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SCHOOL OF ARCHITECTURE AND PLANNING

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APPROVAL SHEET

This project is submitted to the Department of City & Regional Planning, University of Management & Technology, Lahore for the partial fulfillment of Bachelor's Degree

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**DEPARTMENT OF CITY & REGIONAL PLANNING
SCHOOL OF ARCHITECTURE & PLANNING
UNIVERSITY OF MANAGEMENT & TECHNOLOGY, LAHORE**

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DEDICATION

We dedicate this research to all those individuals who believed in us and encouraged us throughout the journey of our educational career. We are thankful to our Parents, teachers and colleagues who helped us and motivated us in every step regardless of all the difficulties we faced. We are thankful to all of them.

DECLARATION

We hereby, declare that this thesis report is the outcome of our own research and it has not been published anywhere else before. The matter quoted in this text has been appropriately referenced and acknowledged.

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ABSTRACT

Commercial areas of Lahore have its own significance in the city, while no one ever thinks about the area whether it is safe or not. To analyze the role of disaster management in commercial areas of Lahore, the research selected first two phases of disaster management cycle which are (i) Perception and (ii) Preparedness. Considering the existing situation of Lahore commercial area, this research is divided into two study areas (i) Formal Markets or Multi Story Commercial Areas and (ii) Informal Markets or Traditional Commercial Markets. These areas have been surveyed and collected data. The analysis of data shows that informal markets have well perception of the occurrence of disaster while they lack in preparedness cycle. As well as formal markets are well prepared in both except one study area which is Hafeez Center, being victim of fire hazard disaster in previous leads to the safety concerns. This research allows to analyze the collected data and its indicators into different phases where as the study highly reflects to existing condition of fire hazard assessment of commercial areas of Lahore.

CHAPTER NO. 1

INTRODUCTION

CHAPTER NO 1. INTRODUCTION

1.1 BACKGROUND

As the second largest city in Pakistan, Lahore is very well known by its commercial activities, there are very different types of commercial activities are going on which includes textiles, industries, tanneries etc. Unfortunately, commercial areas of Lahore have always been a victim of some kind of disasters. Most of them are manmade disasters. Whereas those manmade may include fire hazards, building collapse etc. Considering the fire hazards in the commercial sector of Lahore, the area is going to study in two different domains, (i) Informal Markets (Traditional Commercial Markets) and Formal Markets (Multi Story Commercial Plaza). Informal markets consist further three areas, (i) Shah Alam Market, (ii) Icchara Bazar, and (iii) Baghbanpura Bazar, whereas formal markets are, (i) Emporium Mall, (ii) Hafeez Center and (iii) Xinhua Mall.

Moreover, Risk refers to the likelihood of an adverse effect resulting from an event or an activity. Risk may be described as lack of certainty about consequences of an incident and threat of undesired and misfortunate happening. It can be defined as potential of loss (Rohrmann, 2008), or likelihood of an adverse effect that can be due to the result of an event (Renn & Coates, 2010). That's why, the area is going to be analyzed under these two phases of Perception and Preparedness in the context of pre-disaster management.

The fiasco incorporates both regular and synthetic catastrophes, yet if there should be an occurrence of Lahore "man-made" debacle can be seen more than cataclysmic events and sadly Lahore is deficient in giving departure plans in the need of hour. It impacts the framework, climate, public, creatures, topography and various components of the earth could be impact by the event of the fiasco, and it relies upon the power and beginning of the debacle.

Moreover, general public of Lahore loves doing shopping without considering the safety issues residing in the areas. The study conducted to aware the public about perception and preparedness of Disaster Management Cycle, because in the end safety of humans, infrastructure, environment and topographic are the most important factor while planning a sustainable city and leading that city towards a disaster resilient city.

1.2. PROBLEM STATEMENT

Disaster management is one of the most lacked sector in Lahore. The unattended post disaster effects can lead to poor infrastructure, poor health, poor safety measures. Disasters can be occurred anywhere, whether its city or rural area, a house or commercial market, on contours or on sea side, which can be both natural and manmade. Natural disaster occurs as earthquakes, flooding, volcanoes eruption etc. Whereas manmade disasters occur as fire hazards, collapsed buildings etc, and such disasters mostly happened on urbanized area which directly effects the public. Disaster is considering as the deadly factor, if one cannot be able to protect itself from post disaster stress or effects, the aftermath of the disaster can lead long time which effects the mental health. Natural Disasters occurred from the start of the civilizations, but manmade disasters occurred with the increase of population and development. It has been noticed from the start.

The disaster includes both natural and manmade disasters, but in case of Lahore “man-made” disaster can be seen more than natural disasters and unfortunately Lahore is lacking in providing evacuation plans in the need of hour. It effects the infrastructure, environment, public, animals, geography and multiple elements of the earth could be effect by the occurrence of the disaster, and it depends on the intensity and origin of the disaster.

Occurrence of disaster could be considering as normal if the public or area has been managed with the pre disaster training and techniques. The problem arises when there is no evacuation plans for public, no pre disaster management or no disaster relief schemes, which leaves multiple losses, that’s where problem has been observed. Natural disasters could be seen in a seasonal form like flooding usually occur in monsoon era, earthquakes occur with volcanic eruption but manmade disasters can be seen cyclic, one after another is the scenario of manmade disasters considering the fire hazards in case of commercial areas of Lahore. Concluded the problem, there is a need to provide pre disaster preparation for commercial area of Lahore which includes, (i) Multi Story Commercial Plaza and (ii) Traditional Commercial Markets as long as the administration of these commercial sectors also needs training which is going to be discussed in the study.

1.3. RESEARCH QUESTION

- How well are the commercial markets including formal and informal markets prepared to cope up with the fire hazard?

1.4. RESEARCH OBJECTIVES

1. To review policies of Pre Disaster Management sector of Traditional Commercial Market and Multi Story Commercial Plaza of Lahore.
2. To review evacuation plans of Pre Disaster Management of Traditional Commercial Market and Multi Story Commercial Plaza of Lahore.
3. To evaluate fire hazard preparedness of the (i) Multi Story Commercial Plaza and (ii) Traditional Commercial Markets.
4. To assess preparedness of the community and associated departments after the occurrence of disaster.
5. To recommend/ propose a disaster resilient infrastructure and well prepared community which can resist the upcoming disasters in the future.

1.5. RESEARCH METHODOLOGY

Research refers to the systematic method consisting of enunciating the problem, formulating the hypothesis, collecting the data analyzing the facts and reaching certain conclusions towards the research problem. Research methodology is a way to systematically resolve the problem. (Kothari, 1990)

Gerhardt (2004), argued that “deciding what methodology to use for a study is a challenging endeavor and portends difficulties if the most appropriate methodology is not selected”. A qualitative approach has been adopted for this research. This approach has been chosen due to its research data collection method, such as field surveys include questionnaire based data as well as the research approach fits the main research question which is of “what type”. This type of question is related to procedures and intends to show both the negative and positive feelings of different people within the society. It therefore qualifies to adopt a questionnaire approach for this research. The research methodology adopted for this research is discussed in detail in Chapter-3 of the thesis.

1.6. LITERATURE REVIEW

For this research, the institutional framework of Pakistan has been studied. In accordance to this, international and national articles have also discussed, the details of literature have discussed in chapter 2.

1.7. SCOPE OF STUDY

In order to have in-depth understanding of the problem, the study confines itself to the pre disaster management of commercial market includes traditional commercial market and multi-story commercial plaza in Lahore. The study included fire hazard assessment in the study areas.

The study involves detailed surveys of the selected site to determine the existing building condition in context with fire safety. As well as, to study the planning basis of these markets, their approval status and their fire based evacuation plans.

The study is based on extensive data collection from both the field and the NDMA record (National Disaster Management Authority, Islamabad), as to find out the root cause of unavailability of fire based evacuation plans and not providing the pre disaster techniques/trainings to the general public including customers, staff, owners of the commercial markets.

1.8. LIMITATIONS

- Lack of awareness in public regarding to data collection surveys.
- Unjustified behavior of public has been a major limit to collect the data.
- Outbreak of Covid-19, has played a very negative impact on real ground studies, which imposes multiple types of restrictions.

1.9. STRUCTURE OF THESIS

- This thesis composed of following chapters.
- **Chapter-1** throws a light on the statement of problem, the research question and objectives of research study. It also gives a snapshot of research methodology, scope of research and its limitations.
- **Chapter-2** provides a comprehensive study on international case studies, their methodology and results. Moreover, national research articles written by Dr. Irfan Ahmad Rana in the field of disaster management. In addition to this, studying the authorities present in Pakistan related to disaster has also been incorporated in this chapter.
- **Chapter-3** based on methodology, (i) materials and methods, (ii) questionnaire development, (iii) sampling and (iv) research process.
- **Chapter-4** comprises of data collection and pictorial representation of areas. Moreover, it also throws light on data collection tool e.g.; ODK.

- ***Chapter-5*** this chapter is based on data analysis tools used in this study, which are (i) descriptive analysis, (ii) indexing, (iii) web analysis, (iv) cross tabulation and (v) correlation analysis.
- ***Chapter-6*** extracted the key findings from chapter-5 analysis.
- ***Chapter-7*** provides a detail conclusion of all research.
- ***Chapter-8*** based on the recommendations which includes institutional proposals, infrastructural proposals and awareness based proposals.

CHAPTER NO. 2

LITERATURE REVIEW

CHAPTER NO 2. LITERATURE REVIEW

To review the practices of pre-disaster management phases, the literature review has been done considering institutional framework of Pakistan and other articles.

Disaster/emergency planning for records and information should be a planned approach for the prevention of records and information loss, preparedness and response to the emergency events affecting records and information, recovery of records and information, and necessary processes and equipment for business continuity following the event.

The recovery phase includes the implementation of short-term activities that restore vital records and information while restoring normal business operating procedures and practices. This phase includes assessing damage, stabilization and salvage techniques, restoration of records, information and equipment, and resumption of operations.

The prevention/mitigation phase involves: establishing a vital records program, completing risk management processes, and developing a disaster prevention plan.

The four primary phases are

- **Preparedness** - First, prepare to protect yourself, others and items of great importance in the event an emergency/disaster occurs.
- **Response** - When there is an actual occurrence, administer first aid or get medical attention for victims if necessary. Attend to other emergency procedures that must take place in order to lessen the impact.
- **Recovery** - After things are under control, begin the clean up or repair any damage and if necessary, call in professional restoration services.
- **Mitigation** - Finally, ask how did this disaster, accident or emergency happen and how can any problems that occurred in handling the incident be lessened. (Nojavan et al., 2018)

2.1. INSTITUTIONAL FRAMEWORKS

1. National Disaster Management Authority (NDMA)
2. Provincial Disaster Management Authority (PDMA)
3. District Disaster Management Authority (DDMA)

NDMA

In NDMA Act 2010, the force has been established named as “National Disaster Response Force”

- 1) There shall be established a National Disaster Response Force for the purpose of specialist response to a threatening disaster situation or disaster.
- 2) Subject to the provisions of this Act, the force shall be constituted in such manner and the condition of services of the members of the Force shall be such as may be prescribed.
- 3) Control Direction – The general superintendence, direction and control of the National Disaster Response Force shall vest in, and exercisable by the National Authority.

NDMA has three wings, which are;

Administration & Finance (A&F) Wing

- ❖ Manage all Administrative and Financial matters of NDMA.
- ❖ Provide complete Administrative Support to NDMA Operations Wing.
- ❖ Order, Procure, Transport and keep record of relief goods.
- ❖ Management of Human Resource and related matters.
- ❖ Management / Maintenance of NDMA transport vehicles.
- ❖ Management all Administrative, Finance and Audit matters.

Disaster Risk Reduction (DRR) Wing

- ❖ Handling all matters related to Disaster Risk Reduction Policies, Risk Insurance, Flood related issues, Disaster Awareness and National Disaster Management Committee (NDMC).
- ❖ Implement, Execute Projects and Evaluate all matters related to National Disaster Management Plan (NDMP).
- ❖ Monitor and Evaluate Plans, Strategies at National, Provincial, District level as well as civil sector.
- ❖ Mainstream Disaster Risk Reduction into Development sector.
- ❖ Manage International Cooperation, Global Frameworks and Regional organizations.
- ❖ Coordinate with United Nations Agencies, Bilateral / Multilateral Organizations and International Non-Government Organizations (INGOs) / Non-Governmental Organizations (NGOs).

Operations (OPS) Wing

- ❖ Manage National Emergency Operations Center (NEOC).
- ❖ Supervise and Coordinate Relief and Rescue Operations (Inland and Foreign).
- ❖ Prepare Situation Updates / Briefs.
- ❖ Make Contingency Plans for the country.
- ❖ Supervise all matters related to Urban Search and Rescue (USAR) Teams.
- ❖ Make Briefs / Presentations for Prime Minister, President, Members of Senate & National Assembly and other Dignitaries.
- ❖ Coordinate relief efforts with Federal / Provincial Authorities, Armed Forces and Organizations.
- ❖ Contingency Plans for full spectrum of Disasters faced by Pakistan.

PDMA

Provincial Disaster Management Authority (PDMA) is a Federal Government organization, which deals with natural or man-made disasters in Khyber Pakhtunkhwa of Pakistan. PDMA's mandate is to engage in activities concerning to all four stages of Disaster Management Spectrum. As a sequel to the devastating earthquake of 8 October 2005, the National Disaster Management Ordinance was promulgated with a view to establish and regulate an enhanced and progressive Disaster Management Framework at the National, Provincial and Local level for disaster mitigation, preparedness and response.

PDMA has its department named as “Response & Recovery”, this department deals with the budget needed while Response or Recovery.

The data comprises of

- 1) Response & Recovery Year 2010**
 - ✓ Available Balance in Relief Head Accounts with DCs KP
- 2) Response & Recovery Year 2014**
 - ✓ Available Balance in Relief Head Accounts with DCs KP
- 3) Response & Recovery Year 2015**
 - ✓ Available Balance in Relief Head Accounts with DCs KP
- 4) Response & Recovery Year 2019**

- ✓ Available Balance in Relief Head Accounts with DCs KP

5) Response & Recovery Year 2020

- ✓ Chitral Floods – Recovery Needs Assessment
- ✓ Available Balance in Relief Head Accounts with DCs KP

DDMA

1. Each Provincial Government shall, as soon as may be after issue of notification under sub-section (1) of section 13, by notification in the official Gazette, establish a District Disaster Management authority for every District.
2. The District Authority shall consist of such number of members, as may be prescribed by the Provincial Government and unless the rules otherwise provide, it shall consist of the following members.
 - Head of the local council at the district level who shall be Chairperson, ex-officio.
 - The District Co-ordination Officer.
 - The District Police Officer ex-officio.
 - The Executive District Officer, Health.
 - Such other district level officers, to be appointed by the District Government

NDMA PUBLICATIONS

“National Disaster Response Plan 2019”

- In this book the methods, guidelines, ways have been describes to how to response during or post disaster time.

“Policy Guidelines Implementation Matrix”

- This book consists of Implementation framework in which During or Post disaster areas has been identifying along with actions and activities and their respective responsible authorities. (NDMA, n.d.)

EARTHQUAKE RECONSTRUCTION & REHABILITATION AUTHORITY

GOVERNMENT OF THE ISLAMIC REPUBLIC OF PAKISTAN (ERRA)

- The idea behind the creation of ERRA was to bring all efforts and activities, pertaining to post disaster damage assessment, reconstruction and rehabilitation in the affected areas under one umbrella, with a view to providing a fast track and seismically safe reconstruction regimes and solutions.

- ERRA’s mission is to “Convert this Adversity into an Opportunity” by reconstructing the lost and destroyed facilities, while following highest standards of reconstruction and rehabilitation with the obligation to “Build Back Better”.
- Main role of ERRA is macro planning, developing selected strategies, financing, project approval and monitoring and evaluation. Additionally, it ensures the required coordination and provides facilitation to implementing partners, whereas physical implementation of the projects is the responsibility of respective governments.
- ERRA has intervened in 12 different sectors, 3 cross-cutting programmes, and is required to reconstruct over 13,000 projects, (at the cost of over US \$ 5 billion) located over more than 30,000 sq km of nine districts of AJK and Khyber Pakhtunkhwa. (*ERRA : Earthquake Reconstruction & Rehabilitation Authority, n.d.*)

PAKISTAN POVERTY ALLEVIATION FUND (PPAF)

- PPAF has published a book named as “PPAF DISASTER MANAGEMENT STRATEGY July 2015 – June 2020”. In which the fourth part of the book, represents the Response, Reconstruction and Rehabilitation sector.
- PPAF emphasizes on pre disaster risk reduction so that the preparation pays off and there is minimal loss when a disaster does set in. Emergency response is focused on immediate and short term needs constituting 1) response; 2) evacuation; and 3) relief. HAP standards will be adhered to help PPAF and its partners to design, implement, assess, improve and recognize accountable programmes while saving lives and reducing suffering. (*Pakistan Poverty Alleviation Fund, n.d.*)

2.2. LITERATURE REVIEW

Characterizing flood risk perception in urban communities of Pakistan study gives an insight into psychosocial aspect of multifaceted risk flooding prone urban communities of Punjab, Pakistan. Three urban communities at high flood risk were selected from urban centers of varied population size. A sample of 210 was collected using household surveys. Flood risk perception index was constructed using relevant indicators, and classified into high and low perceived risk. Logistic regression model was used to identify determinants of flood risk perception. The results show that past experiences and hazard proximity significantly influence risk perception. The determinants of risk perception also varied among the

communities, depicting spatial variation. Findings of this study can help in understanding flood risk perception and its determinants, so on style proper risk communication strategies and flood risk management plans. additionally, this study can help in understanding multidimensional flood risk and its spatial dynamics from a science perspective. (Rana, Jamshed, et al., 2020)

Whereas, purpose of another paper is to propose a practical framework for community participation in post-disaster resettlement. The proposed framework has been tested in two model villages (MVs) of Punjab, Pakistan. Primary data were collected through household surveys, focus group discussions and expert interviews. A survey with 67 households was conducted for obtaining qualitative data regarding community participation in post-disaster resettlement. the primary MV (Ittehad MV) was resettled by the local NGO, and therefore the second (Basti Meera Mullan) by the provincial government. Results indicate that community participation significantly varied in selected MVs. NGOs have achieved positive realizations thanks to effective community involvement in resettlement efforts, whereas the governmental approach lacked in proactive community participation. This framework are often used for other disasters, by refining and incorporating disaster relevant components. This research are going to be highly useful for disaster managers, private developers and NGOs engaged in resettling disaster-affected population. The proposed framework can help disaster-affected communities to resettle consistent with their terms. this will only be attained if affected communities will proactively participate in resettlement planning process. This original framework is exclusively designed to achieve sustainability for post-disaster settlement through community participation. (Jamshed et al., 2018)

The objective of third paper is to live the livability as perceived by the residents. Six urban settlements were selected through representative sampling to represent three income groups present within the study area, i. Results showed a big relationship between perceived livability and livability attributes. The environmental attribute was found most vital in affecting livability perception of residents. The study also highlights eight livability variables which require to be considered for improving the standard of life in future urban

development projects, not just in Pakistan, but also other developing countries.(Baig et al., 2019)

While, fourth study evaluates the effectiveness of flood EWS from the perspectives of local experts/institutions and communities. Interviews and consultations with the local experts were carried out to understand the institutional challenges in communicating early warnings, whereas three flood-prone communities from different-sized cities were surveyed. The analysis revealed that almost half of the community respondents did not receive a warning last time when the flood occurred. (*Effectiveness of Flood Early Warning System from the Perspective of Experts and Three Affected Communities in Urban Areas of Pakistan: Environmental Hazards: Vol 20, No 3, n.d.*)

Moreover, this study proposes a risk perception assessment methodology, and is operationalized in context of highschool students during a multi-hazard area of Gilgit, Pakistan. Risk perception was measured using four components, i. Among the measured risk perception indicators, the fear component received the very best score. The study also observed significant differences within the risk perception indicators. This study highlights that for better understanding of the multifaceted nature of disaster risk, the gender aspect must be incorporated in risk perception assessment.(Khan et al., 2020)

he 6th examination paper is said to the urbanization difficulties and openings in Lahore. during this paper examine about the overall history and current state of Lahore in regards to various areas like organization, worldwide environmental change, transportation, wellbeing, training, lodging, foundation and security related issues. Significant worry of this paper is said to urbanization in Lahore when urbanization start and presently where we stand and what challenges we face on account of urbanization. Difficulties like absence of incorporated metropolitan advancement arrangements, unchecked metropolitan development, covering locales of land administering specialists and incapable structure control further exasperate things. On other hand there are some sure advancements like further developed local area offices through Metro and Orange line transport frameworks, and reclamation of walled city. Yet at the same time Lahore must dynamic and organized organizations with specialized, lawful and administrative help for dealing with the steadily expanding populace and organizers had the opportunity to foster plausible, sensible and down to earth metropolitan

advancement intends to ensure incorporated infrastructural and financial improvement inside the city.(Rana & Bhatti, 2018)

The seventh examination paper is said to a calculated structure to know the elements provincial metropolitan linkages for country flood weakness. The point of this paper is to foster a bound together system to survey how provincial metropolitan linkages alter during a circumstance of a flood occasion in rustic regions and the manner in which it influences the weakness of its occupants. Rustic regions are exceptionally defenseless to floods because of restricted social, monetary, and actual assets. Comprehension of rustic weakness is essential for creating viable catastrophe hazard decrease systems. the primary worry of this paper is to know and conceptualize the farming weakness regarding the elements of rustic metropolitan linkages inside the instance of flood occasions. to attempt to naturally, current writing on rustic metropolitan linkages, weakness, even as factor that impact them were fundamentally inspected. Thinking about the main parts of country metropolitan linkages (stream of people, data, money, labor and products) segments of weakness (openness, vulnerability, and limit), and factors (social, monetary, institutional, infrastructural, spatial, and ecological), a brought together structure is proposed. Besides, the structure features the job of spatial variables city size and vicinity to the town as urgent to get a handle on provincial weakness. This system is regularly used as an instrument for understanding complex country weakness for worldwide environmental change variation and catastrophe hazard decrease agonizing about spatial improvement viewpoint. during this specific circumstance, experimental examinations are frequently made to support the proposed system and approaches are regularly presenting likewise. For the most part, the proposed structure can assist with perceiving ideas and associations of weakness, country metropolitan conditions, and provincial advancement dynamic.(Rana, Routray, et al., 2020)

The last examination paper is said to a spatiotemporal elements of improvement imbalances in Lahore city area. The point of this paper is to expand hypothetical comprehension of disparities through noticing its spatiotemporal elements. The destinations of this investigation is to characterize a city area and its grouping, to explore territorial improvement difference in framework and financial area, to survey commitment of foundation in financial advancement

of the town district. For this paper similar investigation has been directed more than 3 times periods (2002, 2007 and 2012) to check improvement level inside the city locale. Information base were separated from public data sets to foster a composite list involving fifteen markers, covering framework and financial spaces, coefficient of variety, t-tests and board information relapse were utilized to know the measure of dissimilarity, and their conditions. Result show that Lahore is impacting seventy sub-regions, out of which 21 are metropolitan, nineteen are peri-metropolitan, and thirty are rustic. Measurable tests affirm that huge improvement change exists between intervals of time, especially inside the framework area. Lahore metropolitan sub-areas have remained exceptionally evolved in every area, trailed by the rest of the metropolitan, peri-metropolitan and provincial sub-locale. This falls according to norms of center fringe model. Results likewise affirm that infrastructural improvement during a city region impact its financial development. (Jamshed et al., 2020)

CHAPTER NO. 3

METHODOLOGY

CHAPTER NO 3. METHODOLOGY

3.1. MATERIALS AND METHODS

The study has been done on two factors which Risk Perception of the community and Risk Preparedness of community and department as well. The prime reason for selecting these two factors is to have idea that how much community is willing to act in such events. For making it more empirical few indicators have been selected by reviewing the literature review.

RISK PERCEPTION

The indicators which has been selected under this factor are;

- Awareness
- Behavior
- Fear
- Reliability

i. Awareness

- There are two reasons to select this indicator, (i) to analyze the awareness/knowledge community have related to fire hazard events and, (ii) to create the awareness through our study that how community should react on such events.

ii. Behavior

- Behavior of the community generally lack in such events that's why it is important to have knowledge about how they have been reacted to the previous hazards and how much are they prepared from the past experience to act in future.

iii. Fear

- Disasters like fire hazards are mostly a consider as deadly disasters that's why general community is under fear related to this indicator. Therefore, this indicator has been selected to examine the fearfulness of the customers and shopkeepers of the area.

iv. Reliability

- Reliability plays a vital role in such disasters, and somehow it is connected to the other indicators as well, like if people will be more reliable on the system they will be less fearful and more aware on this factor, that's why it is important to check on reliability.

