnerability. Disasters have a significant impact on SMEs all around the world. SMEs represent 90% of all private businesses in Pakistan and employ roughly 78% of the non-agricultural work population. The contribution of SMEs to Pakistan's Gross Domestic Product (GDP) is greater than 30%. But these SMEs are vulnerable to natural catastrophes due to limited workforce, geographical location, and limited access to the market. This study explores the preparedness level of SMEs in Gilgit Baltistan, Pakistan, in case of extreme events.

The survey was conducted in three major districts of Gilgit Baltistan; Ghance, Shigar, and Skardu. A total of 150 businesses were included in this study through a structured interview. Data was then analyzed using frequency tables, descriptive tables and cross tables. The average value of Disaster Preparedness (DP) suggests the preparedness level of business. The conclusion of the study is that only 16% of the businesses were prepared for extreme events.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.1. Conclusion

The physical vulnerability assessment of CHS in 3 major districts of Gilgit Baltistan, Pakistan, reveals that the CHS in these districts are critically vulnerable and needs immediate action for its protection and conservation. Few of them were highly vulnerable, demanding rehabilitation and some corrective interventions. Almost half of the CHS surveyed during this research were in the category of medium vulnerability. The study further reveals that rehabilitation/ conservation, the current condition of the building, and corrective interventions are the major factors that may increase or decrease the vulnerability of these buildings.

It is pertinent to mention that almost all of the CHS surveyed during this study are operated and managed by the local community or NOGs. For instance, the Shigar Fort, Old House, and Khaplu Fort are managed by AKCSP. These sites are being used as museums and for residential purposes. The income generated is then used for its conservation and maintenance. Other CHS are being used for religious purposes and managed by the local community. The three CHS, namely, 1) Thoqsi Khar; 2) Kharpocho; & 3) Masjid Panjitan-e-Pak, are vacant and act as tourist spots only with no vehicular access. An urgent vulnerability assessment, rehabilitation, and some corrective interventions are required to diminish vulnerability and ensure the protection of these Cultural Heritage Sites and the visitors' lives.

The analysis of the dated collected further reveals that more than 90% of the Business owners in Gilgit Baltistan are male, which shows that the sole responsibility of earning a livelihood is on the shoulders of the man. The types of business in the area were;

Hotel owners, shopkeepers, Hawkers, tour operators, travel guides, etc. Due to the presence of Cultural Heritage Sites in the study area, tourists from all over the country and abroad directly and indirectly influence the income of local businesses. The per month earning ranges from PKR 10,000 to 200,000, which clearly shows that tourism is playing an important role in boosting the locals' economy, as business related to hospitality is earning more.

The most common types of extreme events in Gilgit Baltistan, Pakistan are earthquakes, landslides, rock falls, floods, GLOF, etc. (Iqbal et al., 2014; Khattak et al., 2010, Atta-Ur-Rahman & Shaw, 2015). The analysis of the dates collected during the field survey depicts that flood is the most common disaster affecting the local businesses, followed by land sliding and earthquakes (see Figure 5.2). The data further reveals that 63% of the respondents were already affected by the extreme events in the past, and the main reason behind this was structural damage followed by Blockage of Transport Linkages and Disruption in the Supply Chain. Among the 150 respondents, the businesses affected due to extreme events in the past, 64% of them took more than 1 year for their recovery. The Disaster Preparedness (DP) level of these businesses were measured using thirteen indicators, namely, Information Regarding Local Disasters, Disaster Survival Kits, First Aid Kits, Special Training, Signed Up with news/alert system, Stored goods at various locations, Arrangements/Plan for shifting of valuable items to a safe place, Light Sources not dependent upon electricity, Cell Phones with good battery along with power banks, Money, Emergency Operational Plan, Evacuation Plan, Insurance Coverage. The data analysis shows that the DP level of 12% of SMEs was very low and that of 31% SMEs was low, making them more vulnerable to extreme events. Based on previous experiences, some of the business tried to prepare themselves for extreme events. As the statics in table no. 5.3 shows that DP level of 41% of the

Businesses was medium. Only 16% out of the total 150 surveyed SMEs were somehow prepared for the extreme events. 25% of the respondents were interested in receiving the information regarding the disasters through Social Media, and 24% of the respondents are interested in receiving the information on cellphones through calls and alerts, followed by Television (19%), Public Meetings (16%), Brochures (10%) and Hoardings or Billboards (6%).

6.2. Recommendations

Therefore, it is recommended that rehabilitation of the CHS, in critically vulnerable conditions, may be carried out immediately. Furthermore, corrective interventions may be carried out in these CHS to decrease the vulnerability. The government may do these, or the site may be handed over to the NGOs related to Cultural Heritage Sites, like in the case of Shigar Fort, Old House, and Khaplu Fort. It is also recommended that a massive and aggressive campaign be initiated to communicate with the locals about the natural hazards, the importance of CHS, and techniques of protection of CHS.

It is recommended that the locals may be educated regarding the disasters and their impacts through various seminars, TV and Radio Programs, and short clips on Social Media. Training drills for eviction in case of extreme events may be performed in the area. Moreover, hazard mapping and master planning of the area must be done to restrict development in areas more vulnerable to extreme events. Local authorities must ensure the building codes and proper design to save the damages due to earthquakes. Furthermore, the path of the flood may be cleared, and embankments may also be constructed before the start of summer. It is also recommended to install Early Warning System (EWS), at various locations in the main commercial area.

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