RISK PREPAREDNESS

To gather the information on preparedness, two domains has been selected which are, (i) Customers/Shop keepers and, (ii) Departments which deals with fire hazard issues. Every domain has its indicators, which are

Risk preparedness indicators for markets

- Safety
- Emergency Medical Services
- Knowledge About Emergency Responsive Departments

i. Safety

- The reason to select this preparedness indicator is to analyze the safety preparedness of the community.

ii. Emergency Medical Services

- The purpose of this indicator is to analyze the availability of emergency medical services and how well are community prepared for medical services.

iii. Knowledge About Emergency Responsive Departments

- It means to check that if the public is well known about these specific departments, and also their facilities which are assigned to the departments at the hour of need

1- MATERIALS AND METHODS

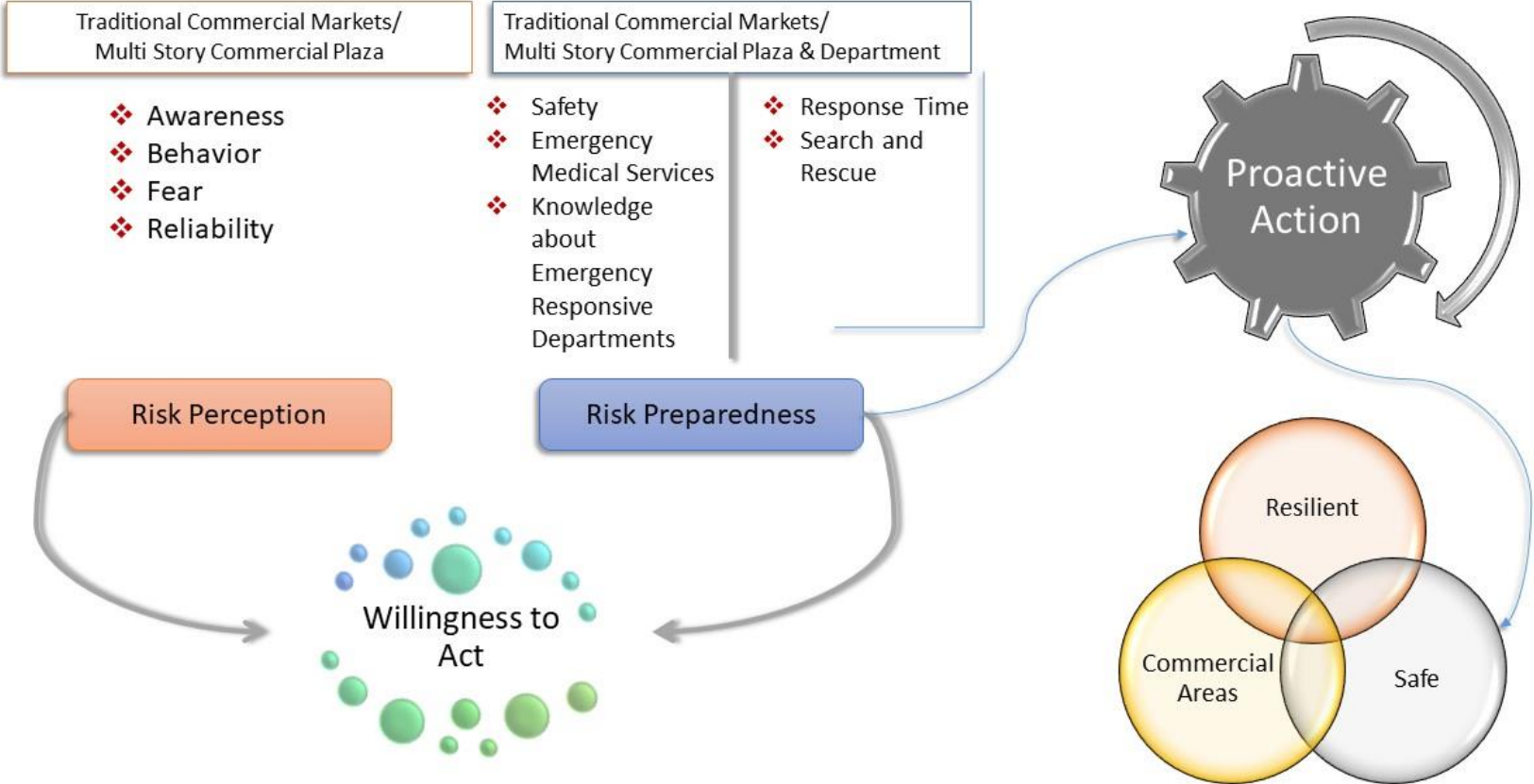


Figure 1 Methodology 1- Materials and Methods

3.2. QUESTIONNAIRE DEVELOPMENT

PERCEPTION INDICATORS

- Awareness
- Behavior
- Fear
- Trust

<u>Awareness</u>	
<i>Fire disaster in buildings is among the known man-made disasters:</i> Qno 1. Do you know about disaster?	(Kihila, 2017)
<i>Disaster preparedness is one of the important elements:</i> Qno 2. If fire disaster occurs, how well are you prepared?	(Kihila, 2017)
<i>Perceived extent of knowledge about rescue and evacuation procedures:</i> Qno 3. How much do you know about rescue and evacuation procedures against these fire hazards?	(Johnson J. R., 2014)
<i>Perceived understanding of disaster cause:</i> Qno 4. How much can you understand causes of these fire hazards?	(Sjöberg & Gianotti, 2017)
<i>Previous disaster has affected the victims in different manners:</i> Qno 5. How much past experience effects you?	(Armaş & Avram, Ho et al., & Sjöberg, 2000)
<i>Fire safety is essential component and requirement in building infrastructure plans:</i> Qno 6. Is there any fire safety plan in building?	(Yeturu1)
<i>Four types of extinguishers viz. water, dry powder, foam and oxygen:</i> Qno 7. Do you know about the types of fire extinguishers?	(Yeturu1)
<u>Behavior</u>	
<i>Awareness on the presence and position of the escape ways for use in case of outbreak:</i> Qno 1. Where is the assembly point you will go to following a fire alarm evacuation?	(Kihila, 2017)
<i>Perceived capacity to deal:</i> Qno 2. How much are you capable to deal with such fiery hazards?	(Chan, 2018)

<p><i>Fire emergency plan is provided for the people in the premises know what to do if there is a fire:</i></p> <p>Qno 3. In case of emergency will you follow the evacuation plan?</p>	(Chan, 2018)
<u>Fear</u>	
<p><i>Perceived extent of fear:</i></p> <p>Qno 1: How much are you afraid of fire hazard?</p>	(Armaş & Avram & Miceli et al., 2008)
<p><i>Increase Occurrence:</i></p> <p>Qno 2. Does fire disaster has occurred already in the area?</p>	(Ho et al., 2008)
<p><i>Fear on the basis of current knowledge:</i></p> <p>Qno 3. How much afraid are you about fire hazards based on current knowledge?</p>	(Wachinger et al., 2010)
<u>Trust</u>	
<p><i>Reliability of information acquired from different sources:</i></p> <p>Qno 1. How much are you reliable on the information about fire hazards which you obtain from different sources?</p>	(Cvetkovich, 2000)
<p><i>Contacting emergency departments is the prime action in such cases:</i></p> <p>Qno 2. Do you know any emergency contact numbers?</p>	(Yeturu1)
<p><i>Trust in disaster management agencies:</i></p> <p>Qno 3. How much do you trust in disaster management agencies in dealing with fire hazards?</p>	(Slovic & Gianotti, 2017)

Table 1 Questionnaire Perception Indicators

PREPARADNESS INDICATORS

- Safety
- Emergency Medical Services
- Knowledge about Emergency Responsive Departments

<u>Safety</u>	
<i>To ensure fire safety and enable effective fire emergency planning:</i> Qno 1. Are you being provided with the proper safety measures?	(C. SIVAKUMAR1, 2018)
<i>To suggest measures to enhance fire safety in commercial buildings:</i> Qno 2. Do you have any knowledge about the safety measures?	(C. SIVAKUMAR1, 2018)
<i>To suggest strategies to enhance fire safety in commercial buildings:</i> Qno 3. What strategies has been adopt by respective building/plaza’s administration to enhance your safety during fire hazard?	(C. SIVAKUMAR1, 2018)
<i>Managers/site in-charges, floor supervisors, and workers regardless of their level:</i> Qno 4. Is your shop is well attended by building/plaza’s staff or workers to maintain the fire hazard precautions?	(C. SIVAKUMAR1, 2018)
<i>Commercial buildings satisfy overall structural feature parameters:</i> Qno 5. Are you satisfied with your building/plaza’s feature regarding to fire hazard?	(Ho et al., 2008)
<u>Emergency Medical Services</u>	
<i>First aid kit is one of the most integral part for disaster preparedness:</i> Qno 1: Are you being provided with first aid kit?	(Nizam Ismail1 DrPH (candidate), 2016)
<i>In some cases it is required that a designated first aid attendant be on duty:</i> Qno 2. Does your shop/plaza has designated first aid attendant for such situations?	(Wachinger et al., 2010)
<i>All workers should know how to apply first aid kit in time of hour:</i> Qno 3. Do you know how to apply first aid kid to yourself and also to the injured one?	(C. SIVAKUMAR1, 2018)
<i>There are different types of first aid measures which are being used in such disaster:</i>	(Nizam Ismail1 DrPH (candidate), 2016)

Qno 4. Mention the type of first aid measure that you know how to apply.	
<u>Knowledge about Emergency Responsive Departments</u>	
<i>Receiving rapid response from fire protection department is the main objective:</i> Qno 1. How much time Rescue 1122 did take last time to response?	(Murphy, 2005)
<i>Fire protection departments should be helpful for the victims:</i> Qno 2. During the occurrence of the previous disaster, was fire protection department such as rescue 1122 was helpful?	(Murphy, 2005)

Table 2 Questionnaire Preparedness Indicators

DEPARTMENTAL PREPARADNESS INDICATORS

- Response Time
- Search and Rescue

<u>Response Time</u>	
<i>Prompt response time:</i> Qno 1. Do you response efficiently towards hazard occurrence area?	(Reliege, 2019)
<i>The standard response time is 9 minutes and 20 seconds:</i> Qno 2. How much time do you take for arriving ?	(Reliege, 2019)
<u>Search and Rescue</u>	
<i>First aid providing facility:</i> Do you keep check on the buildings about first aid availability or do you provide it to yourself during hazard occurrence?	(Gillian, 2014, 2017)
<i>Fire handling training sessions:</i> Do you give training sessions in Commercial areas (to their staff or management), how to escape or take primary actions in such situations?	(Johnson R. , 2016)
<i>Disability friendly rescue facility:</i> How much do you facilitate the disabled persons during disaster occurrence?	(Johnson R. , 2016)

Table 3 Departmental Questionnaire

2-QUESTIONNAIRE DEVELOPMENT

Attribute	Reference	Likert Scale	Evidence Weightage
PERCEPTION INDICATORS			
AWARENESS	<ul style="list-style-type: none"> ○ (Kihila, 2017) ○ (Johnson, 2014) ○ Gianotti ○ (Armaş & Avram, Ho et al., & Sjöberg, 2000) ○ Yeturu1 	0 to 5	0 = Satisfied 3 = Partial Satisfied 5 = Dissatisfied
BEHAVIOR	<ul style="list-style-type: none"> ○ (Kihila, 2017) ○ (Chan, 2018) 		
FEAR	<ul style="list-style-type: none"> ○ (Armaş & Avram & Miceli et al., 2008) ○ (Ho et al., 2008) ○ (Wachinger et al., 2010) 		
TRUST	<ul style="list-style-type: none"> ○ (Cvetkovich, 2000) ○ Yeturu1 ○ (Slovic & Gianotti, 2017) 		
PREPARADNESS INDICATORS			
SAFETY	<ul style="list-style-type: none"> ○ (C. SIVAKUMAR1, 2018) ○ (Ho et al., 2008) 	0 to 5	0 = Satisfied 3 = Partial Satisfied 5 = Dissatisfied
EMERGENCY MEDICAL SERVICES	<ul style="list-style-type: none"> ○ (Nizam Ismail1 DrPH (candidate), 2016) ○ (Wachinger et al., 2010) ○ (C. SIVAKUMAR1, 2018) ○ (Nizam Ismail1 DrPH (candidate), 2016) 		
KNOWLEDGE ABOUT EMERGENCY RESPONSIVE DEPARTMENTS	<ul style="list-style-type: none"> ○ (Murphy, 2005) 		
RESPONSE TIME	<ul style="list-style-type: none"> ○ (Reliege, 2019) 		
SEARCH AND RESCUE	<ul style="list-style-type: none"> ○ (Gillian, 2014, 2017) ○ (Johnson R. , 2016) 		

Table 4 Methodology 2- Questionnaire Development Method

3.3. SAMPLING

STUDY AREA

The commercial area of Lahore has been selected for the study which are categorized as (i) Multi Story Commercial Plaza and (ii) Traditional Commercial Markets. Usually site selection is a procedure of locating an area which needs to be redeveloped or which needs to be rectified by some problem. In case of this study, the site has been selected because of its vulnerability towards hazards.

There are three types of commercial land uses has been identified in Amended Master Plan of Lahore Division 2016, which are “Commercial, Retail/Commercial and Centre Commercial”.

In this study, the three types of commercial land uses merged into (i) Multi Story Commercial Plaza and (ii) Traditional Commercial Markets.

MULTI STORY COMMERCIAL AREA

Multi Story Commercial Plaza means a infrastructure having more than 48 ft. height, measured from the crown of the road to the top of the parapet wall excluding the structures such as chimney stacks, lift heads and water tower etc and classified into medium rise 1 (upto 90 feet), medium rise 2 (upto 120 feet), high rise 1 (upto 200 feet), high rise 2 (upto 300 feet) and sky scrapper above 300 feet.

These plazas shall be approved by Lahore Development Authority (LDA), having proper emergency exit routes. As well as, comprises of stairs, elevators, parking plaza and also provided mandatory open spaces on the surrounding of plaza. (LDA, 2019)

In Lahore, there are numbers of Multi Story Commercial Plaza's, out of which the plaza's which is listed below has been selected on some basis;

1. Hafeez Center
2. Emporium Mall
3. Xinhua Mall

(i) Hafeez Center, Lahore

The building has been selected because of its past event which occurs last year in October. The whole building was captured in fire, which causes huge loss in infrastructure, environment and most importantly its shopkeepers and customers.

Hafeez center is known as Lahore’s most famous electronic plaza. The plaza is usually entertains with the wholesale price gadgets. The reason for pre disaster planning in this plaza is its previous history of fire events and secondly due to its importance in the commercial market of Lahore.



Figure 2 Hafeez Center

(ii) Emporium Mall, Lahore

Emporium mall is known as multi-purpose commercial plaza. Emporium is a shopping mall located in Johar Town, Lahore southwest of Lahore International Expo Centre. The 11-storey mall is spread over 2.7 million square feet and is home to over 200 stores and a five-star hotel. Opened in 2016, it is the second largest mall in Pakistan after the Lucky One Mall in Karachi, and also one of the largest shopping malls of the world by gross leasable area. The Mall is managed by the Nishat Group. According to the mall's website, their daily estimated visitors are 44 thousand people. The mall's architecture was developed by AHR Architects, an international architectural firm and AHR Ali Naqvi Architects Local Architectural Firm. (htt7)



Figure 3 Emporium Mall

(iii) Xinhua Mall

Xinhua Mall is a shopping mall as well as comprises of a cinema multi story building located at MM Alam road.



Figure 4 Xinhua Mall

TRADITIONAL COMMERCIAL MARKET

The traditional commercial markets refers to the place where all kinds of goods were sold. The market which includes a centered large courtyard surrounded by a group of shops overlooking to the road. In the markets, merchants engage in buying and selling. (HMOOD, 2017)

Traditional commercial markets usually refers to those markets which are different from the design standards and are not registered as legal in records. Moreover, such markets consist of those shops which construct without considering mandatory open spaces. In addition to this, these markets

usually located in city core area or considered as basic sector markets. Further, the road infrastructure of such shops does not cope with the recent development



Figure 5 Traditional Marks

The traditional markets has been selected for the study are;

1. Shah Alam Market
2. Bhagbanpura Bazar
3. Icchara Bazar

(i) Shah Alam Market

The "Shah-Almi Gate" is named after Mughal emperor Shah Alam I, son of Aurangzeb. Prior to his death, the gate was called the "Bherwala Gate". During the 1947 partition riots, the gate was burned. Today only the name survives. Shah Alam Market is one of Lahore's biggest commercial markets, "Shah Almi Market" or Shahalmi as locals call it, exists near the site of the gate. This is one of the 12 Doors of Lahore. Its location can be traced at the sidelines of Shah Almi Market, Lahore. (htt3)



Figure 6 Shah Alam Market Imagery

(ii) Baghbanpura Bazar

Baghbanpura a bazar and Union Council of Shalimar tehsil, Lahore District, Punjab, Pakistan. It is located along the Grand Trunk Road some 5 kilometres northeast of the main Lahore city.

(iii) Ichhra Bazar

Ichhra is a commercial and residential area in Lahore, Punjab, Pakistan. It is predominantly a residential and commercial area. Being a very old locality, some very old buildings can be seen in Ichhra. It is noted for its Ichhra Bazaar, among the most economical markets of Lahore. (htt3)



Figure 7 Ichhra Bazar Imagery

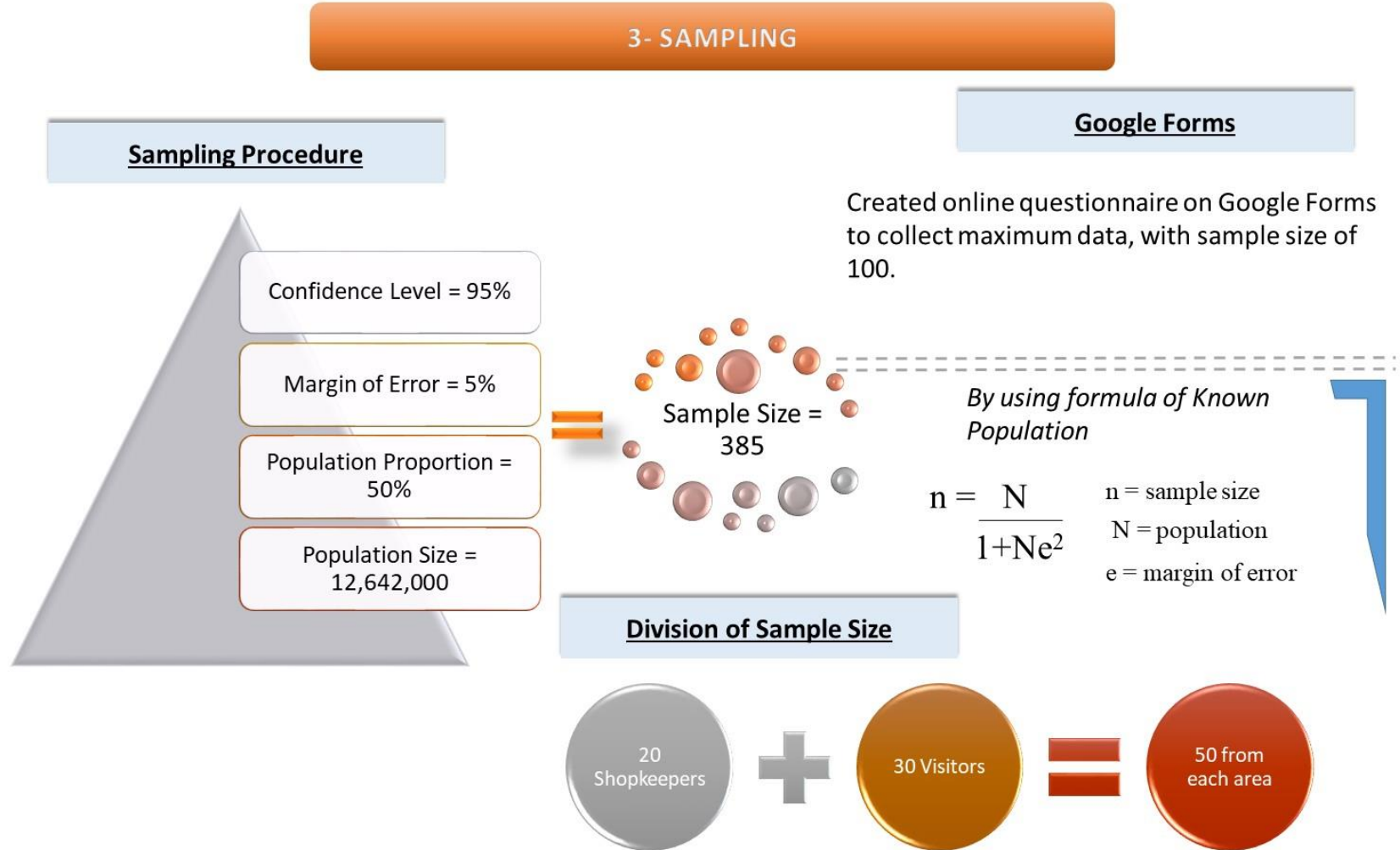


Figure 8 Methodology - 3 Sampling

3.4. Research Process

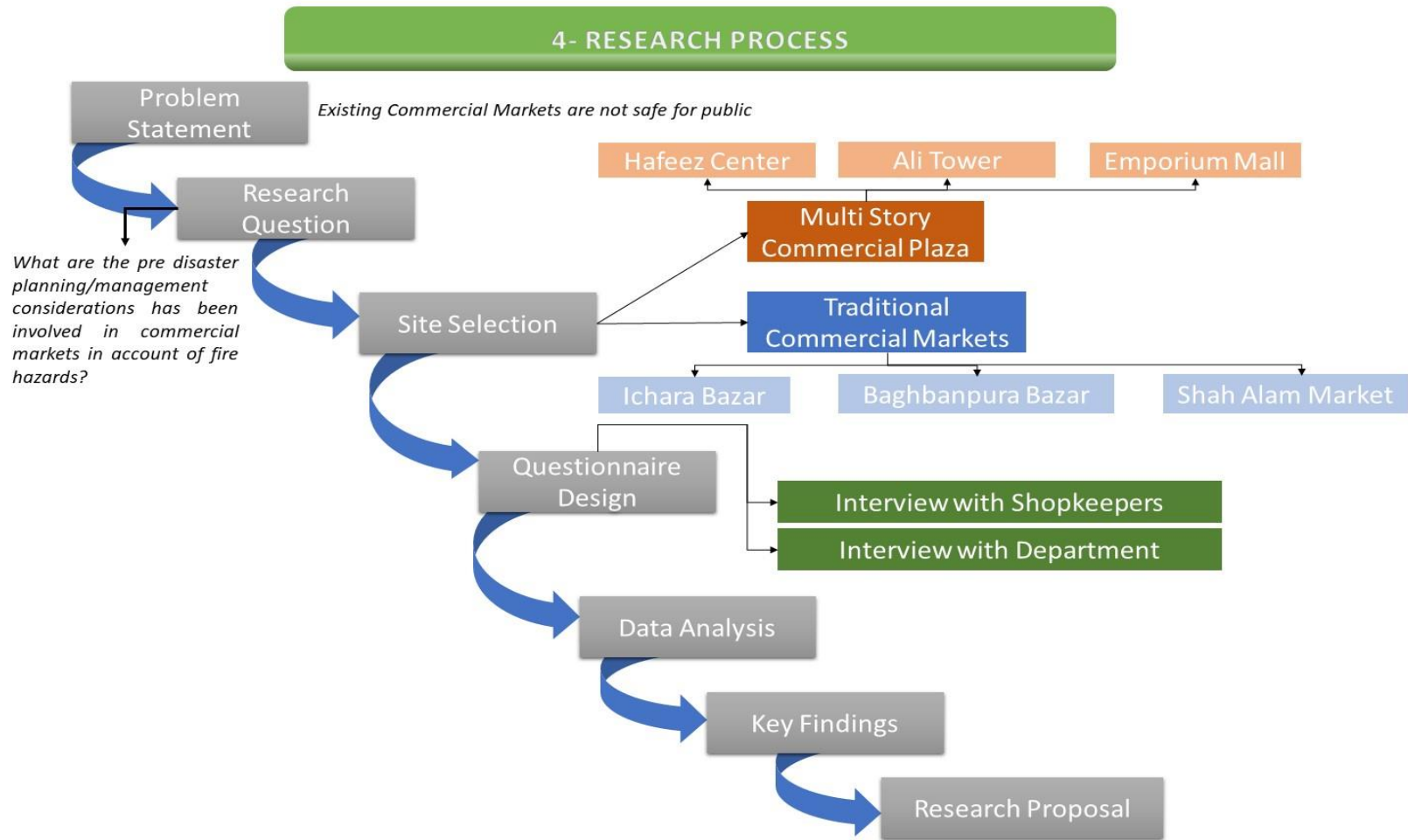


Figure 9 Methodology 4- Research Process

CHAPTER NO. 4

DATA COLLECTION

CHAPTER NO 4. DATA COLLECTION

4.1. PICTORIAL EXISTING SITUATION

Informal Market: Icchra



Figure 10 Infrastructure Condition in Icchara Bazar

In ICCHRA, Streets are unplanned and too narrow to pass 2 men simultaneously. Right of way of streets changes between 4ft to 10ft. The condition is very unpleasant since there is no day light. The streets are very hazardous and people have encroached most of the right of way.

Infrastructure is not good at all. The right of way is too narrow on top of that electric wires pass across the streets almost touching the balconies.

Informal Market: Baghbanpura



Figure 11 Infrastructure Condition of Baghbanpura Bazar

Infrastructure is not good at all. The right of way is too narrow and electric transformer put center in the road on top of that electric wires pass across the streets almost touching the balconies. These things cause of fire hazard.

Informal Market: Shah Alam Market



Figure 12 Infrastructure Condition of Shah Alam Market

In SHAH ALAM MARKET Infrastructure is not good at all. No implement building byelaws streets almost touching the balconies and no set back byelaws.

Formal Market: Emporium Mall



Figure 13 Infrastructure Condition of Emporium Mall

In EMPORIUM MALL, everything is perfect and customer response and shopkeeper response is positive. No hazard in history no short circuit, electric wires covers. And every shop installed cylinder and fire hose reel.

Formal Market: Hafeez Center



Figure 14 Infrastructure Condition of Hafeez Center

In HAFEEZ CENTRE, Public life at risk as Hafeez Center opened without any repair or safety measures. Hundreds of lives have been put at risk by the partial re-opening of Hafeez Centre, which was shut down after a massive fire badly damaged the plaza's physical structure on October 18, especially since no repair or maintenance work has been carried out since then.

Now fire hose reel and cylinder installed on basement and ground floor.

4.2. DATA COLLECTION TOOL

Open Data Kit (ODK)

Field sampling, an integral part of the research, is a very expansive activity which is often unpredictable and can go awfully wrong if not properly planned. It usually marks the onset of the research activities and if it goes wrong, the downstream activities will be compromised.

The data associated with the collected samples is critical and is often neglected. It is imperative to get the data collection right for several reasons:

To maximize the understanding of the biology and the different pieces of information about the identical samples around the same time collected in the same region. (*ODK Documentation, 2021a*)

- To maximize the downstream return on expansive sampling trips.
- To provide a holistic picture of samples to assist in the downstream processing.

Open Data Kit is a free and open source set of tools which help researcher's authors, field, and manage mobile data collection and solutions.

It allows data collection using mobile devices and data submission to the online server, even without an internet connection or mobile carrier services at the time of data collection. (*ODK Documentation, 2021b*)

ODK Built

- Creating forms/ Authoring forms
- Publishing forms to Aggregate or XML

ODK Aggregate

- Store data/ Data server (Google App Engine or web server)

We are using KOBO Toolbox server instead of ODK Aggregate because it not allows every to make their own server cloud space for free. But here we are using KOBO Toolbox server with ODK Collect App because of it is very environment friendly to use, and provide five GBs space on server for free to use. (*ODK Documentation, 2021b*)

KOBO Toolbox

KOBO Toolbox is a free and open source tool for mobile data collection, available to all. It allows you to collect data in the field using mobile devices such as mobile phones or tablets, as well as with paper or computer. (*KoBoToolbox | Data Collection Tools for Challenging Environments, n.d.*)

KOBO Toolbox Server

KOBO Toolbox provide free cloud space to everyone on their server. More than 10,000 responses per month. It allows you to export data in XLS, KML, CSV, ZIP files. It allows you to record audio, video, Coordinates, date and time.(*KoBoToolbox / Data Collection Tools for Challenging Environments*, n.d.)

CHAPTER NO. 5

DATA ANALYSIS

CHAPTER NO 5. DATA ANALYSIS

The data analysis of collected data has undergone multiple analysis procedures, which includes;

1. Descriptive Analysis
2. Indexing
3. The Star Modeling
4. Cross Tabulation
5. Correlation

5.1. DESCRIPTIVE ANALYSIS OF TRADITIONAL COMMERCIAL MARKETS

PERCEPTION INDICATORS

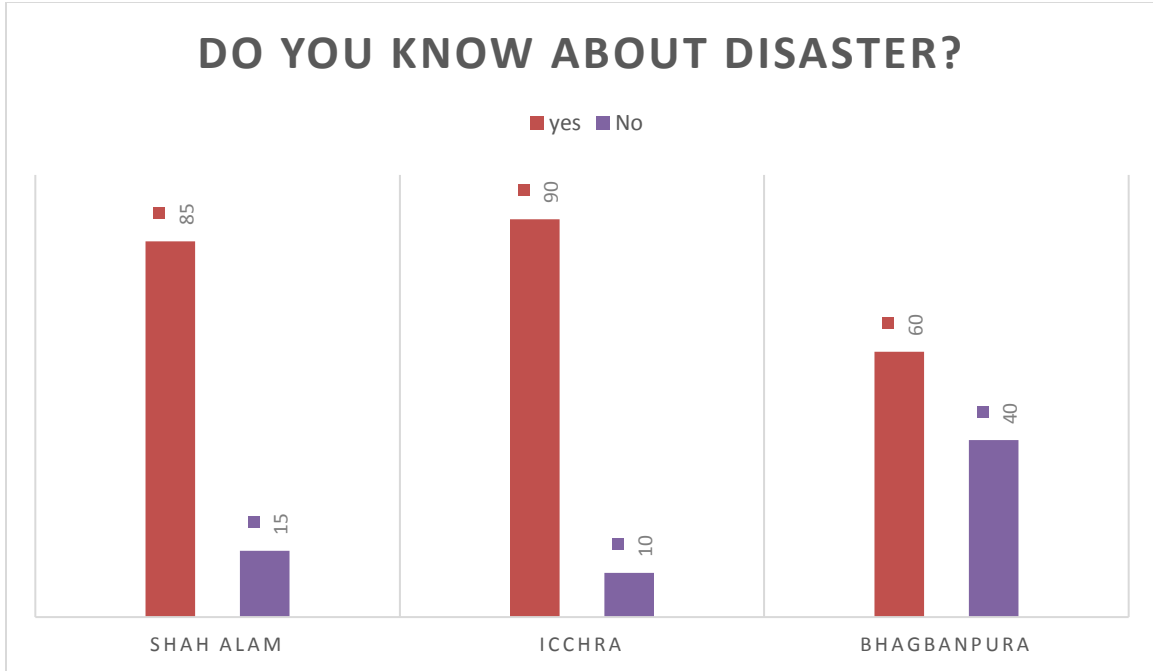
- Awareness
- Behavior
- Fear
- Trust

PERCEPTION INDICATORS ANALYSIS

AWARENESS

1. Do you know about disaster?

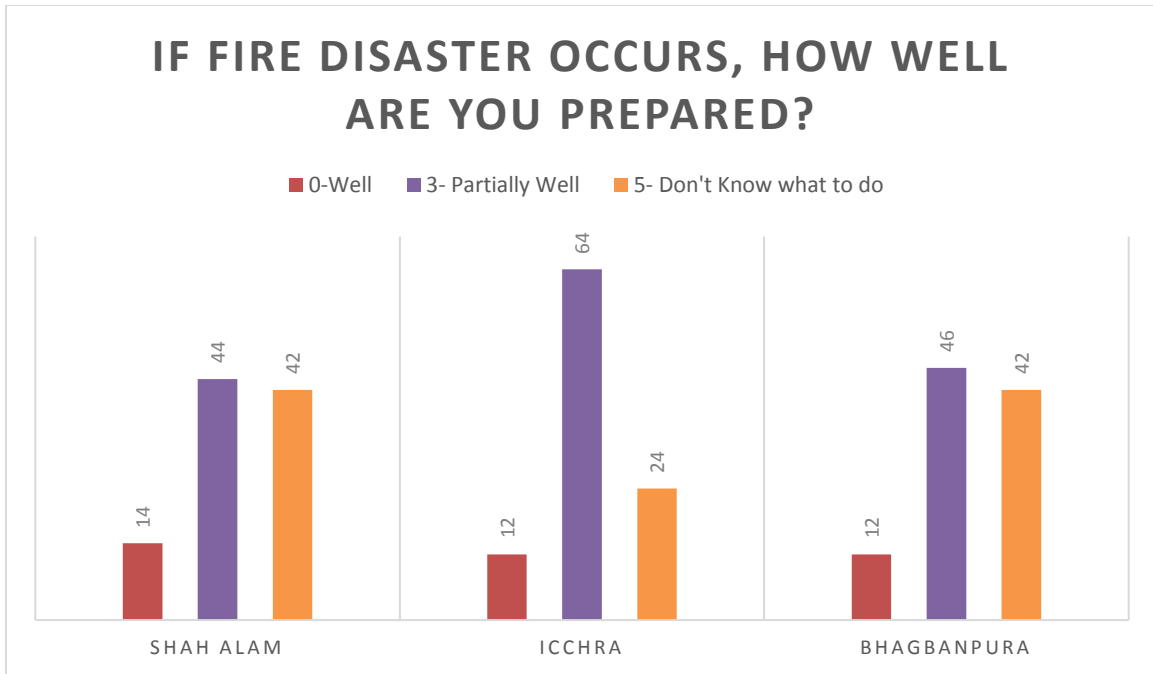
Disaster is an event which causes damage to the land, infrastructure, human lives, environment and geography, that's why incorporating a question like "Do you know about Disaster?" is important in questionnaire, from which the analysis has been generated that from three areas of our traditional commercial market, the respondents of Icchara Bazaar (including shopkeepers and customers) are well known about disaster with the percentage of 90% where as 10% respondents are not sure about what is a Disaster. The 85% respondents of Shah Alam Market knows about a disaster where as 15% have no idea about significant event and in with least percentages of 60% respondents of Baghbanpura Bazar knows about disaster but 40% respondents does not have any idea which can be consider as vulnerability of Baghbanpura Bazar.



Graph: 1 Do you know about Disaster?

2. If fire disaster occurs, how well are you prepared?

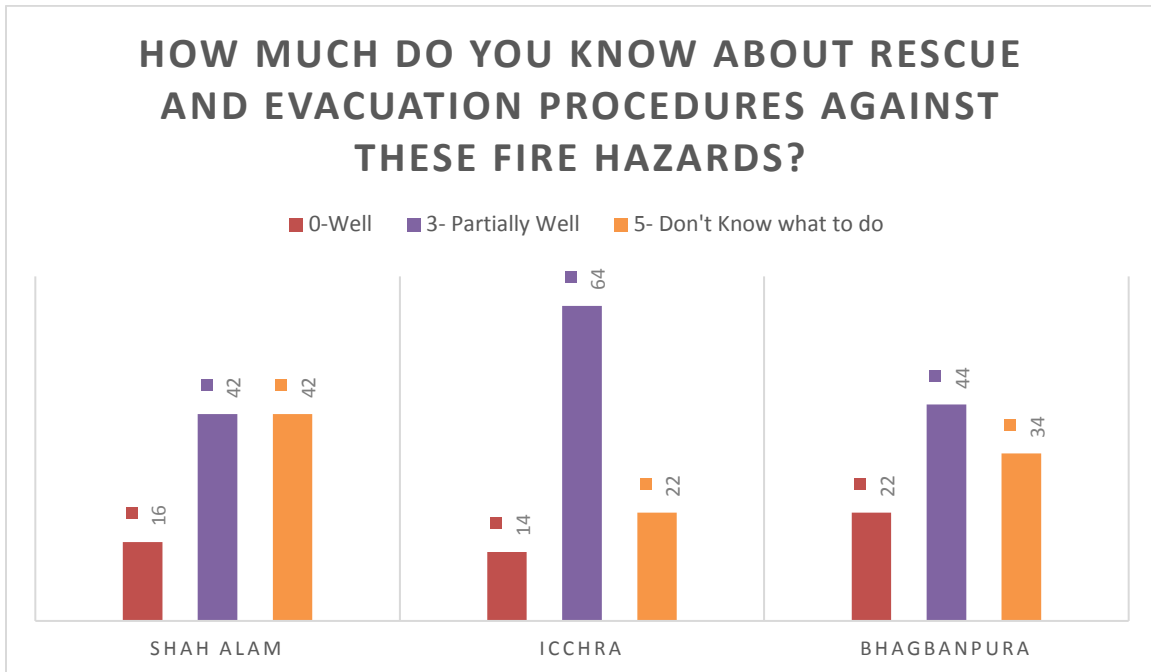
Considering the indicator of Perception, it is necessary to analyze the perception level of public in case of fire hazards. The collected data shows that the respondents of Ichhara bazar is partially prepared with the sequence number of 3 on Likert scale comprising of 64% public where as Bhagbanpura Bazar and Shah Alam market ranks on lowest value which says that they don't know what to do in case of fire hazard occurrence. Furthermore, only 12%-14% respondents of all of the three markets are well prepared in case of fire hazards which clearly represents that the general public highly in a need of providing fire hazard preparedness awareness to make the markets and Lahore City a sustainable one.



Graph: 2 How well are you prepared?

3. How much do you know about rescue and evacuation procedures against these fire hazards?

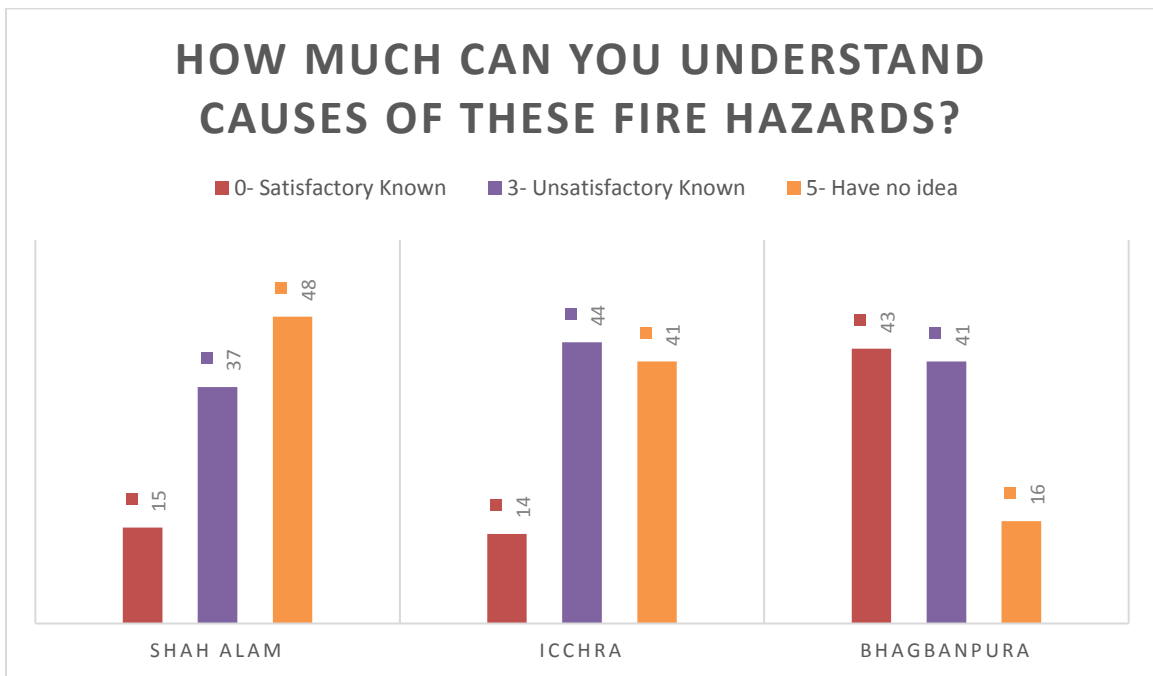
The collected data shows that respondents of Baghbanpura Bazar are well known about the rescue and evacuation procedures with the highest percentages of among three area 22% where as the most information lacked market is Shah Alam market whose respondents don't know what to do with the percentage of 42% and in the last majority respondents of Baghbanpura Bazar are partially well prepared about the rescue and evacuation procedure with the percentage of 44%.



Graph: 3 Evacuation Procedures

4. How much can you understand causes of these fire hazards?

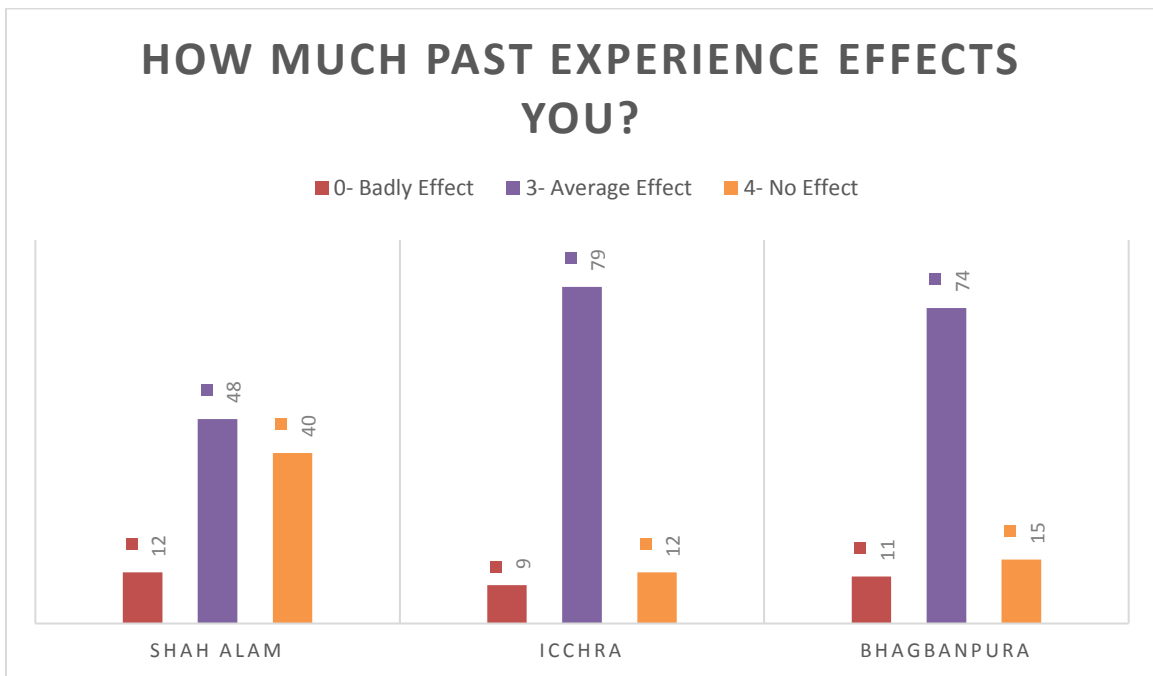
Understanding the causes of fire hazards is very important to deal with such hazards, by asking this question to respondents the collected data represents that with the highest percentage of 43% in Baghbanpura Bazar knows the causes of fire hazards where as with te percentage of 37% and 41% the area Shah Alam market and Baghbanpura Bazar’s public unsatisfactory known about the causes of fire hazards and with the highest percentage of 48% the respondents of Shah Alam market does not have any idea about what are the causes of such hazards, the reason of that is the congested infrastructure which means that they usually did not get to the main cause of such hazards.



Graph: 4 Understanding Causes

5. How much past experience effects you?

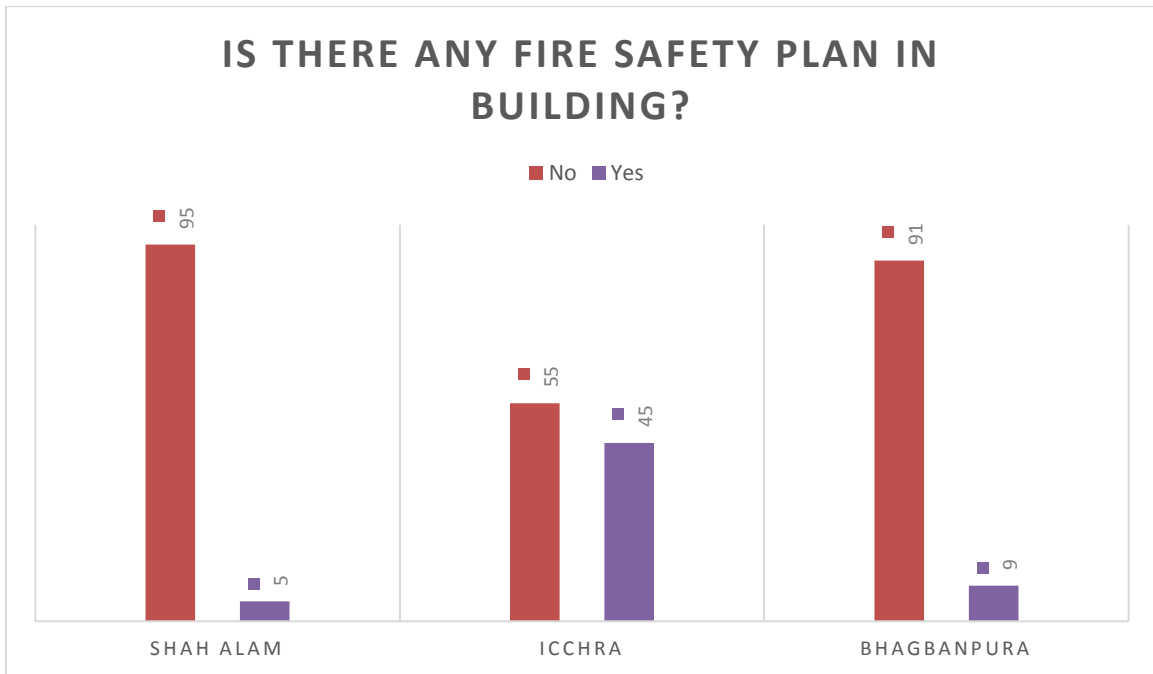
Areas like traditional markets are more likely to have fire hazards in the past, that's why asking the question to know about the damage the previous event has caused so that the future preparedness can be develop through those experience. By asking the question to the respondents (including customers and shopkeepers), the collected data represents that Shah Alam market is more like to have badly effect in past experience with the percentage of 12% where as 40% respondents of this market says that they have no effect which shows a distinct between market collaboration. The other market's which are Icchara Bazar and Baghbanpura Bazar faced 79% and 74% average effect by previous fire hazard in the respective areas.



Graph: 5 Effect of Past Experience

6. Is there any fire safety plan in building?

Considering the level of perception, having a fire safety plan in building should be the mandatory step of commercial planning and there should be the check on it whether is it being implemented or not by desired authorities, that's why asking this question to the selected survey areas Shah Alam market, Baghbanpura Bazar and Icchara Bazar the answer has been collected in such a way that 95%, 91% and 55% respondents says that there is an absence of fire safety plan in the respective buildings and only 45% respondents of Icchara Bazar says that there is a fire safety plan in the shops.

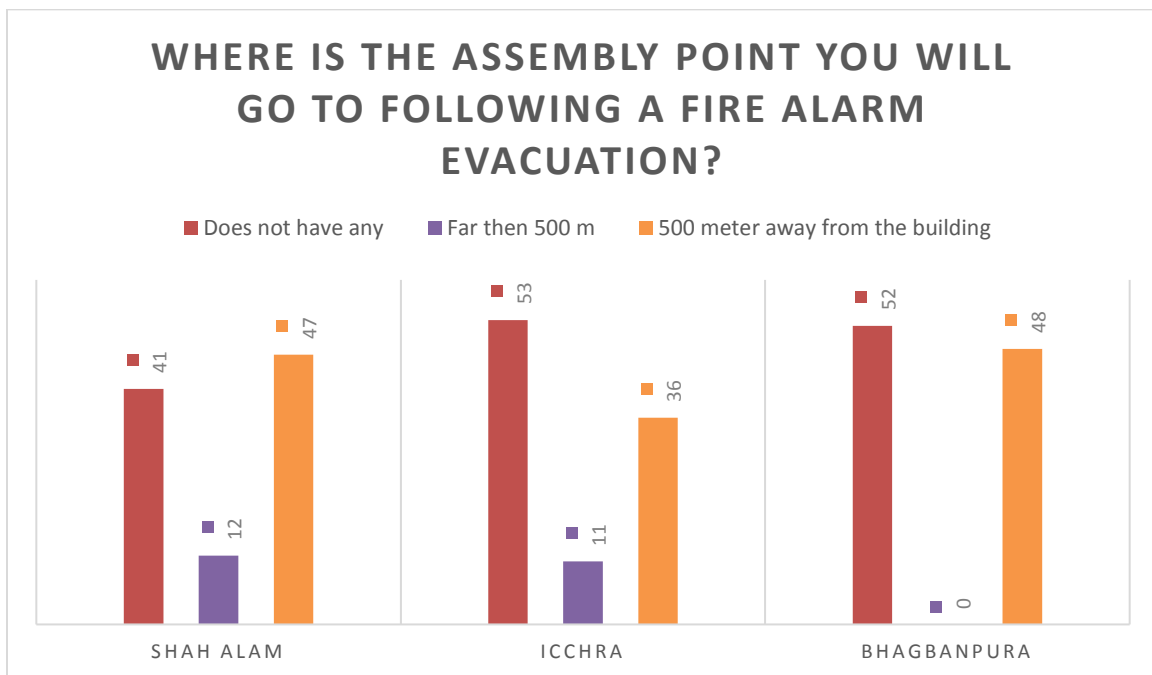


Graph: 6 Availability of Safety Plan

BEHAVIOR

1. Where is the assembly point you will go to following a fire alarm evacuation?

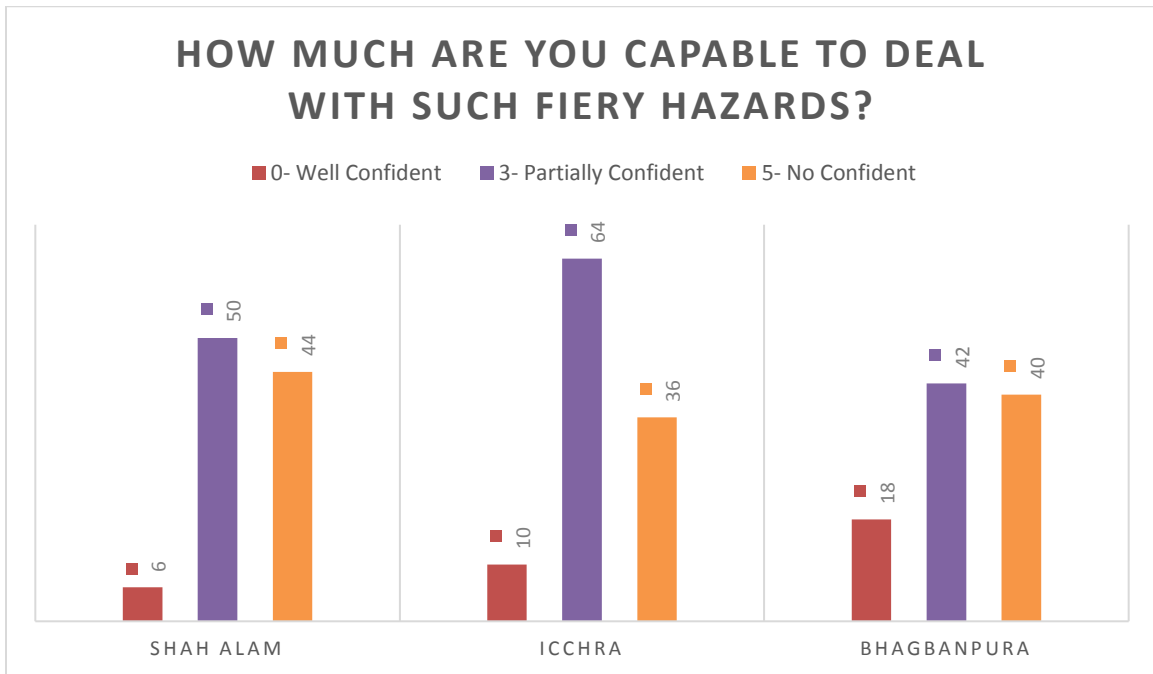
Assembling point is the area consist of vacant and green land mostly like big grounds, such points are used to gather the public in case of any hazards like fire hazard, earthquakes etc. the question has been asked to the respondents to analyze the behavior of the public towards the specific point and to know about the existence of such area in the markets. The data represents that with the respondents’ percentage of 41%, 53% and 52% of the area Shah Alam market, Icchara Bazar and Baghbanpura Bazar does not have any assembling point near the markets where as the respondents percentage of 47%, 36% and 48% of area Shah Alam market, Icchara Bazar and Baghbanpura Bazar does have a assembling point but even away from 500m away from the markets which is according to standards are not feasible. The area having assembling points at 500m away from markets are Shah Alam market and Icchara Bazar with the percentages of 12% and 11%.



Graph: 7 Assembly Point

2. How much are you capable to deal with such fiery hazards?

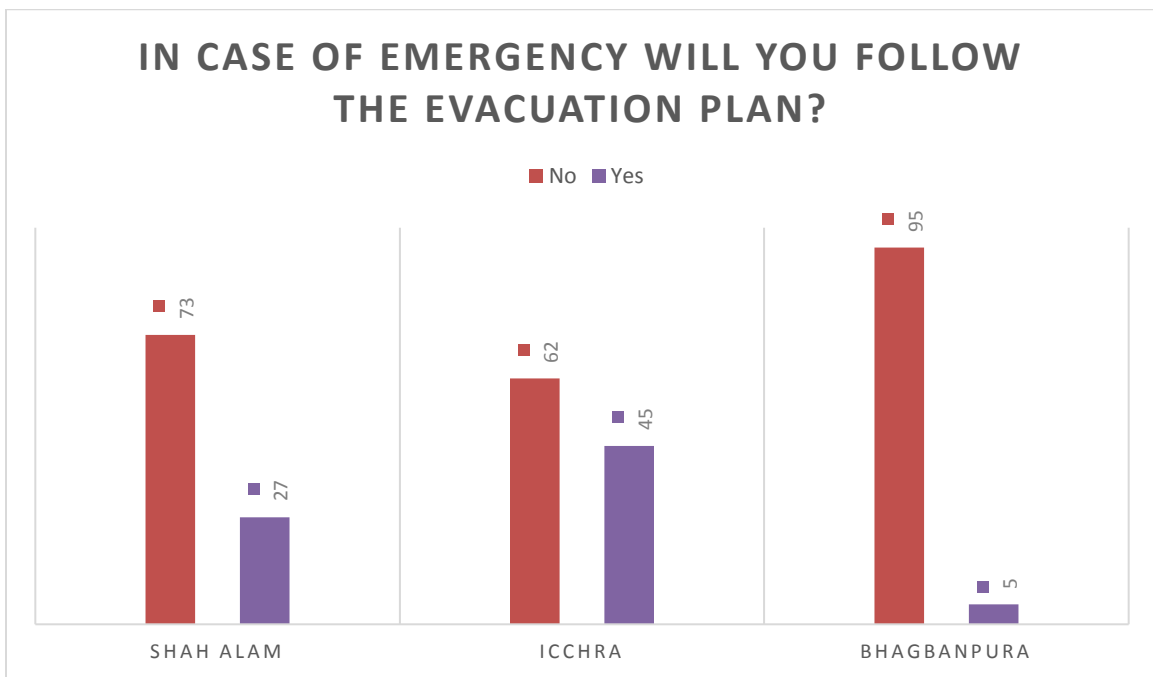
The collected data shows that majority of the respondents of all three markets have no confidence about how to deal with fiery hazards with the percentage pf 44%, 36% and 40% out of 100% each of Shah Alam market, Icchara Bazar and Baghbanpura Bazar. Where as, Icchara Bazar’s 64% respondents responds to have partially confidence to deal with the hazards and only 6%, 10% and 18% respondents are only well confident about their capability of area Shah Alam market, Icchara Bazar and Baghbanpura Bazar. The huge number of respondents in the category of not having idea is also be the reason of illiteracy rate in the markets.



Graph: 8 Capable to Deal with fire hazards

3. In case of emergency will you follow the evacuation plan?

Following the evacuation plan is a keen step to analyze the public's behavior and the perception of the public. By asking the question the data shows that with the respondent's percentage of 73%, 62% and 95% of the area Shah Alam market, Icchara Bazar and Baghbanpura Bazar says that they will not follow the evacuation plans where as with the highest percentage of respondents among three areas of 45% responds positively to follow the evacuation plan. The reason of not following the evacuation could be that the area does not have any and second reason of this response can be the not understanding the pros of having evacuation plan.

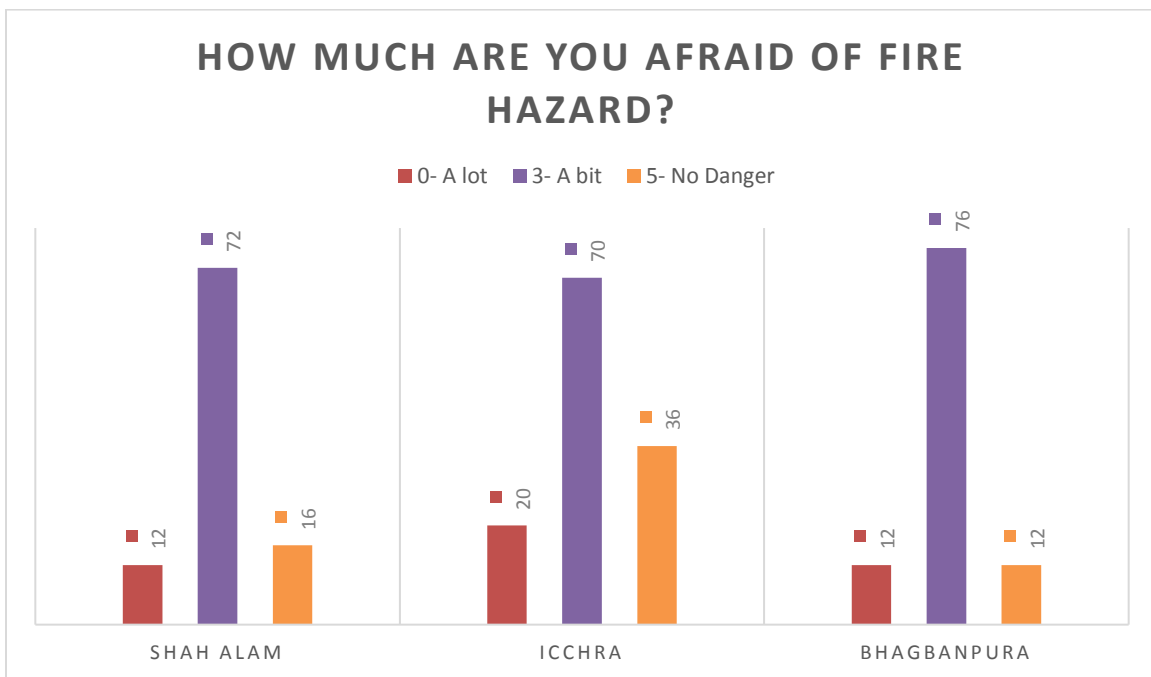


Graph: 9 Following the evacuation plan

FEAR

1. How much are you afraid of fire hazard?

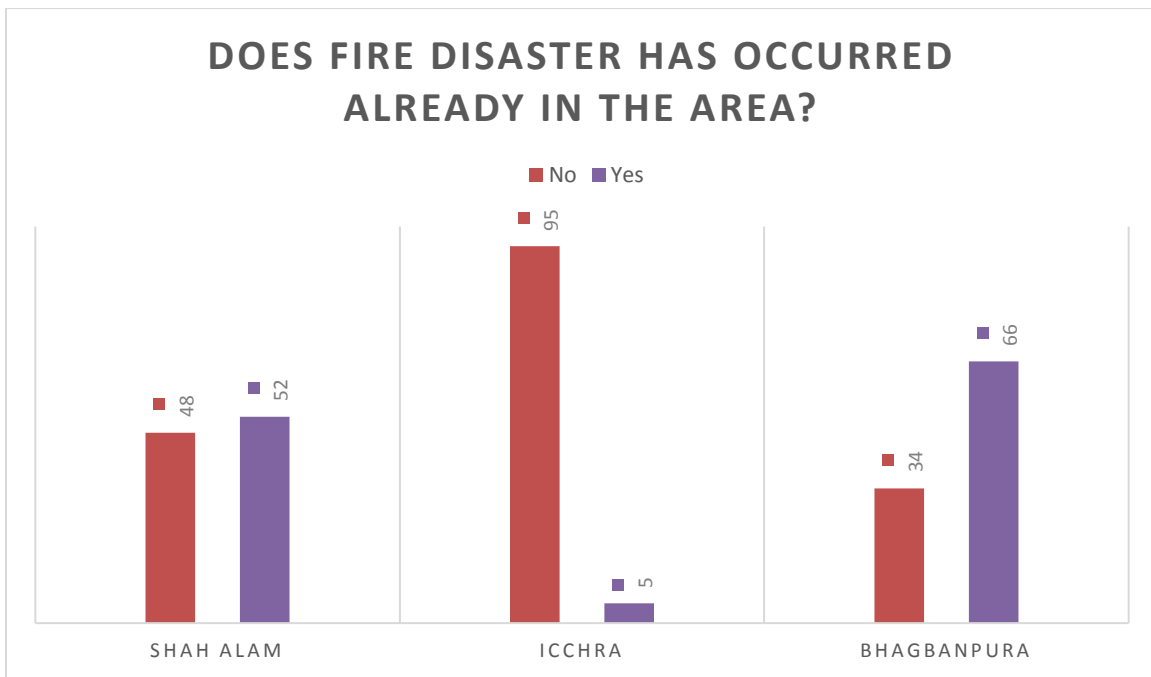
Fear is an element which can be caused naturally, it is really important to know the fear level of the study area to check the perception of the public. By asking the question, the data shows that the majority of respondents are a bit afraid of fire hazards with percentages of 72%, 70% and 76% for the areas Shah Alam market, Icchara Bazar and Baghbanpura Bazar, respectively. Respondents of Icchara Bazar say that they have no danger with a percentage of 36%, which is the highest percentage among the three areas in this category.



Graph: 10 Afraid of Disaster

2. Does fire disaster has occurred already in the area?

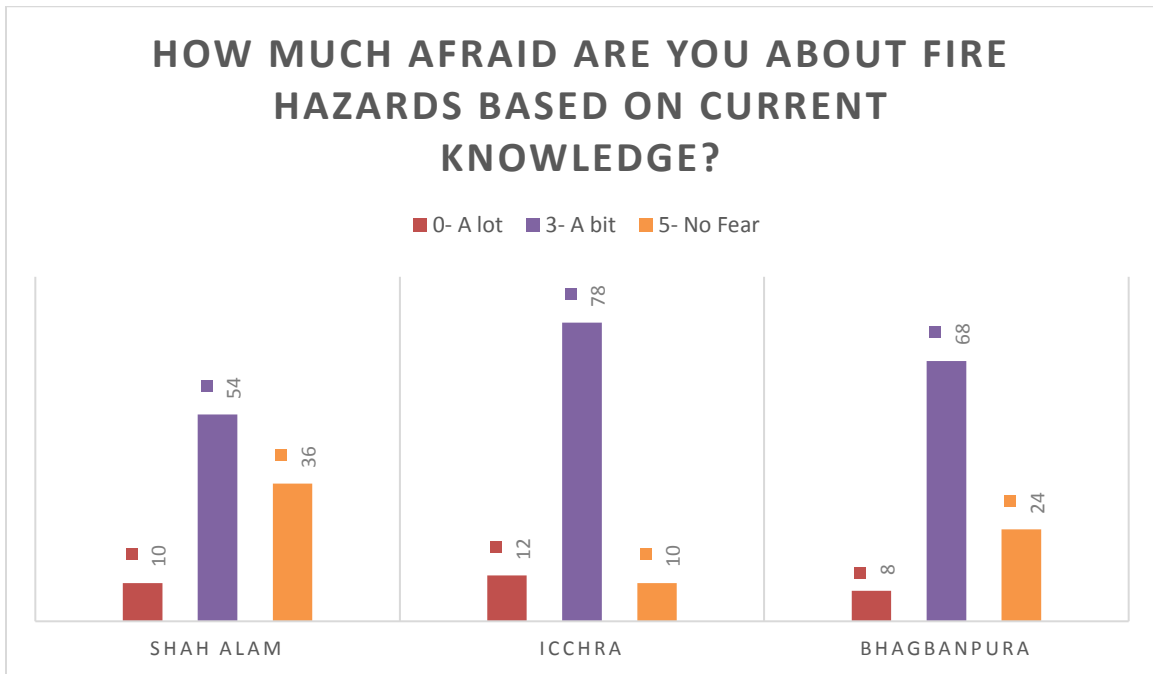
This question is related to the previous question of “Past Experience”. The question is asked to know the frequency or existence of the fire disaster in the area. It is important to check that which market is more victim of this hazard and the data shows that Shah Alam market and Baghbanpura Bazar is more likely to have this hazard in past with the percentage of 52% and 66% out of 100% each where as with the response rate of 95% of Icchra Bazar states that there is no fire disaster has occurred in this area before.



Graph: 11 Already occurrence of fire hazards

3. How much afraid are you about fire hazards based on current knowledge?

The data represents that with the percentages of 54%, 78% and 68% of respondents of area Shah Alam market, Icchara Bazar and Baghbanpura Bazar are a bit afraid about the fire hazards according to the current knowledge of the area or existing situation of area. Where as 36%, 10% and 24% respondents of Shah Alam market, Icchara bazar and Baghbanpura Bazar has no fear about the hazard and with the least percentages of 10%, 12% and 8% the respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar are a lot afraid about fire hazards based on currents knowledge.

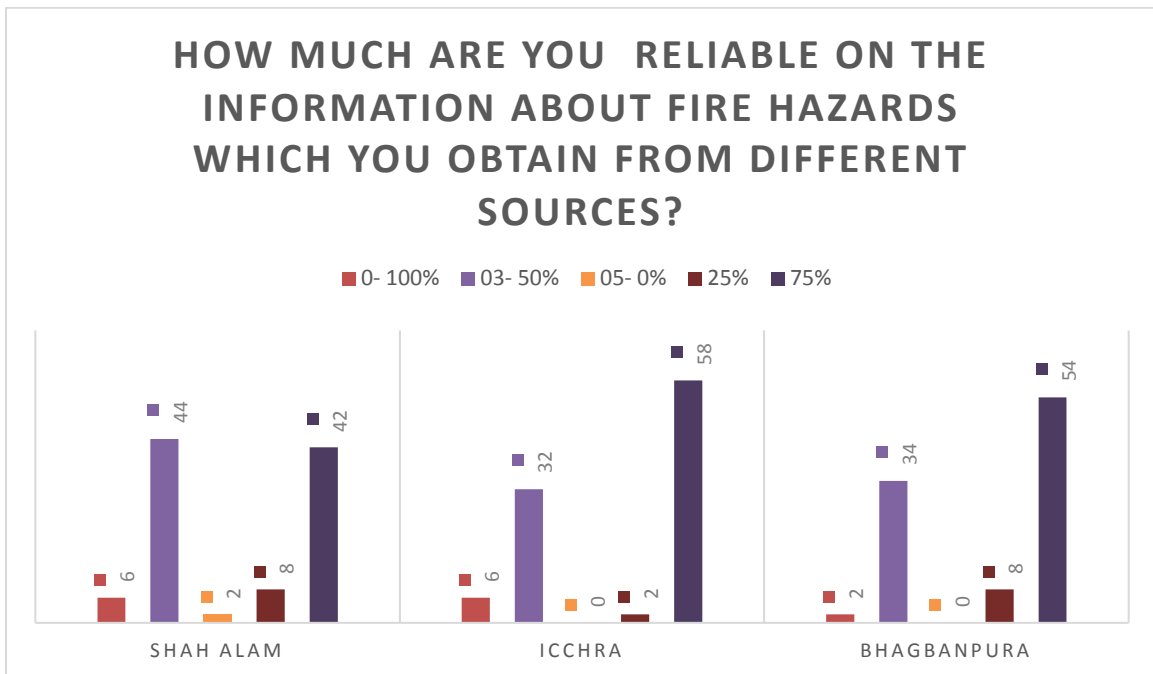


Graph: 12 Afraid of fire hazard based on current knowledge

TRUST

1. How much are you reliable on the information about fire hazards which you obtain from different sources?

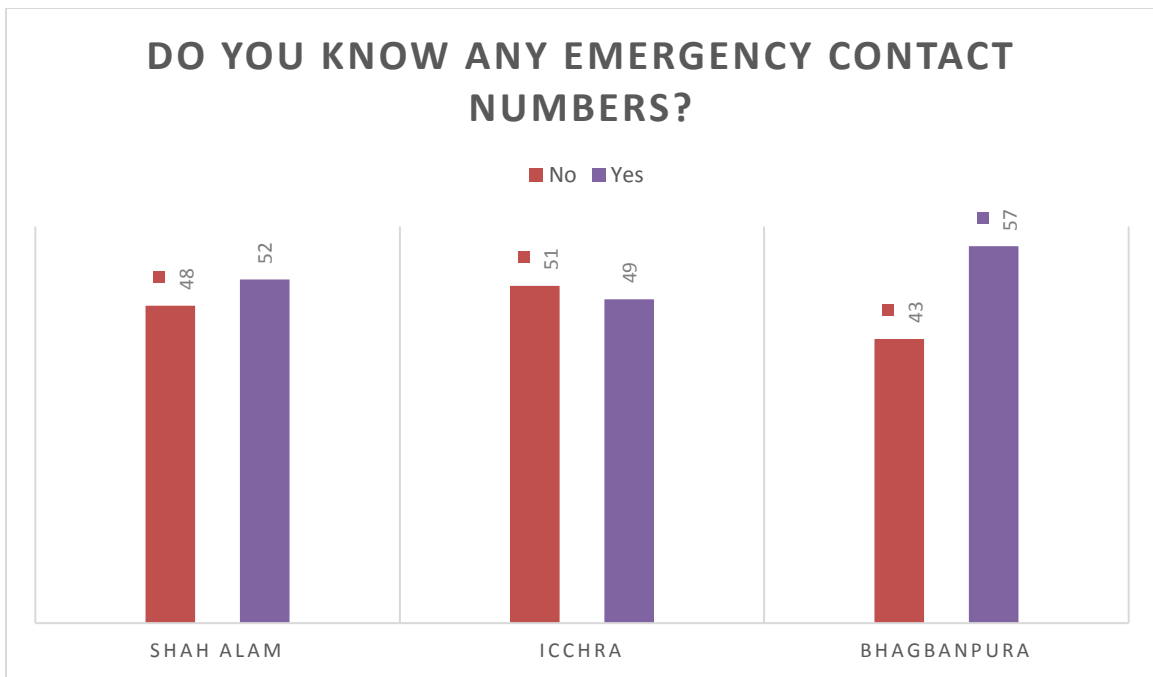
Mostly information about fire hazards deliver after the occurrence of fire hazards, that why to analyze the reliability of the respondents is very necessary by collecting the data, it says that 44%, 32% and 34% respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar have trust of 50% on the sources. Whereas, 42%, 58% and 54% respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar have 75% of trust on the sources which shows that majority of the public do relay on the sources.



Graph: 13 Reliability on information

2. Do you know any emergency contact numbers?

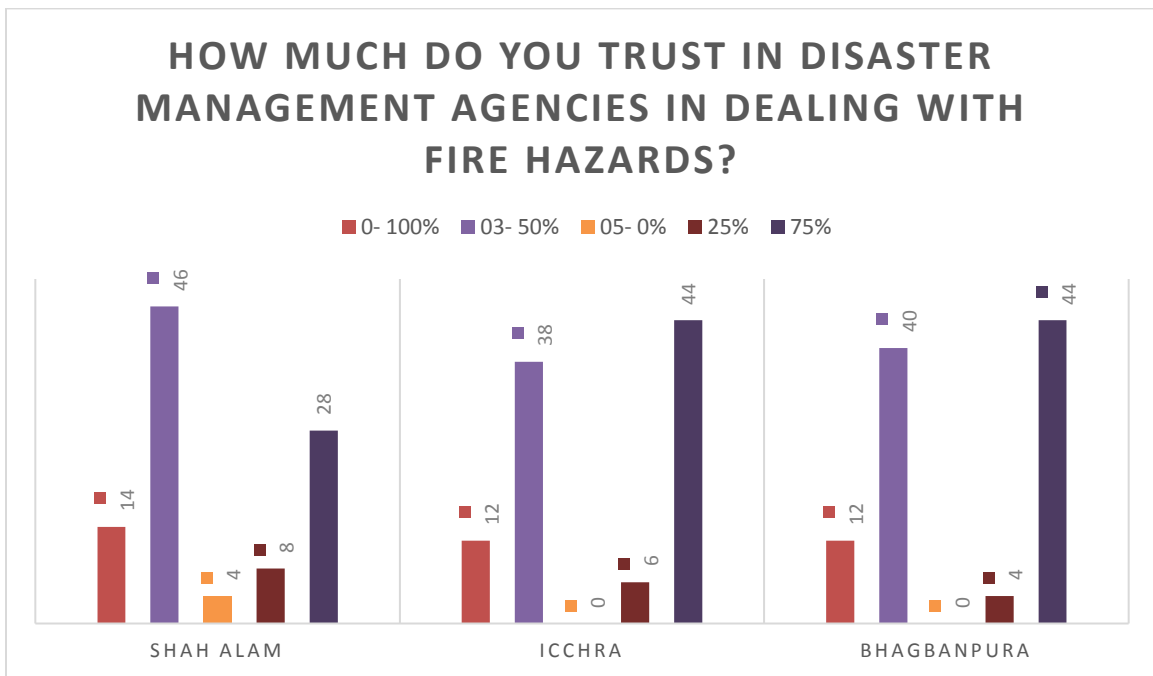
In perception, knowing all the emergency contact numbers is also very important. The asked question get the responses which says that 48%, 51% and 43% respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar did not know the emergency contact number the reason of this huge percentages can be the illiteracy or not having the recent knowledge where as 52%, 49% and 57% of respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar knows emergency contact numbers which can be used at the hour of need.



Graph: 14 Knowing any contact numbers

3. How much do you trust in disaster management agencies in dealing with fire hazards?

Disaster management agencies are playing a vital role to reduce the occurrence and damage of fire hazards. In this case, the question has been asked to analyze the perception of trust between the respondents and agencies, from which the data has been shows that 46%, 38% and 40% respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar has 50% trust on the agencies, where as 28%, 44% and 44% respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar has 75% trust on the agencies and with the trust level of 100% the area respondents responds with the percentages of 14%, 12% and 12% of the area of Shah Alam market, Icchara Bazar and Baghbanpura Bazar.



Graph: 15 Trust in disaster management agencies

PREPAREDNESS INDICATORS

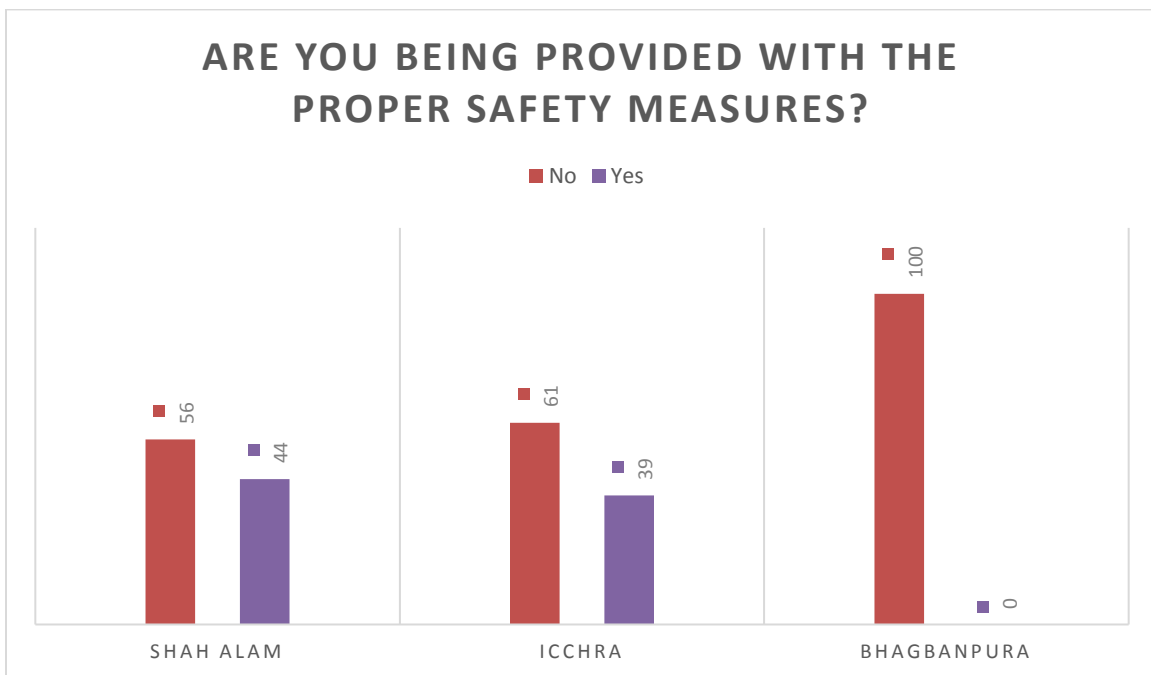
- Safety
- Emergency Medical Services
- Knowledge about Emergency Responsive Departments

PREPAREDNESS INDICATORS ANALYSIS

SAFETY

1. Are you being provided with the proper safety measures?

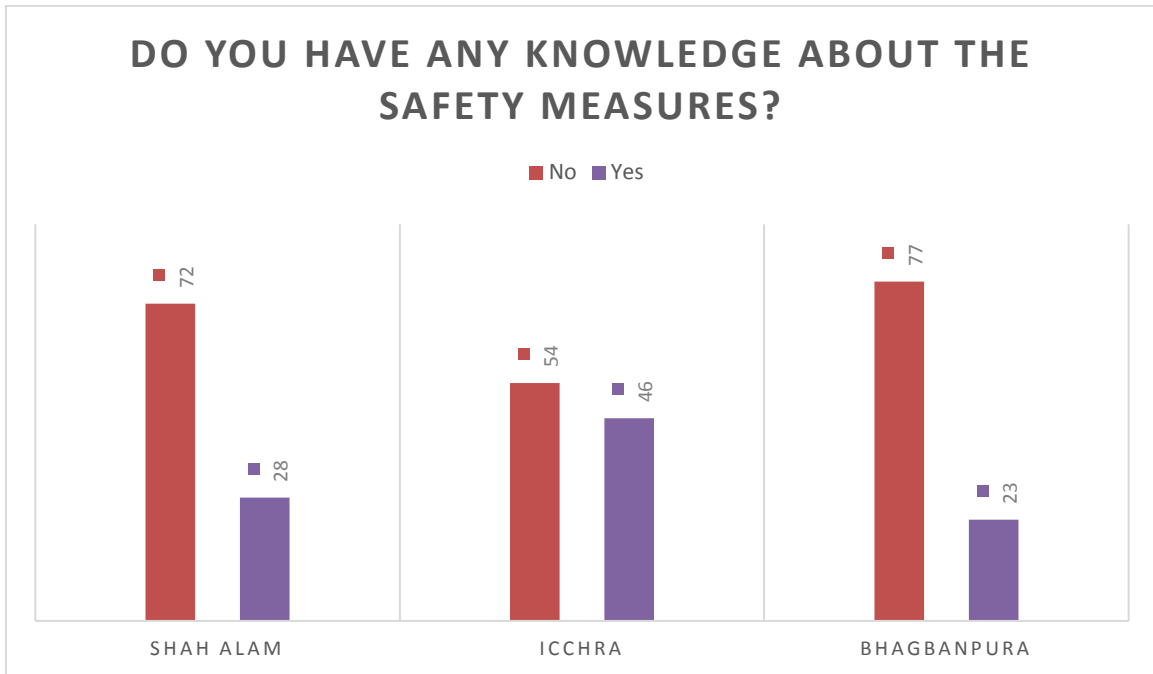
In the matter of area preparedness level, it is important to check the availability of safety measures in the individual shop and in whole market. The question has been asked to the public and the data has been collected says that with the highest percentage of 100% Baghbanpura Bazar has not provided with any of safety measures where as 56% and 61% respondents of Shah Alam market and Icchara Bazar responds that they are not being provided with the safety measure. Furthermore, the percentages of 44% and 39% respondents of Shah Alam market and Icchara Bazar responds positively of having safety measures.



Graph: 16 Provided with proper safety measures

2. Do you have any knowledge about the safety measures?

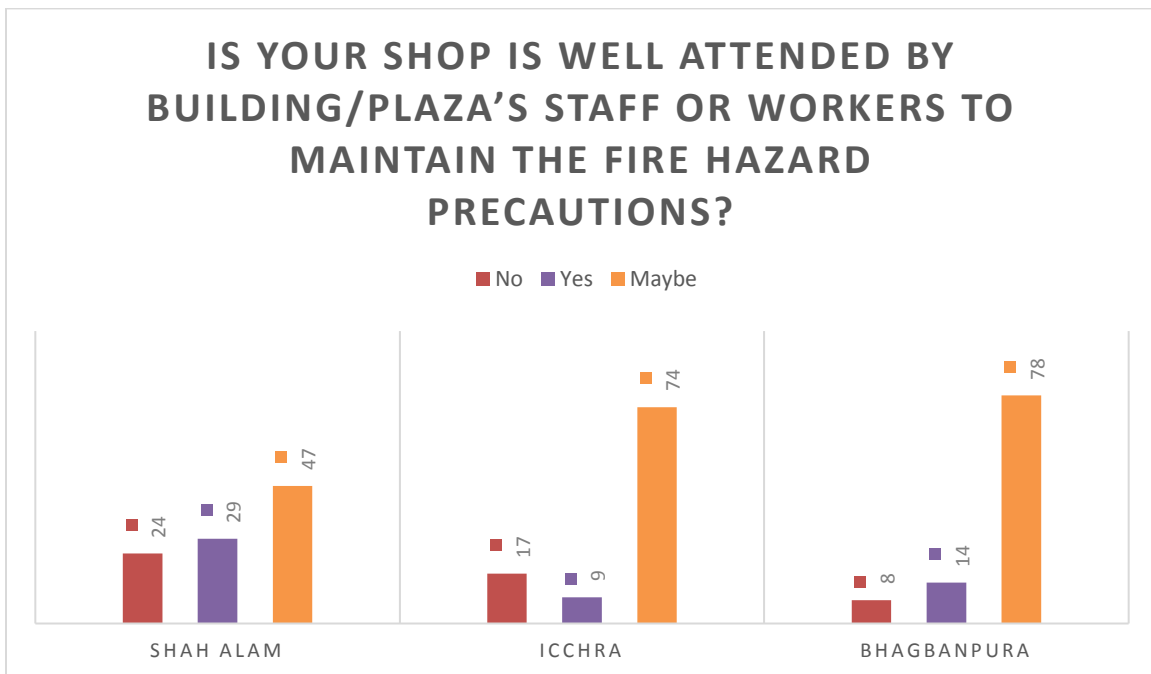
The knowledge about safety measures is also very important in preparedness level, the responses shows that 72%, 54% and 77% respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar has responded negatively of not having any knowledge related to safety measures while 28%, 46% and 23% respondents of area Shah Alam market, Icchara Bazar and Baghbanpura Bazar responds positively that they do have a little bit knowledge about the safety measures.



Graph: 17 Knowledge about safety measures

3. Is your shop is well attended by building/plaza’s staff or workers to maintain the fire hazard precautions?

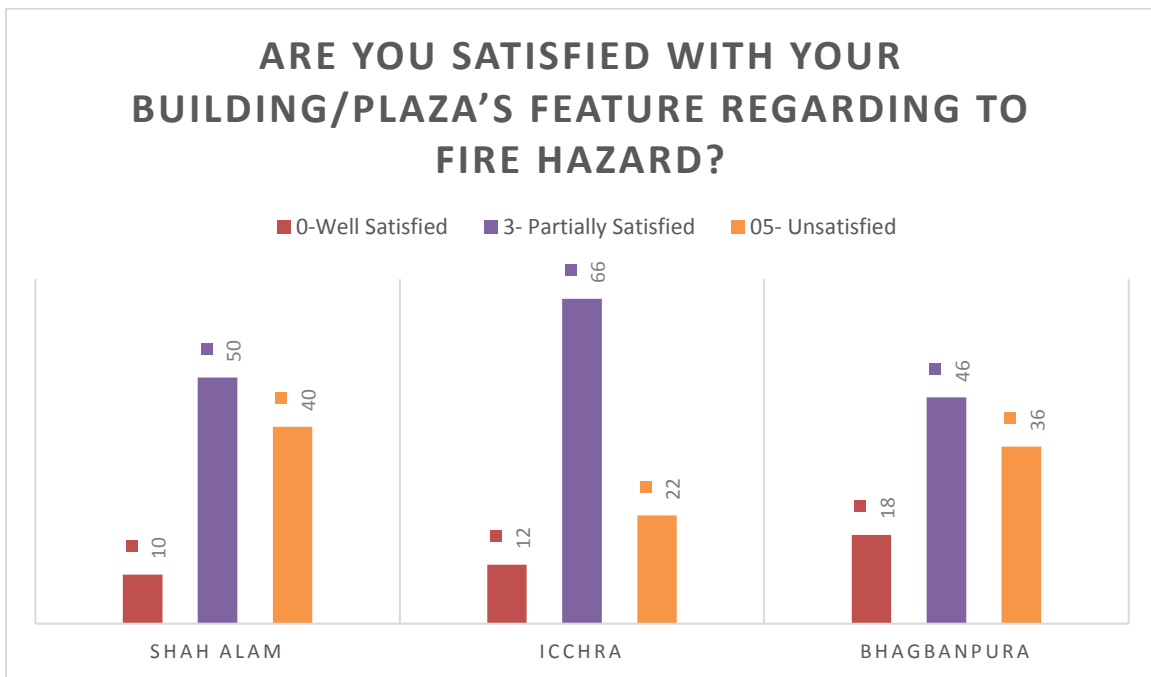
Preparedness level do require the maintenance pf shop or area, the data represents that 47%, 74% and 78% respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar responds that maybe there is or there is not any attended by any worker to up to date the building daily or accordingly to the situations where as 29%, 9% and 14% respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar responds in negative and 24%, 17% and 8% respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar responds positively that their shop or market is being well attended by area’s staff or workers to maintain the fire hazard precautions.



Graph: 18 Shop is well attend by staff

4. Are you satisfied with your building/plaza’s feature regarding to fire hazard?

According to the collected data, the percentages of 50%, 66% and 46% respondents of area Shah Alam market, Icchara Bazar and Baghbanpura Bazar responds to medium level of Likert scale which is (03) says that they are partially satisfied with the building design features where as 40%, 22% and 36% of the respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar responds negatively that they are not satisfied with their building design or features and with the least percentages of 19%, 12% and 18% of respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar responds positively that they are satisfied with the building design, they reason of this satisfaction is maybe that they have developed individual shops according to their will with better planning and infrastructure.

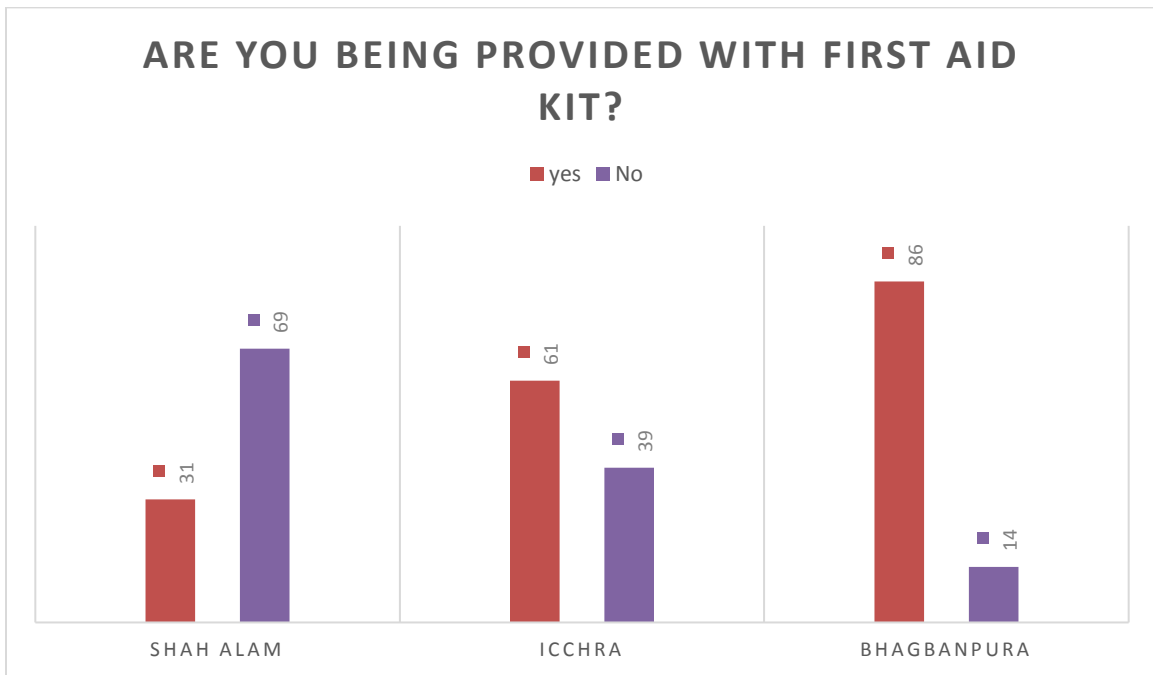


Graph: 19 Satisfaction of Building Features

EMERGENCY MEDICAL SERVICES

1. Are you being provided with first aid kit?

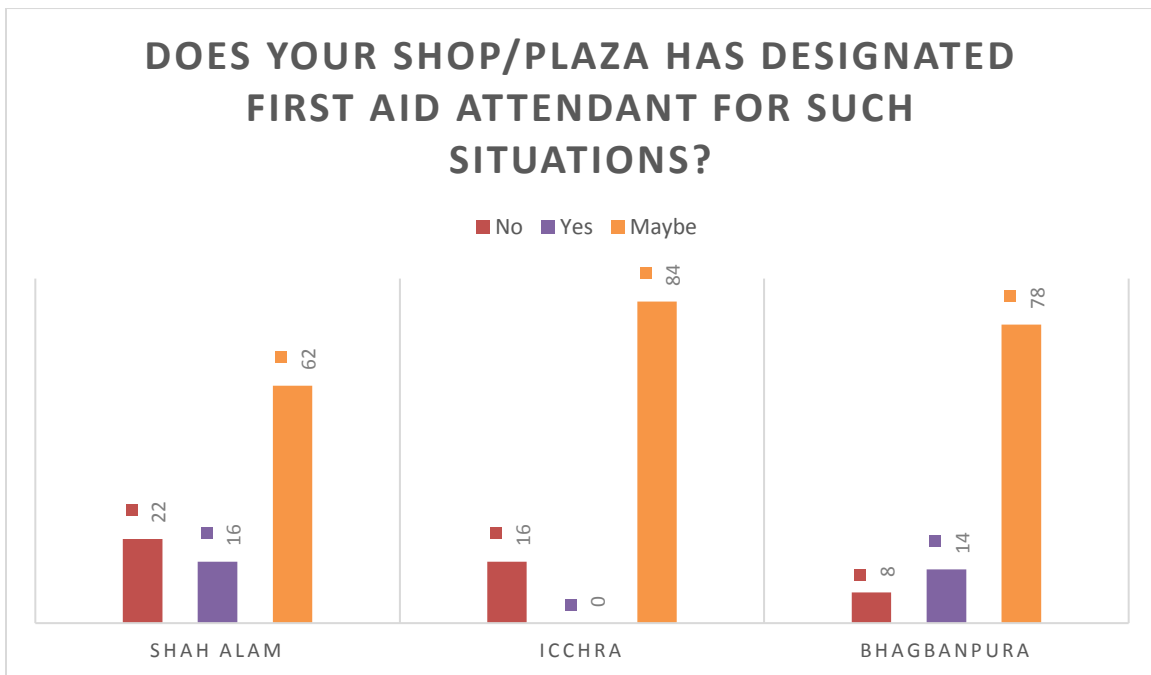
Preparedness also covers the first aid kit section, by asking the question the responses has been gathered which says that 69%, 39% and 14% respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar responds positively while 31%, 61% and 86% of the respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar responds negatively of not being provided with the first aid kit.



Graph: 20 Being provided with first aid kit

2. Does your shop/plaza has designated first aid attendant for such situations?

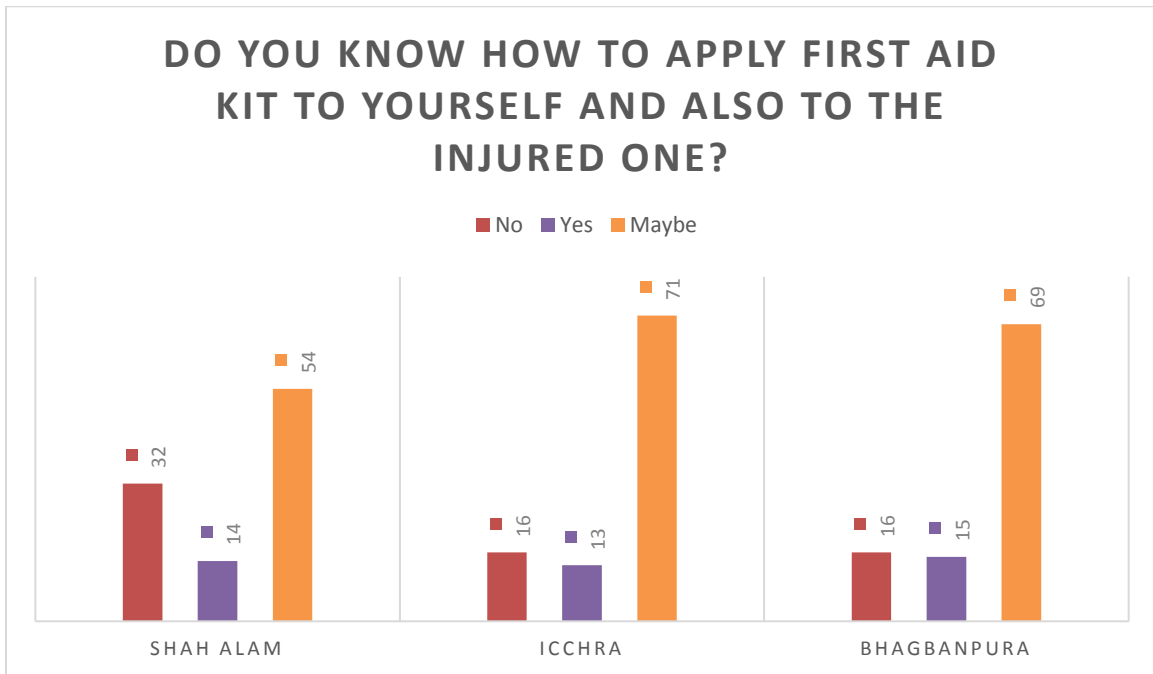
The data shows that 62%, 84% and 78% respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar did not know that their shop has or has not have designated first aid attendant for such situations where as 22%, 16% and 8% respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar responds negatively while 16% and 14% respondents of Shah Alam market and Baghbanpura Bazar responds positively that they do have first aid attendant for such situations.



Graph: 21 Attendant for first aid kit

3. Do you know how to apply first aid kit to yourself and also to the injured one?

It is really important to know whether the individuals capable of applying first aid kit to yourself and to others, the data has been gathered which shows that 54%, 71% and 69% respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar responds in maybe direction which means they are or they are not capable of doing this, while 32%, 16% and 16% respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar responds negatively and with the least values of 14%, 13% and 15% respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar responds positively.

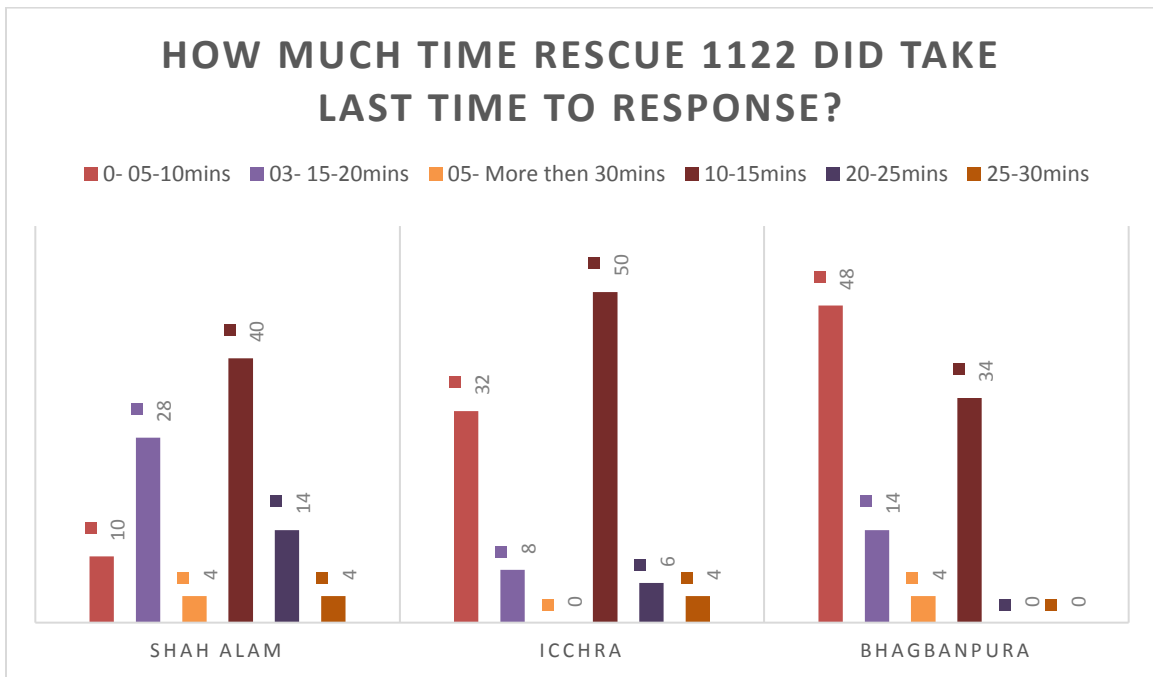


Graph: 22 Applying first aid kit

KNOWLEDGE ABOUT EMERGENCY RESPONSIVE DEPARTMENTS

1. How much time Rescue 1122 did take last time to response?

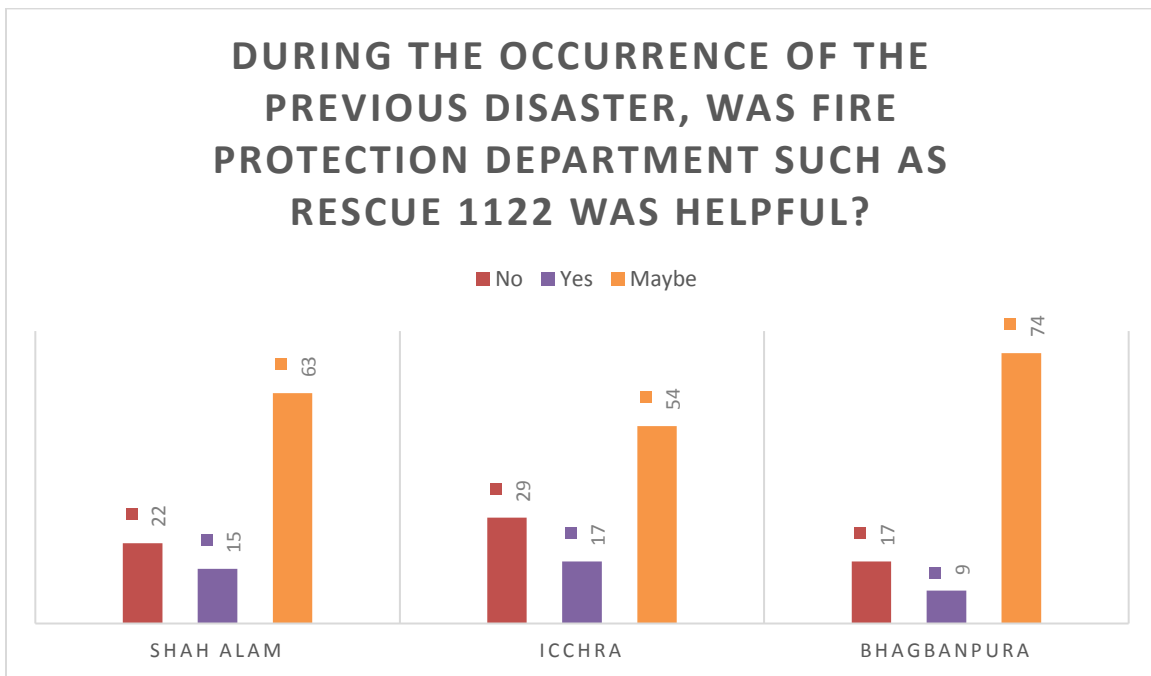
Rescue 1122 is a very efficient authority which responds on time, while considering this fact, the question has asked to the respondents which responses that 40%, 50% and 34% respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar responds that rescue 1122 takes 10-15 minutes of arriving where as 10%, 32% and 48% respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar responds that they took 05-10 minutes. Which shows that the authority works efficiently towards the fire hazards.



Graph: 23 Time taken by rescue 1122

2. During the occurrence of the previous disaster, was fire protection department such as rescue 1122 was helpful?

The collected data shows that 63%, 54% and 74% respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar responds in maybe option that they did or did not knows that fire protection department was helpful or not where as 22%, 29% and 17% of respondents of Shah Alam market, Icchara Bazar and Baghbanpura Bazar responds in negatively while with the least values of 15%, 17% and 9% of respondents f Shah Alam market, Icchara Bazar and Baghbanpura Bazar responds positively that during the occurrence of previous disaster fire protection department and rescue1122 was being helpful.



Graph: 24 Rescue 1122 is helpful

5.2. DESCRIPTIVE ANALYSIS OF MULTI STORY COMMERCIAL PLAZA PERCEPTION INDICATORS

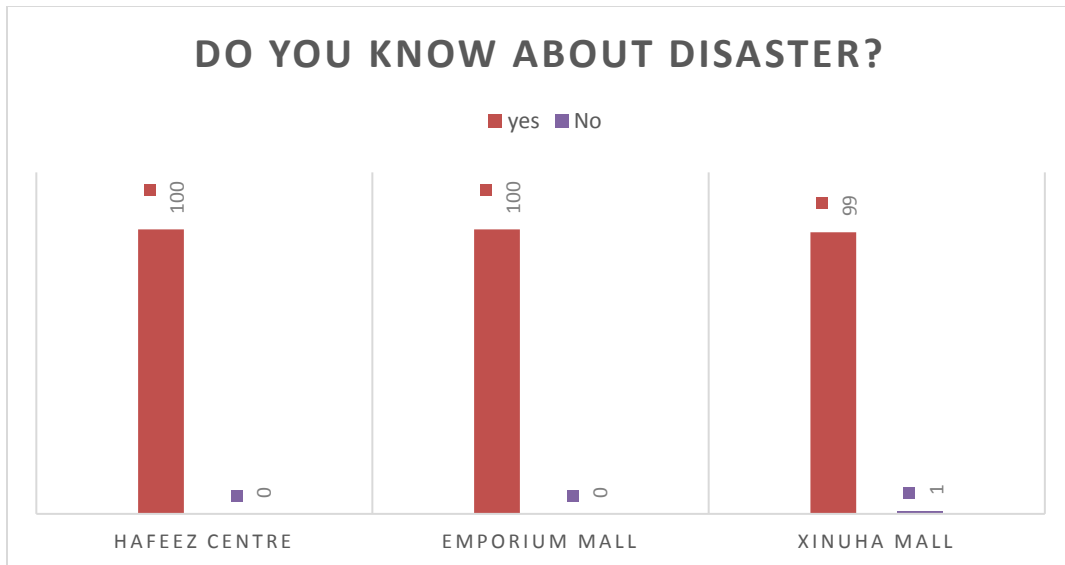
- Awareness
- Behavior
- Fear
- Trust

PERCEPTION INDICATORS ANALYSIS

AWARENESS

1. Do you know about disaster?

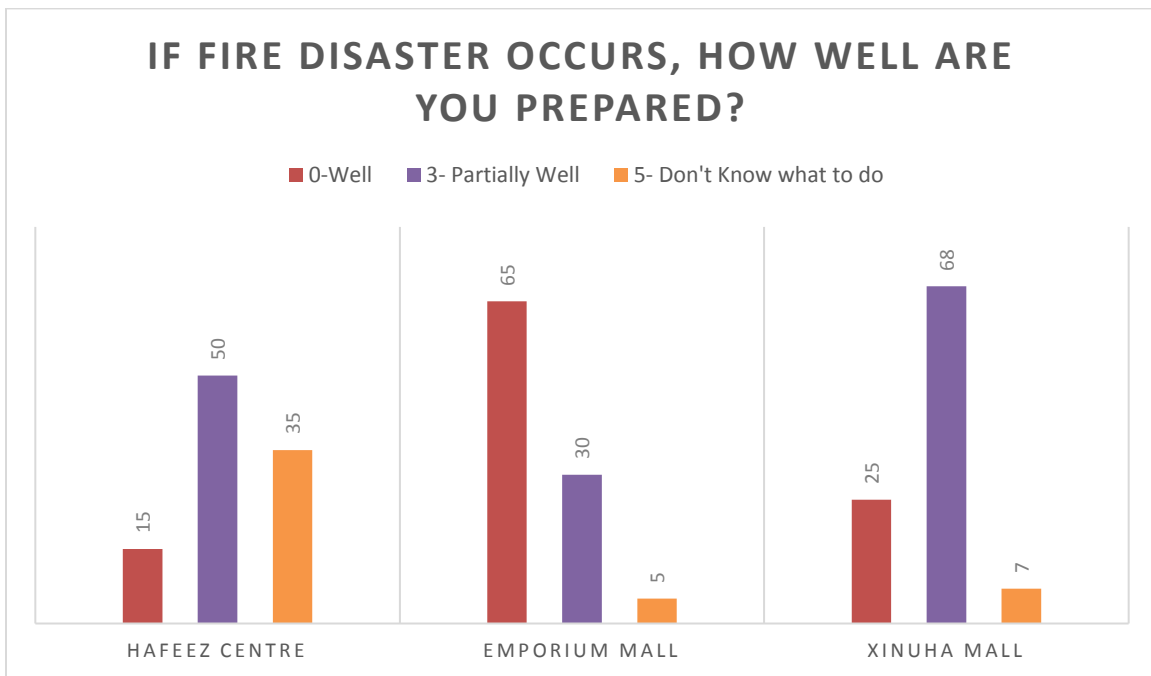
Disaster is an event, which causes damage to the land, infrastructure, human lives, environment and geography. That’s why incorporating a question like “Do you know about Disaster?” is important in questionnaire, from which the analysis has been generated that from three areas of our multi-storey market, the respondents of Hafeez centre and Emporium Mall (including shopkeepers and customers) are well known about disaster with the percentage of 100%. The 99% respondents of Xinuha Mall knows about a disaster where as 1% have no idea about significant event.



Graph: 25 Do you know about disaster?

2. If fire disaster occurs, how well are you prepared?

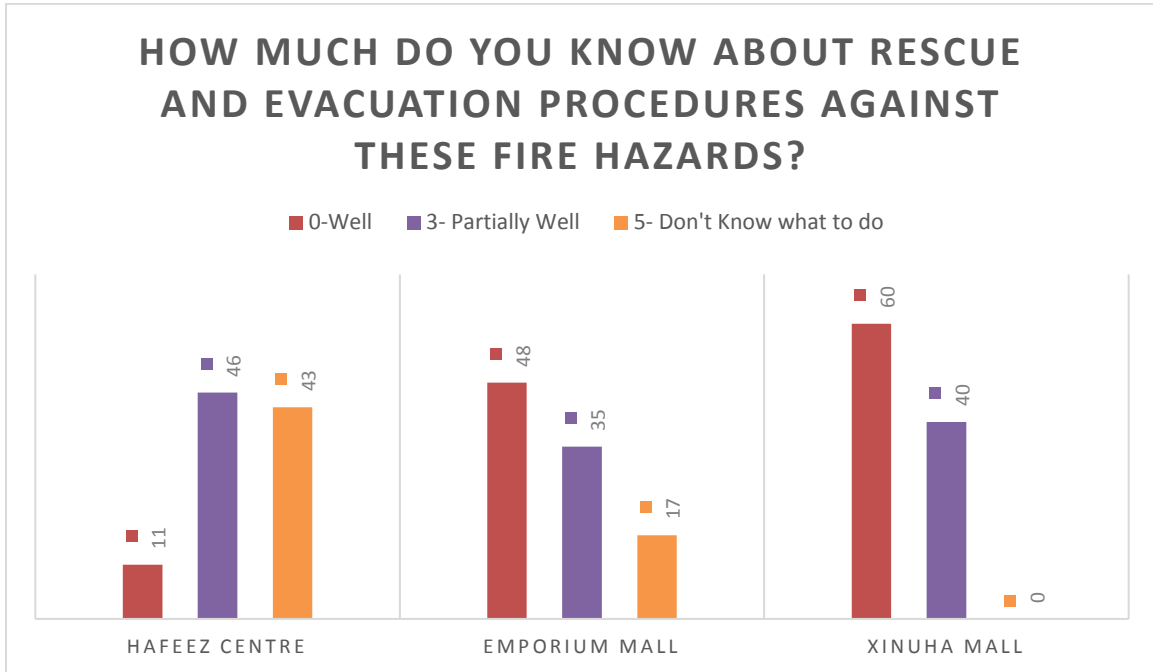
Considering the indicator of Perception, it is necessary to analyze the perception level of public in case of fire hazards. The collected data shows that the respondents of Xinuha Mall is partially prepared with the sequence number of 3 on Likert scale comprising of 68% public where as Hafeez center is 50% and Emporium Mall ranks on lowest value which says that they don't know what to do in case of fire hazard occurrence. Furthermore, only 15%-65% respondents of all of the three markets are well prepared in case of fire hazards which clearly represents that the general public highly in a need of providing fire hazard preparedness awareness to make the markets and Lahore City a sustainable one.



Graph: 26 how well are you prepared?

3. How much do you know about rescue and evacuation procedures against these fire hazards?

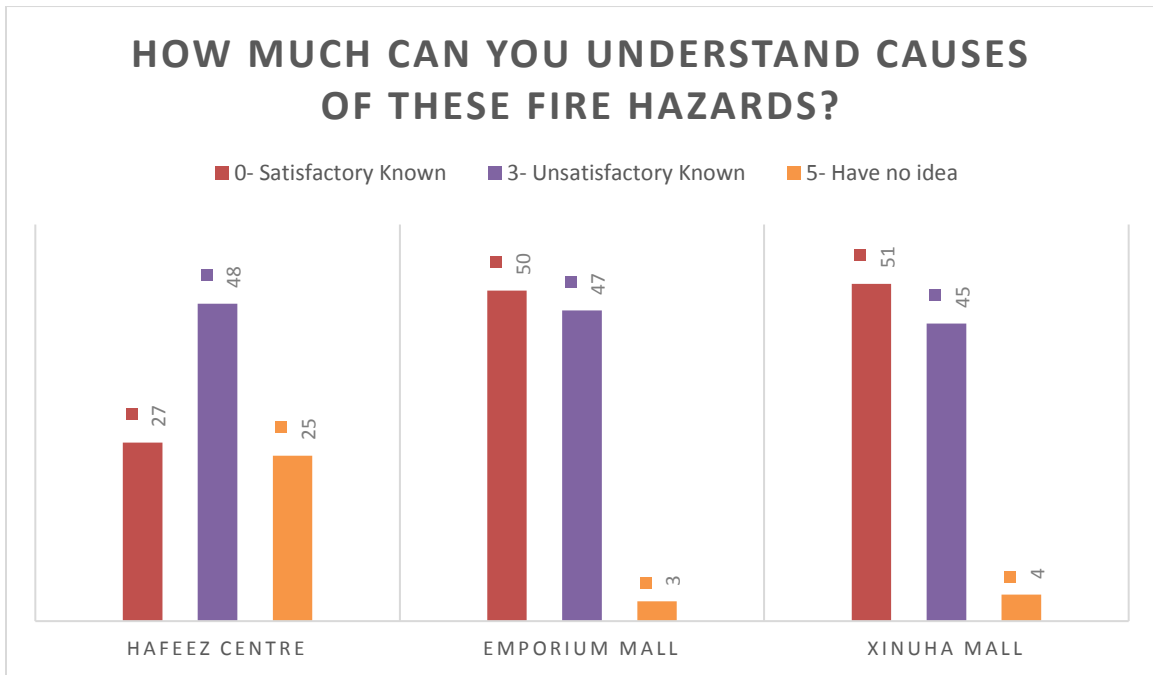
The collected data shows that respondents of Xinuha Mall are well known about the rescue. And evacuation procedures with the highest percentages of among three area 17% where as the most information lacked market is Hafeex center market whose respondents don't know what to do with the percentage of 43% and in the last majority respondents of Hafeez center are partially well prepared about the rescue and evacuation procedure with the percentage of 46%.



Graph: 27 Following evacuation plan

4. How much can you understand causes of these fire hazards?

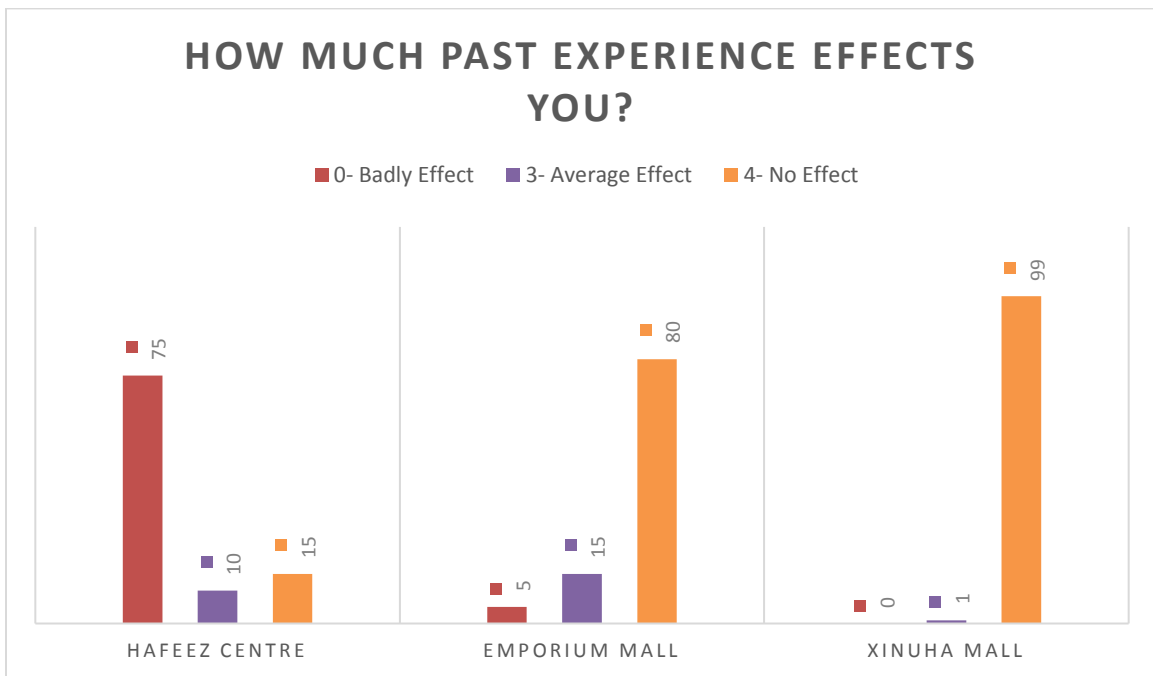
Understanding the causes of fire hazards is very important to deal with such hazards, by asking this question to respondents. The collected data represents that with the highest percentage of 51% in Xinuha Mall knows the causes of fire hazards. Whereas with the percentage of 48% and 47% the area Hafeez center market and Emporium Mall public unsatisfactory known about the causes of fire hazards and with the highest percentage of 25% the respondents of Hafeez center market does not have any idea about what are the causes of such hazards.



Graph: 28 Understanding the causes of fire hazards

5. How much past experience effects you?

Areas like multi-story markets are more likely to have fire hazards in the past that is why asking the question to know about the damage the previous event has caused so that the future preparedness can be develop through those experiences. By asking the question to the respondents (including customers and shopkeepers), the collected data represents that Hafeez center market is more like to have badly effect in past experience with the percentage of 75% where as 15% respondents of this market says that they have no effect which shows a distinct between market collaboration. The other market’s which are Emporium Mall and Xinuha Mall faced 15% and 1% average effect by previous fire hazard in the respective areas.



Graph: 29 Past experience effecting

6. Is there any fire safety plan in building?

Considering the level of perception, having a fire safety plan in building should be the mandatory step of commercial planning and there should be the check on it whether is it being implemented or not by desired authorities. That's why asking this question to the selected survey areas Hafeez center market, Emporium Mall and Xinuha Mall the answer has been collected in such a way that 95%, 91% and 55% respondents says that there is a fire safety plan in the buildings and only 80% respondents of Hafeez center says that there is no fire safety plan in the building.

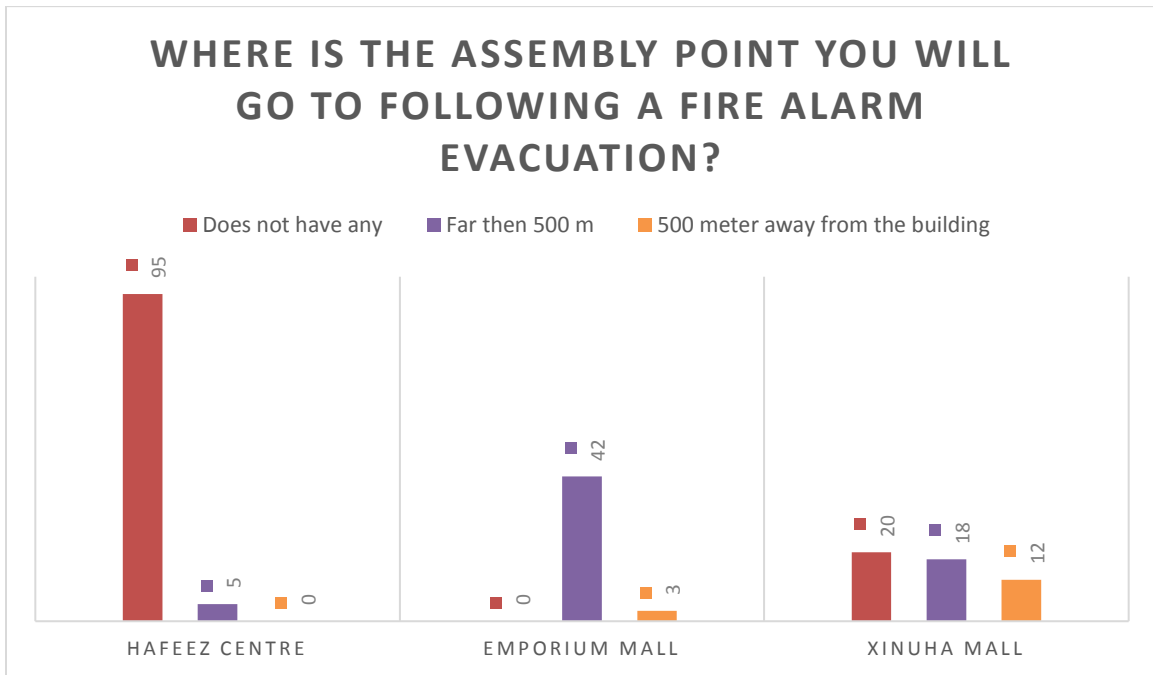


Graph: 30 Availability of fire safety plan

BEHAVIOR

1. Where is the assembly point you will go to following a fire alarm evacuation?

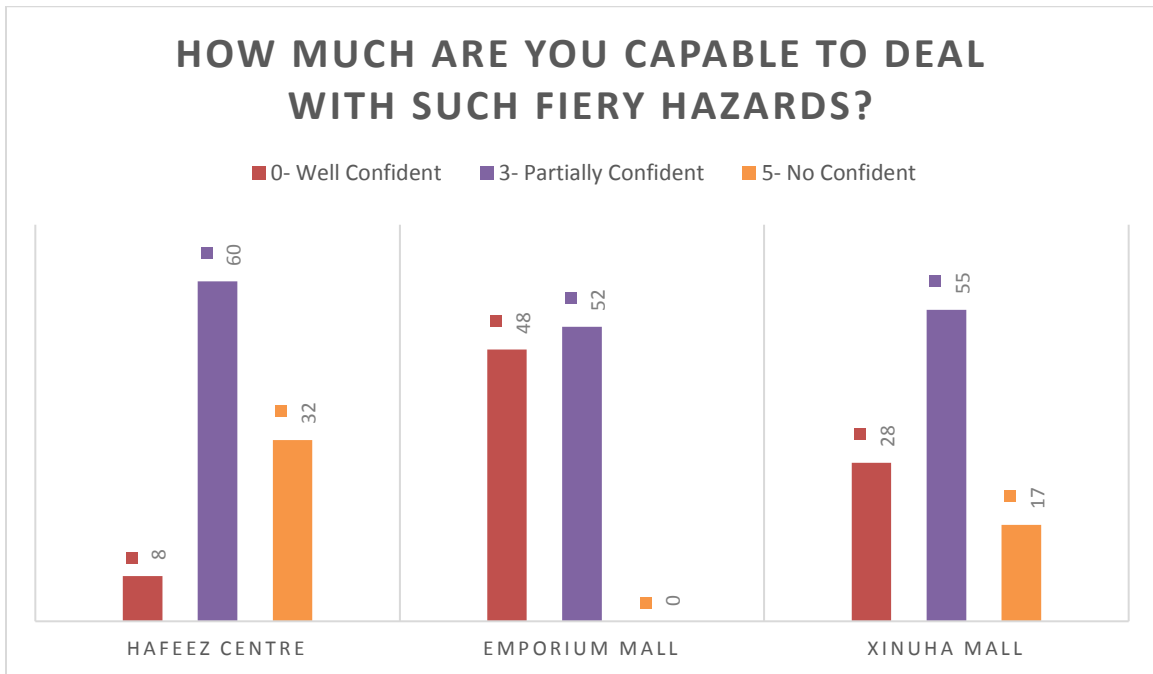
Assembling point is the area consist of vacant and green land mostly like big grounds, such points are used to gather the public in case of any hazards like fire hazard, earthquakes etc. the question has been asked to the respondents to analyze the behavior of the public towards the specific point and to know about the existence of such area in the markets. The data represents that with the respondents’ percentage of 95%, and 20% of the area Hafeez center market, and Xinuha Mall does not have any assembling point near the markets where as the respondent’s percentage of 55% and 50% of area Emporium Mall, and Xinuha Mall does have a assembling point but near the building which is according to standards are not feasible. The area having assembling points fat then 500m away from markets are Emporium Mall and Xinuha Mall with the percentages of 42% and 18%.



Graph: 31 Assembly Point

2. How much are you capable to deal with such fiery hazards?

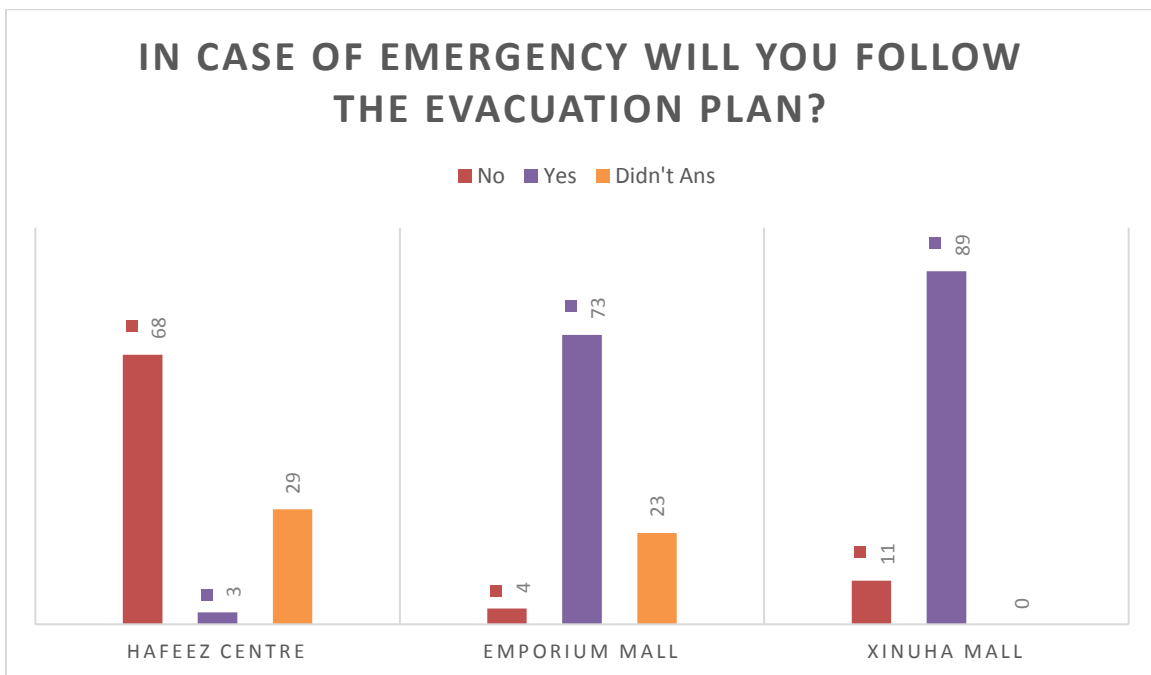
The collected data shows that majority of the respondents of all three markets have Partially Confident about how to deal with fiery hazards with the percentage of 60%, 52% and 55% out of 100% each of Hafeez center market, Emporium Mall and Xinuha Mall. Whereas, Hafeez center 8%, Emporium Mall 48% and Xinuha Mall 28% respondents are well confident responds to have to deal with the hazards and only 44%, 0% and 17% respondents are only No confident about their capability of area Hafeez center market, Emporium Mall and Xinuha Mall. The huge number of respondents in the category of partially confident in the markets.



Graph: 32 Capable to deal fire hazards

3. In case of emergency will you follow the evacuation plan?

Following the evacuation plan is a keen step to analyze the public’s behavior and the perception of the public. By asking the question the data shows that with the respondent’s percentage of 68%, 4% and 11% of the area Hafeez center market, Emporim Mall and Xinuha Mall says that they will not follow the evacuation plans whereas with the highest percentage of respondents among three areas of 89% responds positively to follow the evacuation plan. The reason of not following the evacuation could be that the area does not have any and second reason of this response can be the not understanding the pros of having evacuation plan.

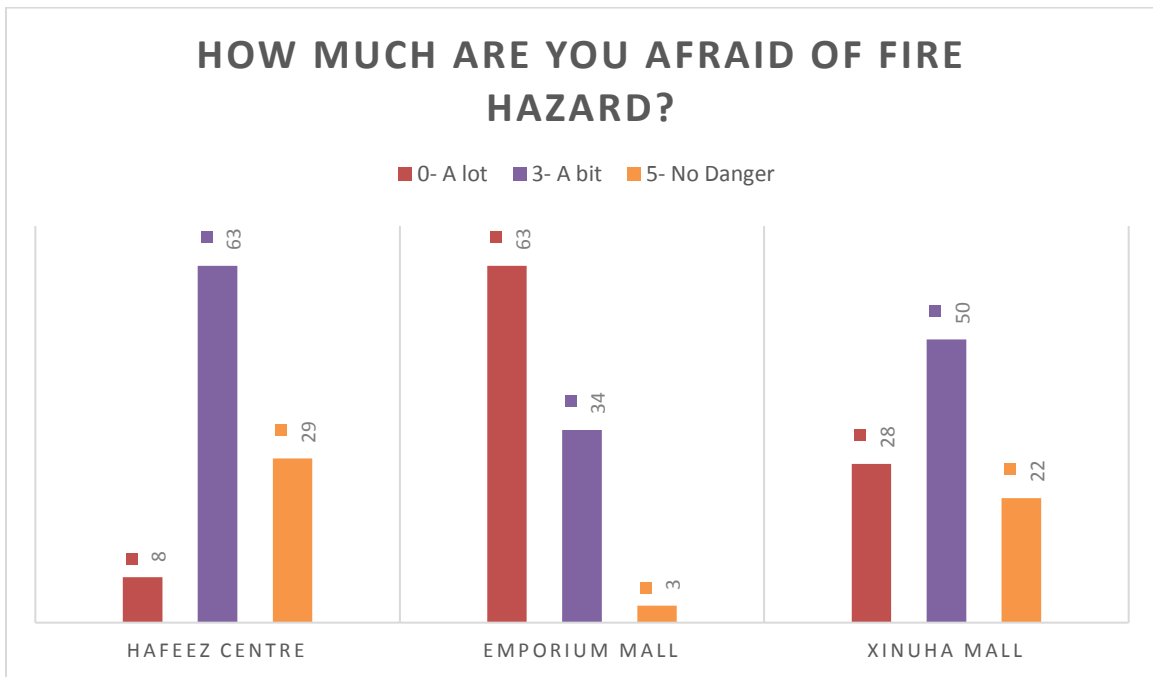


Graph: 33 Will you follow evacuation plan

FEAR

1. How much are you afraid of fire hazard?

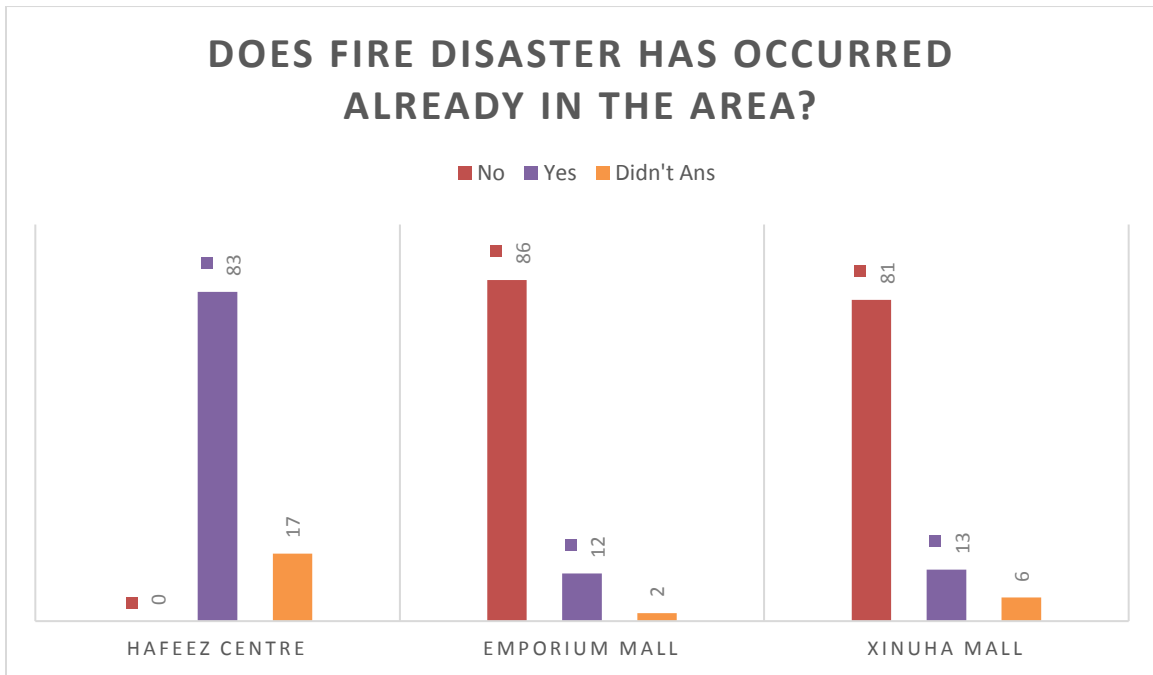
Fear is an element which can be caused naturally, it is really important to know the fear level of the study area to check the perception of the public. By asking the question, the data shows that the majority of respondents are a bit afraid of fire hazards with percentages of 63%, 34% and 50% for the areas Hafeez center market, Emporium Mall and Xinuha Mall. Whereas respondents of Hafeez center and Xinuha Mall say that they have no danger with percentages of 29% and 22% which is the highest percentage among the three areas in this category.



Graph: 34 Afraid of fire hazards

2. Does fire disaster has occurred already in the area?

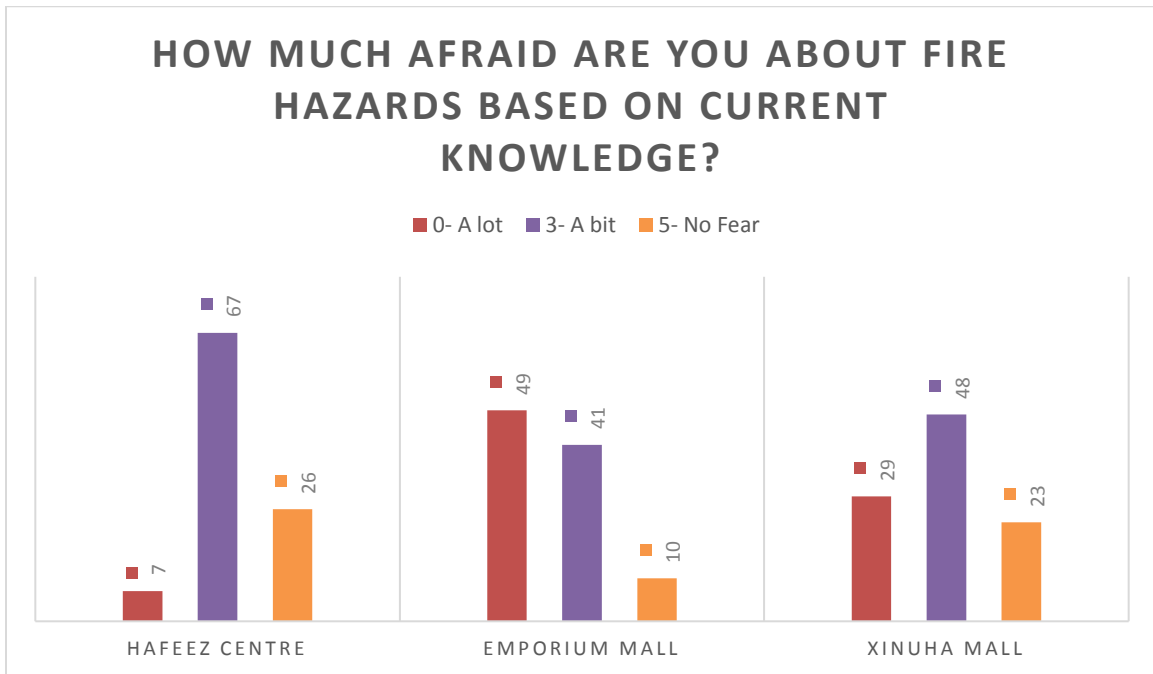
This question is related to the previous question of “Past Experience”. The question is asked to know the frequency or existence of the fire disaster in the area. It is important to check that which market is more victim of this hazard and the data shows that Hafeez center is more likely to have this hazard in past with the percentage of 83% out of 100%. whereas with the response rate of 86% and 81% of Emporium Mall and Xinuha Mall states that there is no fire disaster has occurred in this building before.



Graph: 35 Already occurrence of fire hazard

3. How much afraid are you about fire hazards based on current knowledge?

The data represents that with the percentages of 67%, 41% and 48% of respondents of the area Hafeez center market, Emporium Mall and Xinuha Mall are a bit afraid about the fire hazards according to the current knowledge of the area or existing situation of building. Whereas 7%, 49% and 29% respondents of Hafeez center market, Emporium Mall and Xinuha Mall a lot afraid about fire hazards based on currents knowledge and with the least percentages of 26%, 10% and 23% the respondents of Hafeez center market, Emporium Mall and Xinuha Mall have no fear about the fire hazard.

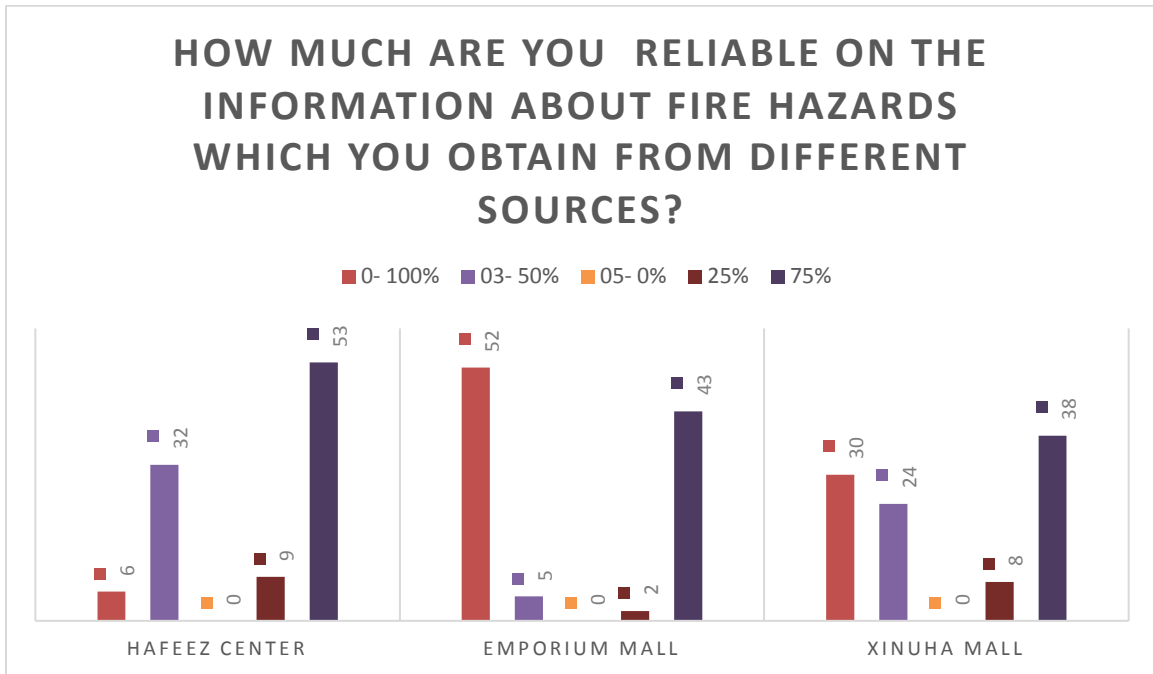


Graph: 36 Afraid about hazard based on current knowledge

TRUST

1. How much are you reliable on the information about fire hazards which you obtain from different sources?

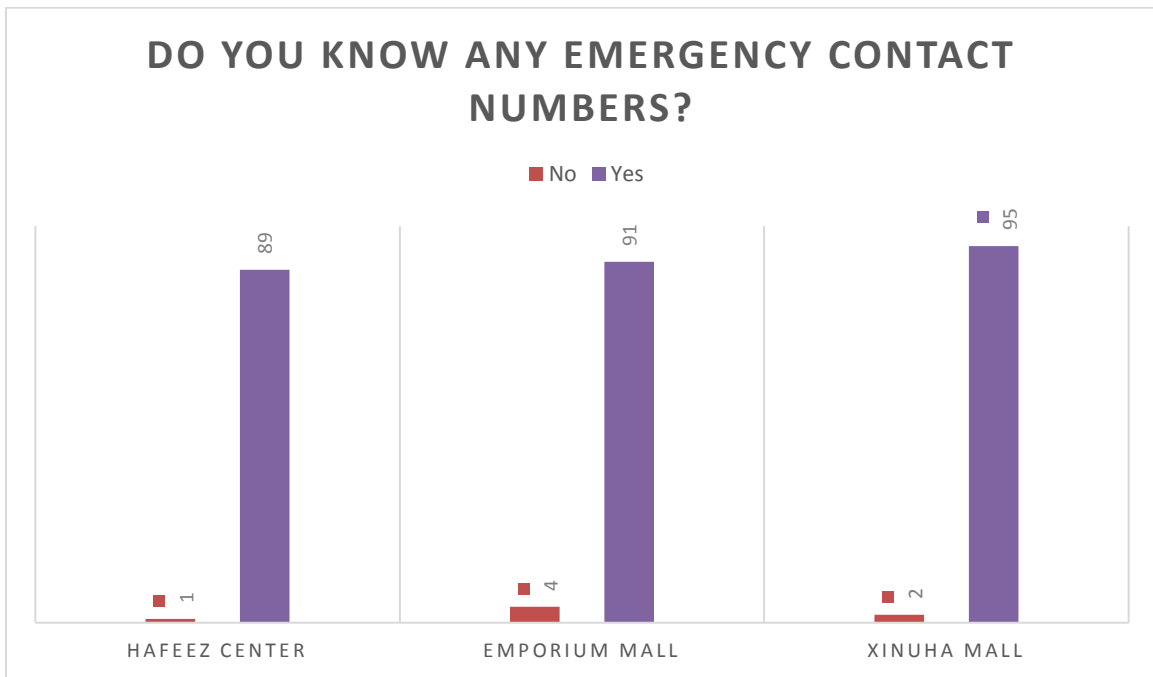
Mostly information about fire hazards deliver after the occurrence of fire hazards, that why to analyze the reliability of the respondents is very necessary by collecting the data, it says that 32%, 05% and 24% respondents of Hafeez Center, Emporium Mall and Xinuha Mall have trust of 50% on the sources. Whereas, 53%, 43% and 38% respondents of Hafeez Center Emporium Mall and Xinuha Mall have 75% of trust on the sources which shows that majority of the public do relay on the sources.



Graph: 37 Reliability on information

2. Do you know any emergency contact numbers?

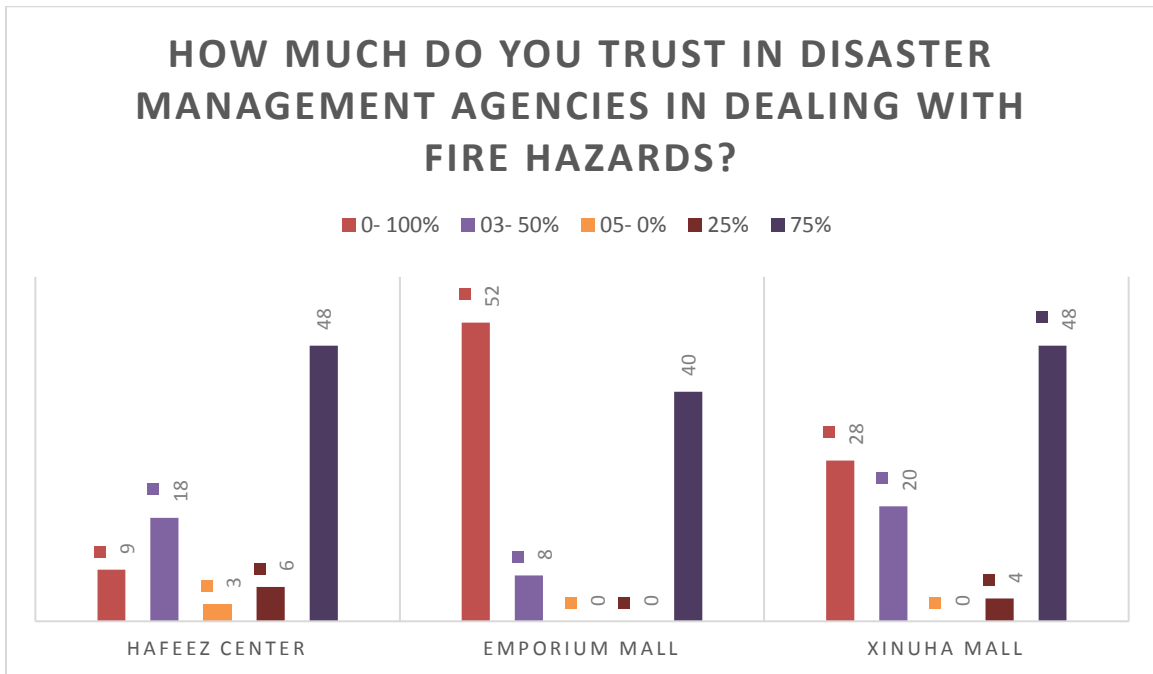
In perception, knowing all the emergency contact numbers is also very important. The asked question get the responses which says that 89%, 91% and 95% respondents of Hafeez Center, Emporium Mall and Xinuha Mall knows emergency contact numbers which can be used at the hour of need.



Graph: 38 Knowing emergency contact numbers

3. How much do you trust in disaster management agencies in dealing with fire hazards?

Disaster management agencies are playing a vital role to reduce the occurrence and damage of fire hazards. In this case, the question has been asked to analyze the perception of trust between the respondents and agencies, from which the data has been shows that 18%, 08% and 20% respondents of Hafeez Center, Emporium Mall and Xinuha Mall has 50% trust on the agencies, where as 48%, 40% and 48% respondents of Hafeez Center, Emporium Mall and Xinuha Mall has 75% trust on the agencies and with the trust level of 100% the area respondents responds with the percentages of 09%, 52% and 28% of the area of Hafeez Center, Emporium Mall and Xinuha Mall



Graph: 39 Trust in disaster management agencies

PREPAREDNESS INDICATORS

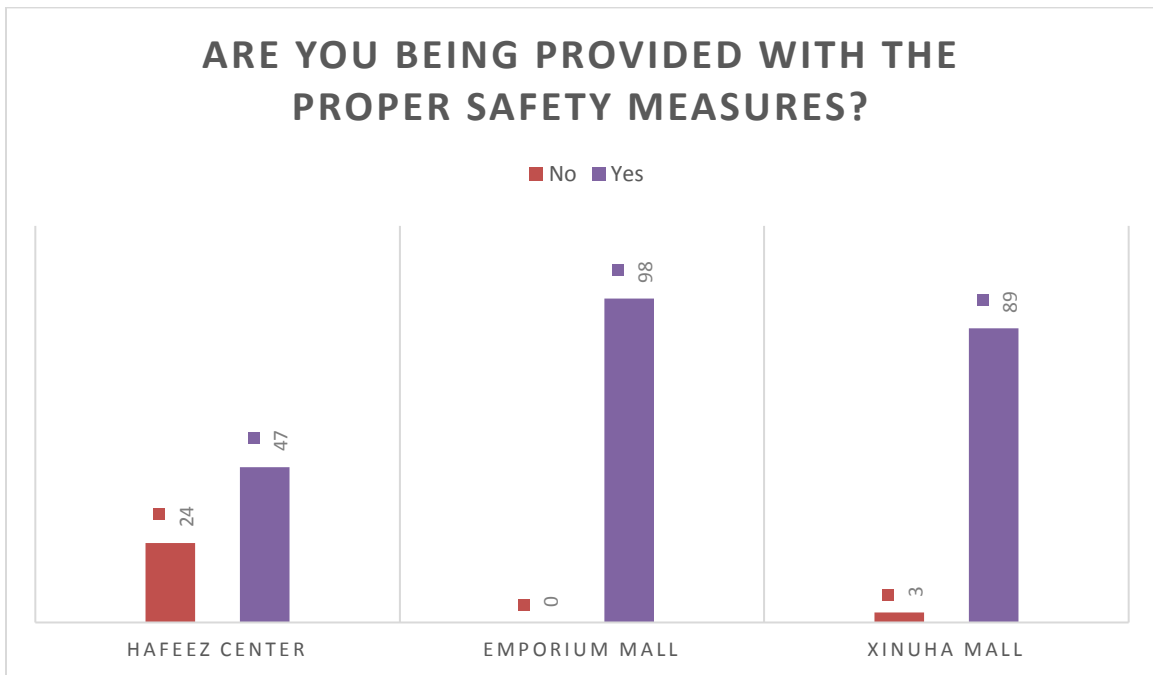
- Safety
- Emergency Medical Services
- Knowledge about Emergency Responsive Departments

PREPAREDNESS INDICATORS ANALYSIS

SAFETY

1. Are you being provided with the proper safety measures? *

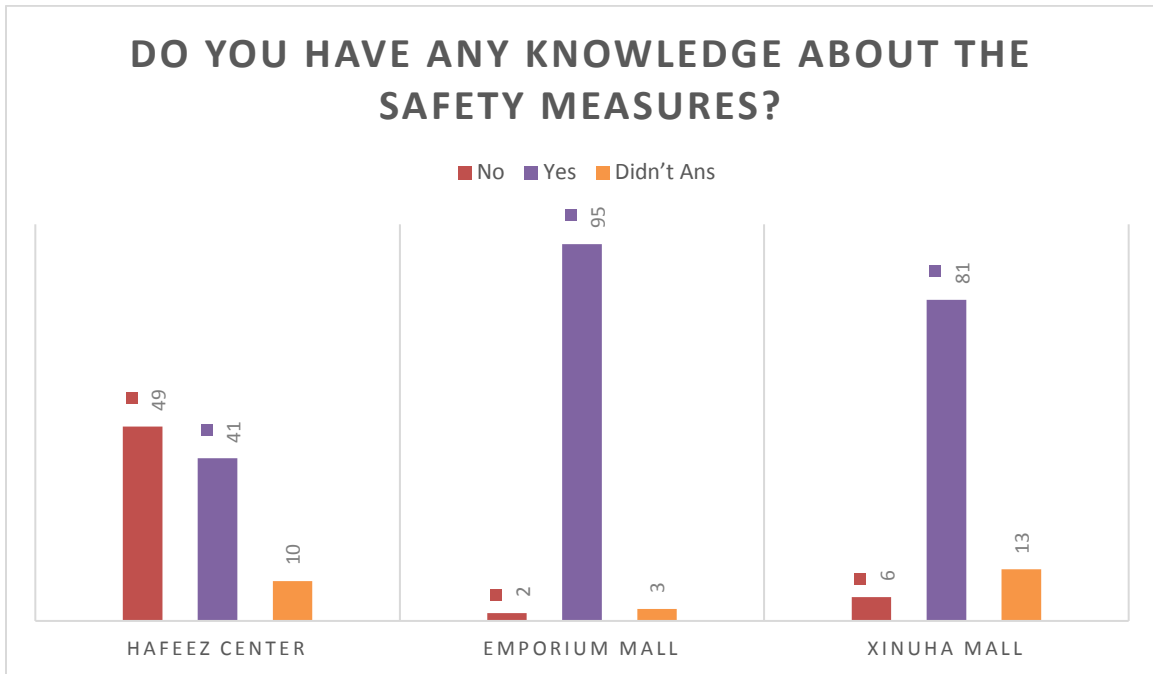
In the matter of area preparedness level, it is important to check the availability of safety measures in the individual shop and in whole market. The question has been asked to the public and the data has been collected says that with the highest percentage of 100% Xinuha Mall has not provided with any of safety measures where as 56% and 61% respondents of Hafeez Center and Emporium Mall responds that they are not being provided with the safety measure. Furthermore, the percentages of 44% and 39% respondents of Hafeez Center and Emporium Mall responds positively of having safety measures.



Graph: 40 Building Provided with proper safety measures

2. Do you have any knowledge about the safety measures?

The knowledge about safety measures is also very important in preparedness level, the responses shows that 49%, 02% and 06% respondents of Hafeez Center, Emporium Mall and Xinuha Mall has responded negatively of not having any knowledge related to safety measures while 41%, 95% and 81% respondents of area Hafeez Center, Emporium Mall and Xinuha Mall responds positively that they do have a little bit knowledge about the safety measures.



Graph: 41 Knowledge about safety measures

3. Is your shop is well attended by building/plaza’s staff or workers to maintain the fire hazard precautions?

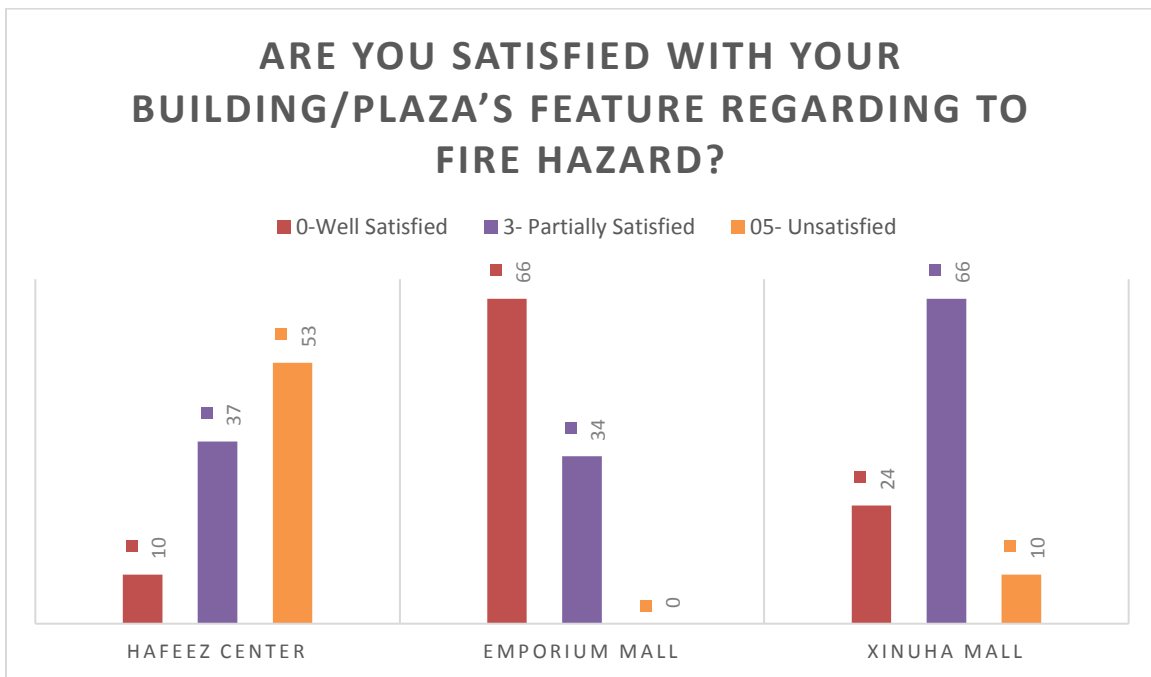
Preparedness level do require the maintenance pf shop or area, the data represents that 07%, 20% and 43% respondents of Hafeez Center, Emporium Mall and Xinuha Mall responds that maybe there is or there is not any attended by any worker to up to date the building daily or accordingly to the situations where as 31%, 01% and 08% respondents of Hafeez Center, Emporium Mall and Xinuha Mall responds in negative and 23%, 76% and 32% respondents of Hafeez Center, Emporium Mall and Xinuha Mall responds positively that their shop or market is being well attended by area’s staff or workers to maintain the fire hazard precautions.



Graph: 42 shop well attended by staff

4. Are you satisfied with your building/plaza’s feature regarding to fire hazard?

According to the collected data, the percentages of 37%, 34% and 66% respondents of area Hafeez Center, Emporium Mall and Xinuha Mall responds to medium level of Likert scale which is (03) says that they are partially satisfied with the building design features where as 53%, 00% and 10% of the respondents of Hafeez Center, Emporium Mall and Xinuha Mall responds negatively that they are not satisfied with their building design or features and with the least percentages of 10%, 66% and 24% of respondents of Hafeez Center Emporium Mall and Xinuha Mall responds positively that they are satisfied with the building design, they reason of this satisfaction is maybe that they have developed individual shops according to their will with better planning and infrastructure.

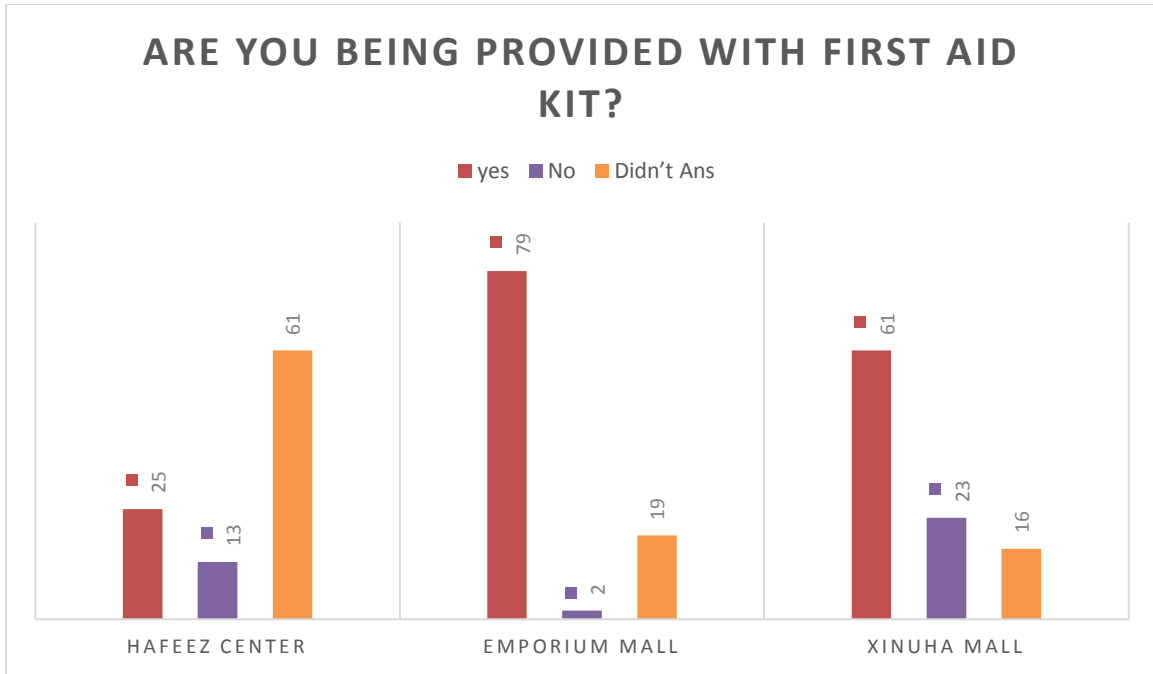


Graph: 43 Satisfaction with building features

EMERGENCY MEDICAL SERVICES

1. Are you being provided with first aid kit?

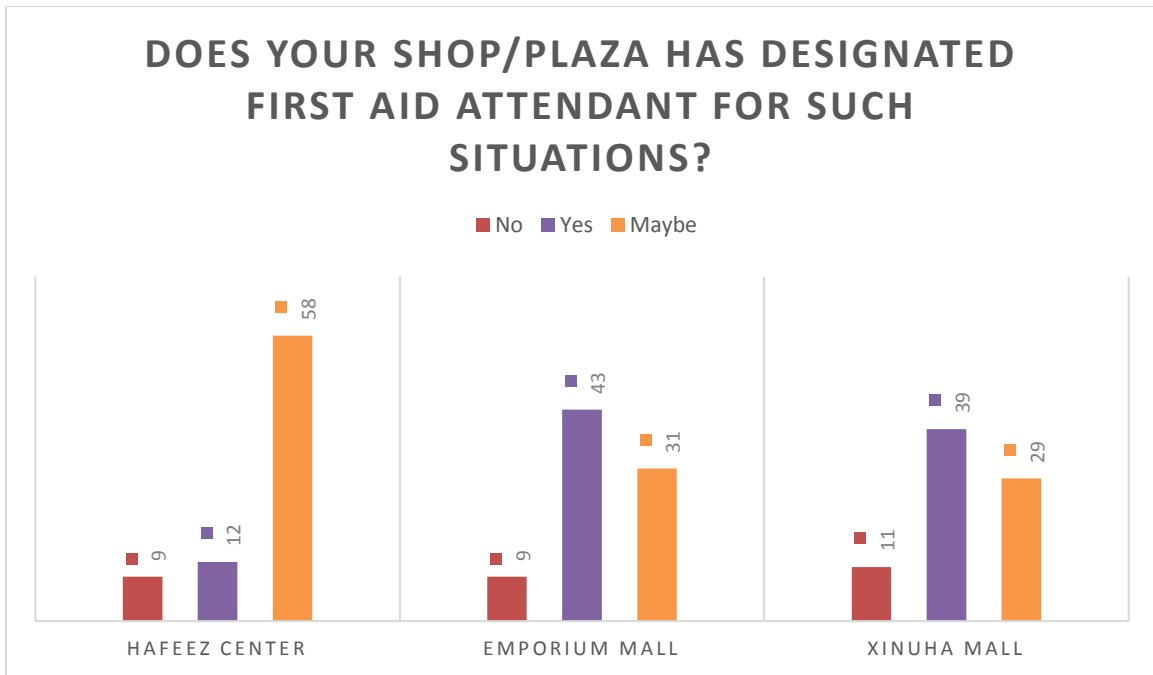
Preparedness also covers the first aid kit section, by asking the question the responses has been gathered which says that 25%, 79% and 61% respondents of Hafeez Center, Emporium Mall and Xinuha Mall responds positively while 13%, 02% and 23% of the respondents of Hafeez Center, Emporium Mall and Xinuha Mall responds negatively of not being provided with the first aid kit.



Graph: 44 Provided with first aid kit

2. Does your shop/plaza has designated first aid attendant for such situations?

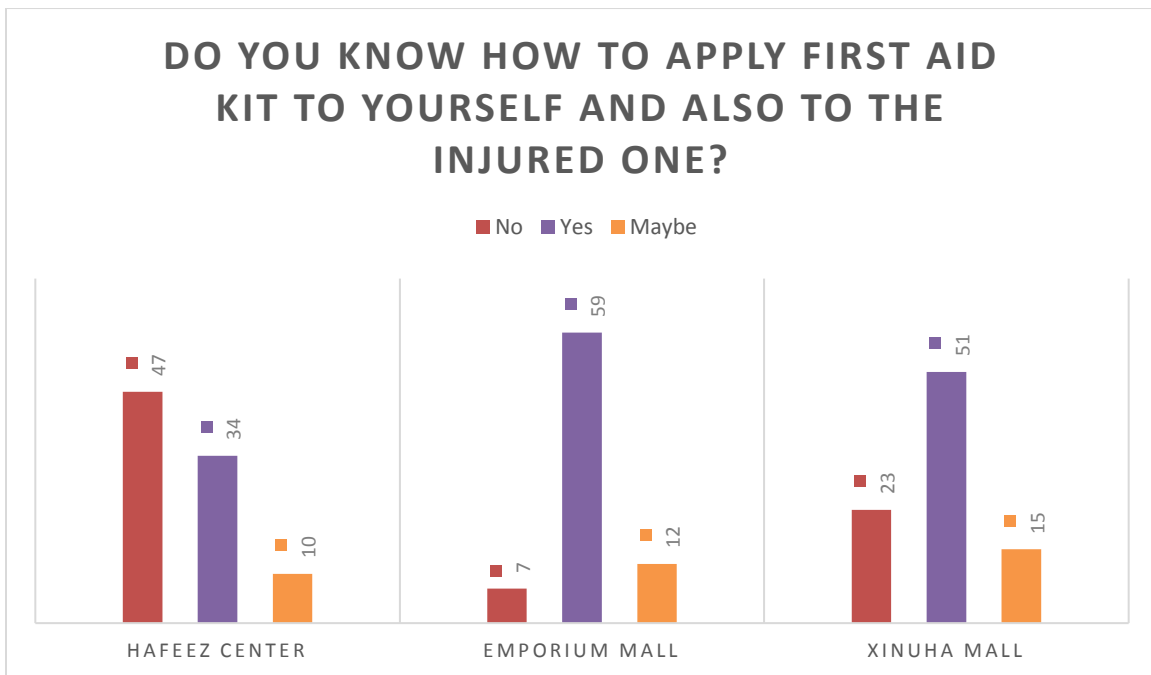
The data shows that 58%, 31% and 29% respondents of Hafeez Center, Emporium Mall and Xinuha Mall did not know that their shop has or has not have designated first aid attendant for such situations where as 09%, 09% and 11% respondents of Hafeez Center, Emporium Mall and Xinuha Mall responds negatively while 12%, 43% and 39% respondents of Hafeez Center, Emporium Mall and Xinuha Mall responds positively that they do have first aid attendant for such situations.



Graph: 45 Separate first aid attendant for fire situations

3. Do you know how to apply first aid kit to yourself and also to the injured one?

It is really important to know whether the individuals capable of applying first aid kit to yourself and to others, the data has been gathered which shows that 10%, 12% and 15% respondents of Hafeez Center, Emporium Mall and Xinuha Mall responds in maybe direction which means they are or they are not capable of doing this, while 47%, 07% and 23% respondents of Hafeez Center, Emporium Mall and Xinuha Mall responds negatively and with the least values of 34%, 59% and 51% respondents of Hafeez Center, Emporium Mall and Xinuha Mall responds positively.

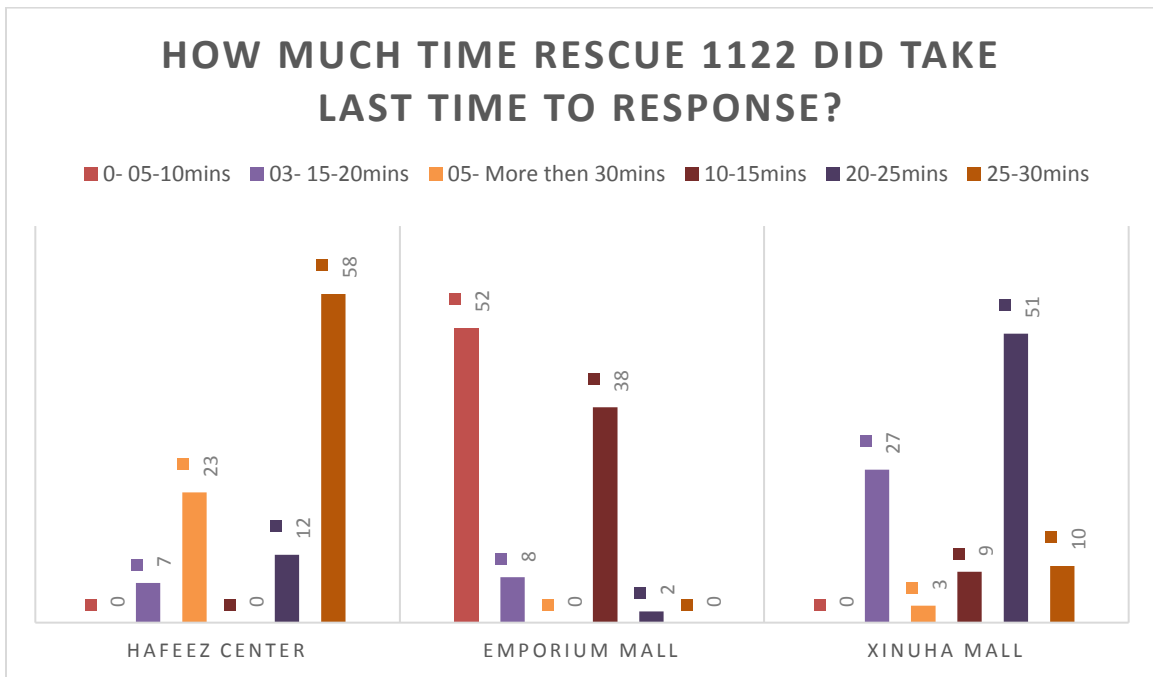


Graph: 46 Knowledge about how to apply first aid kit

KNOWLEDGE ABOUT EMERGENCY RESPONSIVE DEPARTMENTS

1. How much time Rescue 1122 did take last time to response?

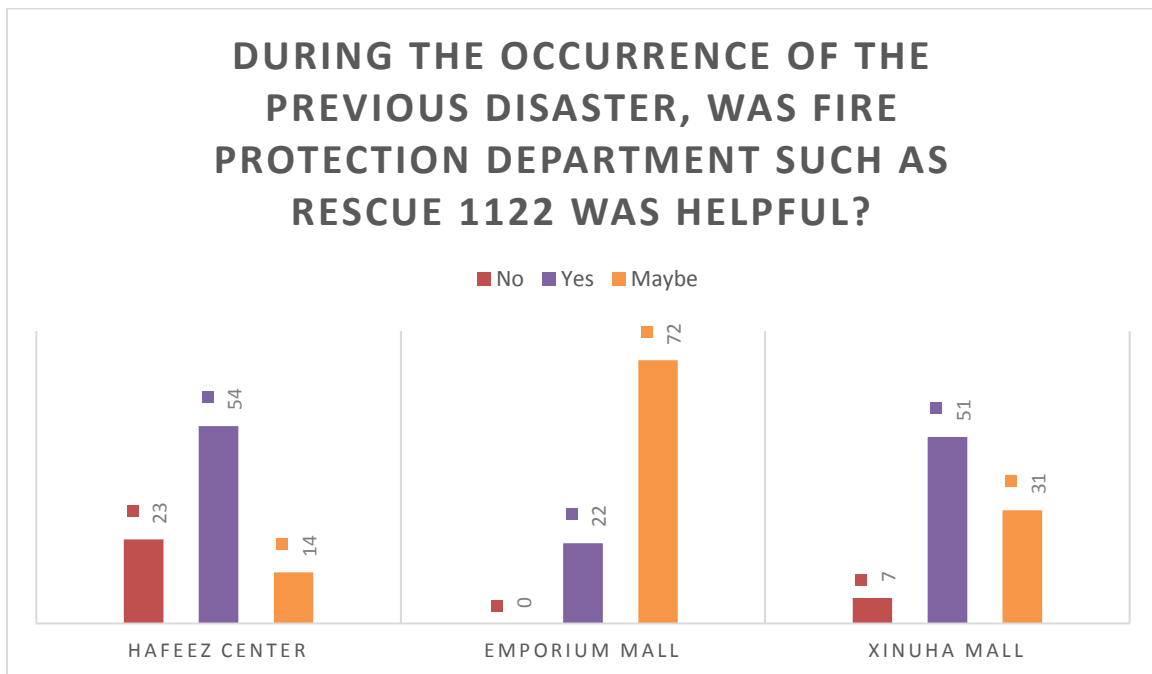
Rescue 1122 is a very efficient authority which responds on time, while considering this fact, the question has asked to the respondents which responses that 00%, 38% and 09% respondents of Hafeez Center, Emporium Mall and Xinuha Mall responds that rescue 1122 takes 10-15 minutes of arriving where as 00%, 52% and 00% respondents of Hafeez Center, Emporium Mall and Xinuha Mall responds that they took 05-10 minutes. Which shows that the authority works efficiently towards the fire hazards.



Graph: 47 Rescue 1122 took time

2. During the occurrence of the previous disaster, was fire protection department such as rescue 1122 was helpful?

The collected data shows that 14%, 72% and 31% respondents of Hafeez Center, Emporium Mall and Xinuha Mall responds in maybe option that they did or did not knows that fire protection department was helpful or not where as 23%, 00% and 07% of respondents of Hafeez Center, Emporium Mall and Xinuha Mall responds in negatively while with the least values of 54%, 22% and 51% of respondents of Hafeez Center Emporium Mall and Xinuha Mall responds positively that during the occurrence of previous disaster fire protection department and rescue1122 was being helpful.



Graph: 48 Rescue 1122 was helpful

5.3. INDEXING

Indexing is a process which has been used in this study to evaluate the data from 0% to 100% according to the Likert Scale of (0 to 5 range). Further through indexing, averages of each attribute has been calculated and then evaluated on “Star Modeling”.

4.3.1. Score Level

Score Level for Positive Responses

SCORING	LEVEL	RANK
5	80-100%	Satisfied
4	60-80%	Partial Satisfied
3	40-60%	Neutral
2	20-40%	Partial Dissatisfied
1	0-20%	Dissatisfied
0	0	Worse

Graph: 49 Score Level for Positive responses

The above table predicts the positive responses and their scoring. Which shows that, if one respondent responds a question in satisfactory way which is a positive response then the answer will be rank 5 and accordingly all the responses has been incorporated through this method.

Score Level for Negative Responses

SCORING	LEVEL	RANK
0	80-100%	Satisfied
1	60-80%	Partial Satisfied
2	40-60%	Neutral
3	20-40%	Partial Dissatisfied
4	0-20%	Dissatisfied
5	0	Worse

Graph: 50 Score Level for Negative responses

The above table predicts the negative responses and their scoring. Which shows that, if one respondent responds a question in totally dissatisfaction way which is a negative response then the answer will be rank 5 and accordingly all the responses has been incorporated through this method.

TRADITIONAL COMMERCIAL MARKET INDEXING			
PERCEPTION INDICATORS			
<i>AWARENESS</i>	<u>SHAH ALAM MARKET</u>	<u>ICCHARA BAZAR</u>	<u>BAGHBANPURA BAZAR</u>
1. Knowledge about Disaster	5	5	4
2. Preparedness Level on occurrence of disaster	3	4	3
3. Knowledge about rescue and evacuation procedures	3	4	3
4. Understanding causes of fire hazards	2	3	3
5. Effectiveness of past experience	3	4	4
6. Availability of fire safety plan in building	0	3	1
AVERAGE	2.67	3.84	3
<i>BEHAVIOR</i>			
1. Availability of fire alarm	3	3	3
2. Capability to deal with fiery hazards	2	4	3
3. Following the evacuation plan	3	3	2
AVERAGE	2.67	3.34	2.67
<i>FEAR</i>			
1. Level of being afraid about fire hazard	4	4	4
2. Area already victim of fire hazards	3	5	4
3. Afraid about fire hazards based on current knowledge	3	4	4
AVERAGE	3.34	4.34	4
<i>TRUST</i>			
1. Reliability on the information about fire hazards	3	4	4
2. Knowledge about emergency contact numbers	3	2	3

FIRE HAZARD ASSESSMENT IN COMMERCIAL AREAS OF LAHORE

3. Trust in disaster management agencies	3	2	3
AVERAGE	3	2.67	3.34
PREPAREDNESS INDICATORS			
<i>SAFETY</i>	<u>SHAH ALAM MARKET</u>	<u>ICCHARA BAZAR</u>	<u>BAGHBANPURA BAZAR</u>
1. Being providing with safety measures	2	3	0
2. Knowledge about safety measures	1	2	1
3. Shop is being well attended by workers to maintain the precautions	3	4	4
4. Satisfaction regarding building features	4	4	3
AVERAGE	2.5	3.25	2
<i>EMERGENCY MEDICAL SERVICES</i>			
1. Being providing with first aid kit	1	3	1
2. Availability of designated first aid attendant for such hazard situation	2	3	2
3. Knowledge to apply first aid kid to yourself and to others	3	2	3
AVERAGE	2	2.67	2
<i>KNOWLEDGE ABOUT EMERGENCY RESPONSIVE DEPARTMENTS</i>			
1. Time took by Rescue 1122 to response in past	3	3	4
2. Reuse 1122 being helpful or not during the fire hazard situations	4	4	4
AVERAGE	3.5	3.5	4

Graph: 51 Traditional Commercial Market Indexing

Graph: 52 Final Scoring Of Traditional Commercial Market Indexing

FINAL SCORING			
TRADITIONAL COMMERCIAL MARKET INDEXING			
PERCEPTION INDICATORS			
INDICATORS	<u>SHAH ALAM MARKET</u>	<u>ICCHARA BAZAR</u>	<u>BAGHBANPURA BAZAR</u>
<i>AWARENESS</i>	2.67	3.84	3
<i>BEHAVIOR</i>	2.67	3.34	2.67
<i>FEAR</i>	3.34	4.34	4
<i>TRUST</i>	3	2.67	3.34
PREPAREDNESS INDICATORS			
INDICATORS	<u>SHAH ALAM MARKET</u>	<u>ICCHARA BAZAR</u>	<u>BAGHBANPURA BAZAR</u>
<i>SAFETY</i>	2.5	3.25	2
<i>EMERGENCY MEDICAL SERVICES</i>	2	2.67	2
<i>KNOWLEDGE ABOUT EMERGENCY RESPONSIVE DEPARTMENTS</i>	3.5	3.5	4

- The final indexing of indicators represents that Shah Alam Markets lacks in awareness other than two areas with the indexing value of 2.67. In Behavior, Shah Alam and Baghbanpura Bazar both lacks in it which also indexing value is 2.67 while Icchara rely on 3.34 indexing value in Behavior. Fear has been ranked in a negative indicator which says that Hafeez Center has the highest indexed value of 4.34 which means that this area has the highest level of fear of disaster. The last perception indicator is Trust, whose responses gathered in a negative way which shows that Icchara Bazar has the least trust on departments or rescue. In preparedness section, Baghbanpura Bazar has the least value of indexing score which is 2, that means this area public has the least safety. Meanwhile, Shah Alam Market and Baghbanpura Bazar has the least emergency medical services and in the last almost every area has satisfactory information of emergency responsive departments.

<u>MULTI-STOREY COMMERCIAL PLAZAS</u>			
PERCEPTION INDICATORS			
<i>AWARENESS</i>	<u>HAFEEZ CENTER</u>	<u>EMPORIUM MALL</u>	<u>XINUHA MALL</u>
7. Knowledge about Disaster	5	5	5
8. Preparedness Level on occurrence of disaster	3	4	3
9. Knowledge about rescue and evacuation procedures	3	3	4
10. Understanding causes of fire hazards	3	4	4
11. Effectiveness of past experience	5	1	0
12. Availability of fire safety plan in building	1	5	5
AVERAGE	3.34	3.68	3.5
<i>BEHAVIOR</i>			
4. Availability of fire alarm	0	5	4
5. Capability to deal with fiery hazards	3	3	3
6. Following the evacuation plan	2	4	5
AVERAGE	1.67	4	4
<i>FEAR</i>			
4. Level of being afraid about fire hazard	4	4	3
5. Area already victim of fire hazards	5	0	0
6. Afraid about fire hazards based on current knowledge	3	3	2
AVERAGE	4	2.34	1.68
<i>TRUST</i>			
4. Reliability on the information about fire hazards	4	4	3
5. Knowledge about emergency contact numbers	5	5	5

FIRE HAZARD ASSESSMENT IN COMMERCIAL AREAS OF LAHORE

6. Trust in disaster management agencies	4	4	4
AVERAGE	4.34	4.34	4
PREPAREDNESS INDICATORS			
<i>SAFETY</i>	<u>HAFEEZ CENTER</u>	<u>EMPORIUM MALL</u>	<u>XINUHA MALL</u>
5. Being providing with safety measures	2	5	5
6. Knowledge about safety measures	3	5	5
7. Shop is being well attended by workers to maintain the precautions	2	4	3
8. Satisfaction regarding building features	1	4	3
AVERAGE	2	4.5	4
EMERGENCY MEDICAL SERVICES			
4. Being providing with first aid kit	1	4	4
5. Availability of designated first aid attendant for such hazard situation	3	4	3
6. Knowledge to apply first aid kid to yourself and to others	2	4	3
AVERAGE	2	4	3.34
KNOWLEDGE ABOUT EMERGENCY RESPONSIVE DEPARTMENTS			
3. Time took by Rescue 1122 to response in past	1	4	4
4. Reuse 1122 being helpful or not during the fire hazard situations	3	4	3
AVERAGE	2	4	3.5

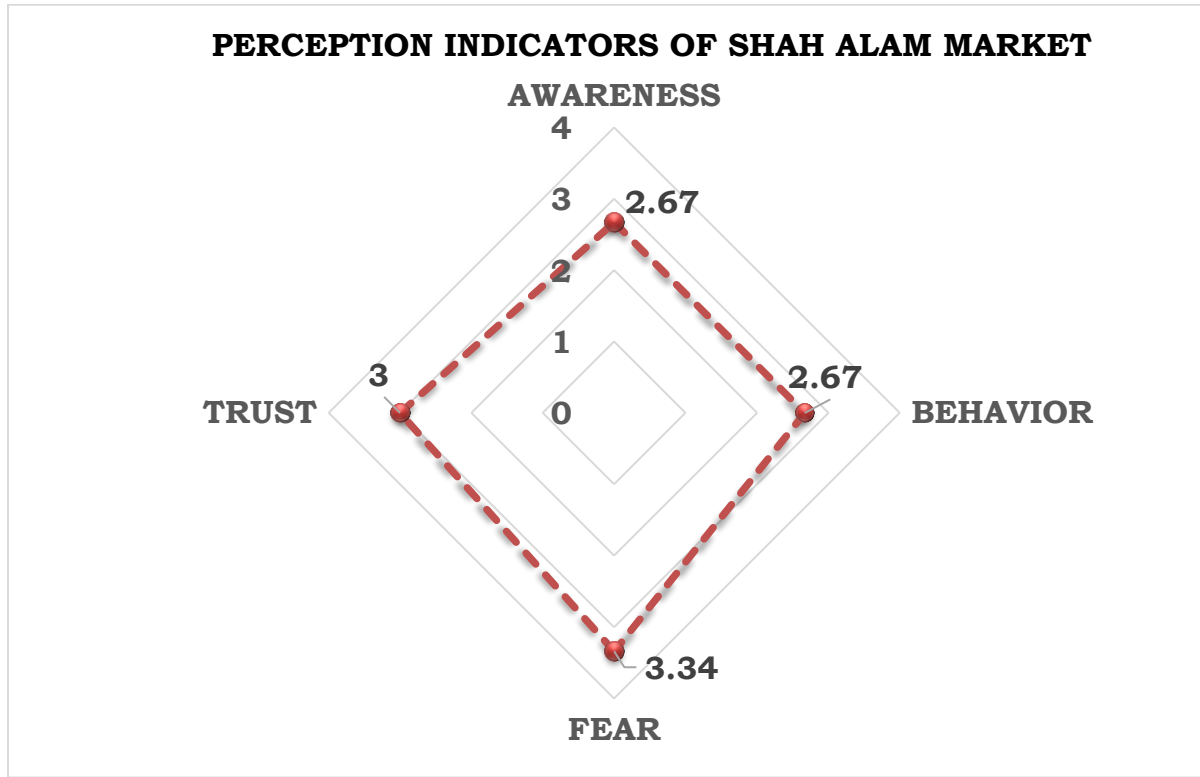
Graph: 53 Multi-Story Commercial Plazas Indexing

Graph: 54 Final Scoring Of Multi-Story Commercial Plazas

FINAL SCORING			
<u>MULTI-STOREY COMMERCIAL PLAZAS</u>			
PERCEPTION INDICATORS			
INDICATORS	<u>HAFEEZ CENTER</u>	<u>EMPORIUM MALL</u>	<u>XINUHA MALL</u>
<i>AWARENESS</i>	3.34	3.68	3.5
<i>BEHAVIOR</i>	1.67	4	4
<i>FEAR</i>	4	2.34	1.68
<i>TRUST</i>	4.34	4.34	4
PREPAREDNESS INDICATORS			
INDICATORS	<u>HAFEEZ CENTER</u>	<u>EMPORIUM MALL</u>	<u>XINUHA MALL</u>
<i>SAFETY</i>	2	4.5	4
<i>EMERGENCY MEDICAL SERVICES</i>	2	4	3.34
<i>KNOWLEDGE ABOUT EMERGENCY RESPONSIVE DEPARTMENTS</i>	2	4	3.5

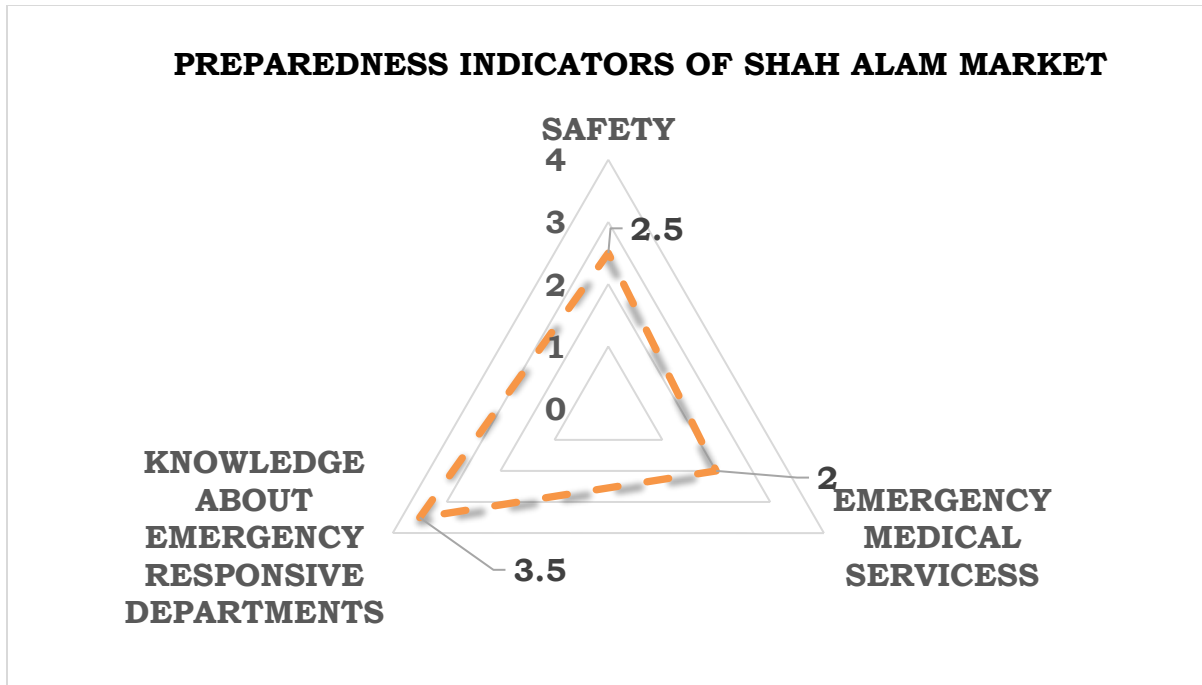
- The final indexing of indicators represents that Hafeez Center lacks in awareness other than two areas with the indexing value of 3.34. In Behavior, Shah Alam and Baghbanpura Bazar both lacks in it which also indexing value is 2.67 while Icchara rely on 3.34 indexing value in Behavior. Fear has been ranked in a negative indicator which says that Hafeez Center has the highest indexed value of 4.34 which means that this area has the highest level of fear of disaster. The last perception indicator is Trust, whose responses gathered in a negative way which shows that Icchara Bazar has the least trust on departments or rescue. In preparedness section, Baghbanpura Bazar has the least value of indexing score which is 2, that means this area public has the least safety. Meanwhile, Shah Alam Market and Baghbanpura Bazar has the least emergency medical services and in the last almost every area has satisfactory information of emergency responsive departments.

5.4. THE STAR MODELING ANALYSIS OF TRADITIONAL MARKETS
INDEXING OF SHAH ALAM MARKET



Graph: 55 Web Graph Perception Indicator of Shah Alam

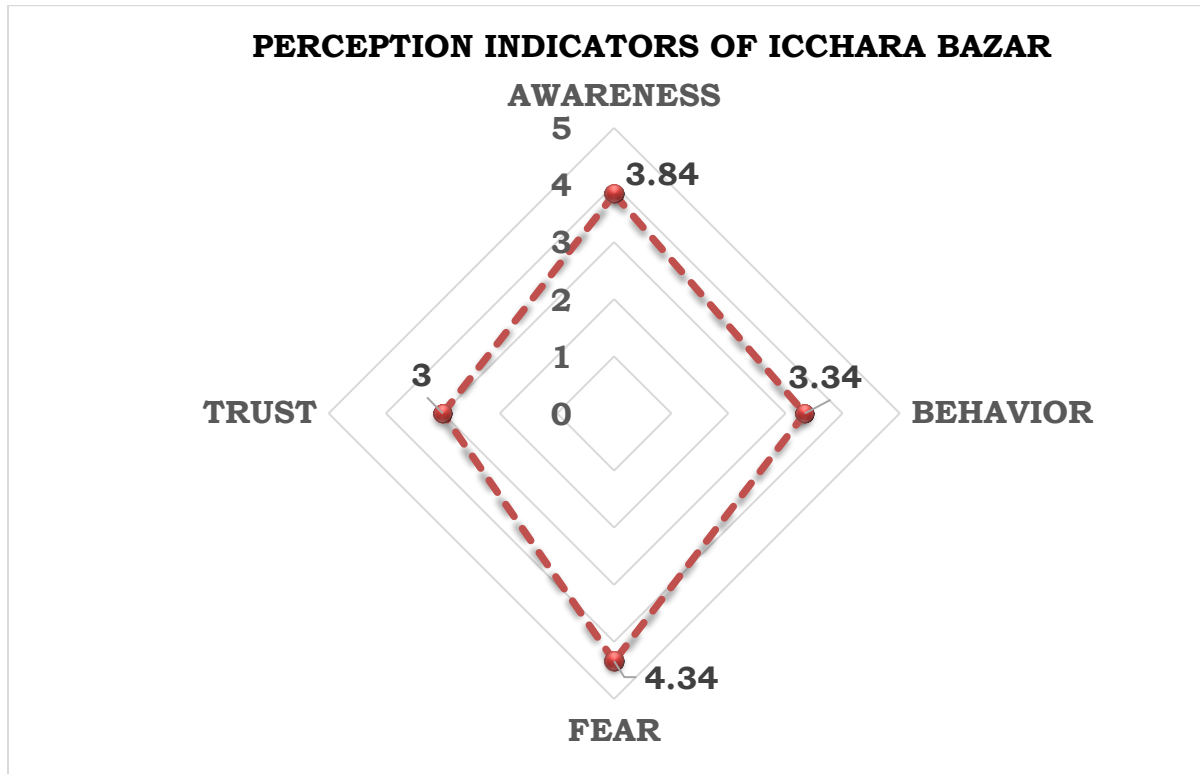
Shah Alam market in perception phase lacks in Behavior and Awareness indicator as both are ranked in 2.67 position out 5 which means that their behavior towards disaster is not reliable or they don't know what to do in such situations, whereas community does not have awareness regarding such hazards. Furthermore, in fear indicator they ranked 3.34 out of 5 and in trust they also ranked in medium level which is 3. So overall, Shah Alam market is not up to the mark on perception phase.



Graph: 56 Web Graph Preparedness Indicator of Shah Alam

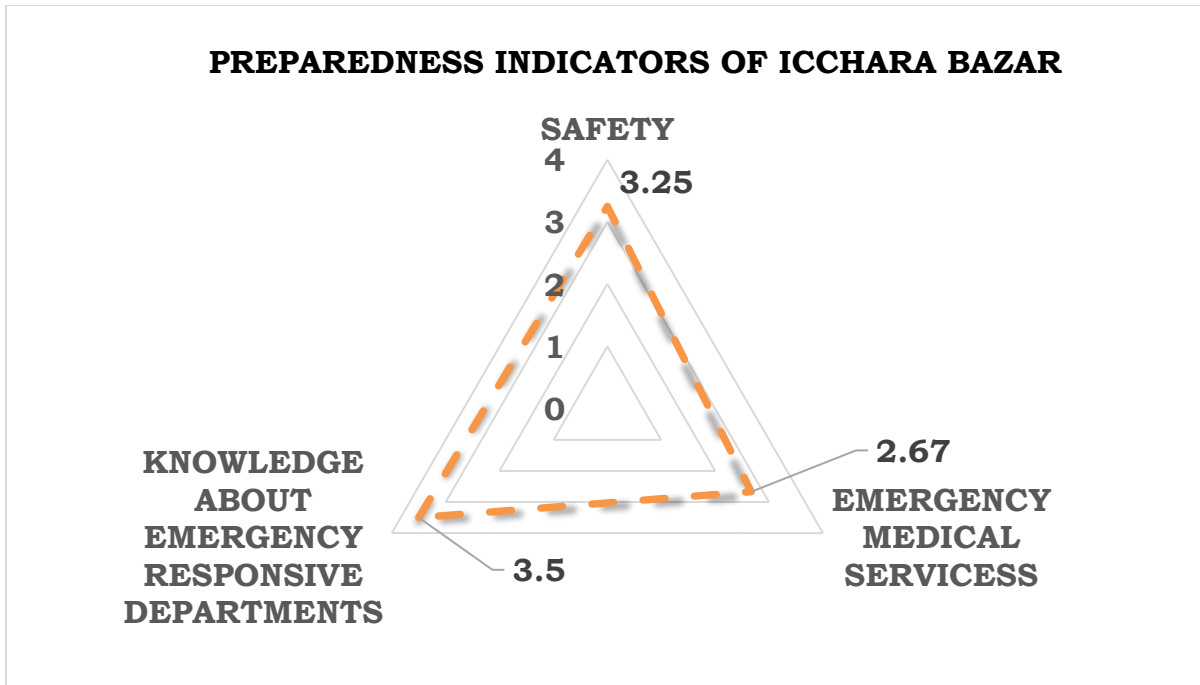
Shah Alam market in preparedness phase lacks in Emergency medical services indicator are ranked in 2 position out 5 which means that their Emergency medical services towards disaster is not reliable or they don't know what to do in such situations, Safety indicator are ranked in 2.5 position out 5 which means that their Safety towards disaster is not reliable. Furthermore, in Knowledge about emergency responsive department indicator they ranked 3.5 out of 5 means medium level. So overall, Shah Alam market is not up to the mark on preparedness phase.

INDEXING OF ICCHARA BAZAR



Graph: 57 Web Graph Perception Indicator of Icchara Bazar

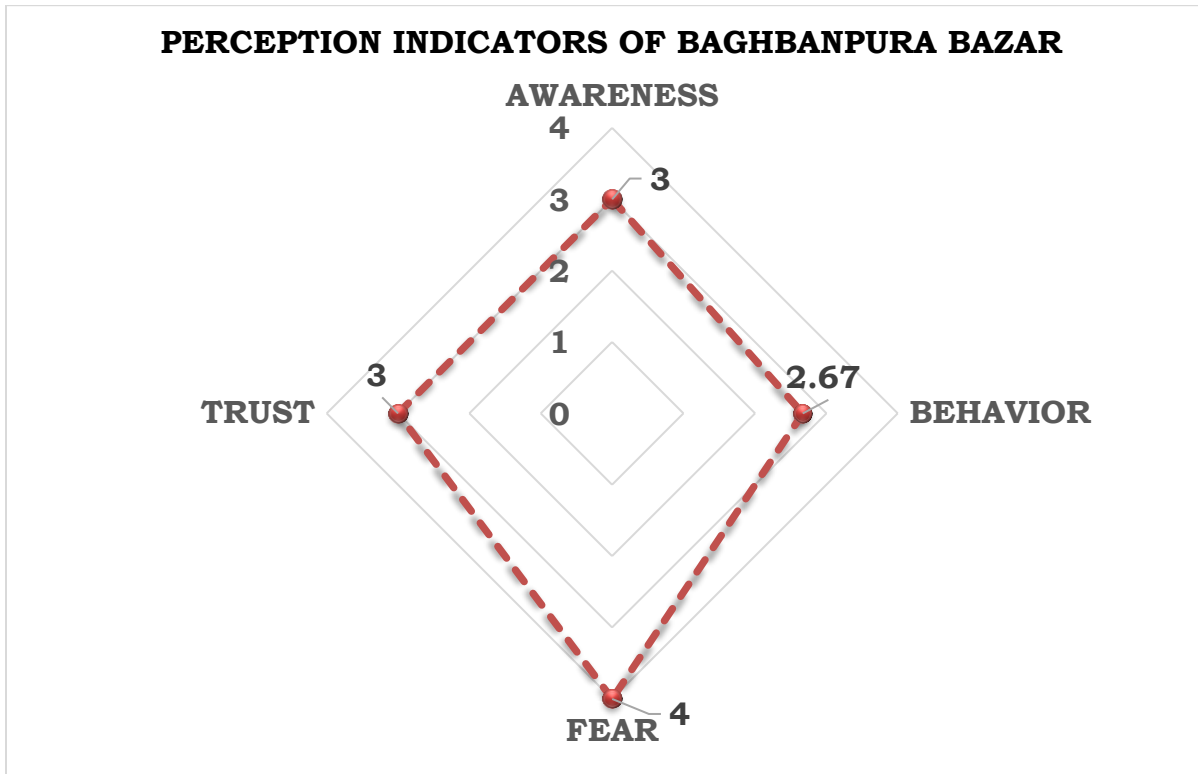
Icchara Bazar in perception phase in Behavior ranked in 3.34 position out 5 and Awareness indicator are ranked in 3.84 position out 5 which means that their behavior towards disaster is reliable or they know what to do in such situations, Furthermore, in fear indicator they ranked 4.34 out of 5 and in trust they also ranked in medium level which is 3. So overall, Icchara Bazar is up to the mark on perception phase.



Graph: 58 Web Graph Preparedness Indicator of Icchara Bazar

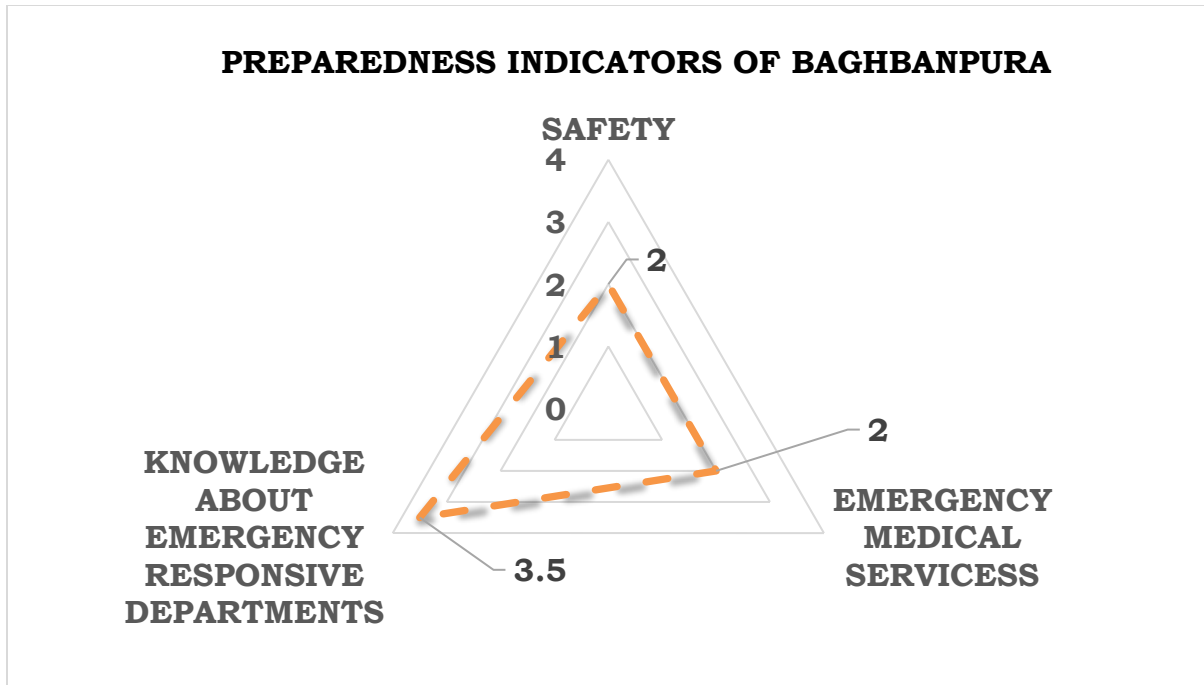
Icchara Bazar in preparedness phase lacks in Emergency medical services indicator are ranked in 2.67 position out 5 which means that their Emergency medical services towards disaster is may be reliable or they don't know what to do in such situations, Safety indicator are ranked in 3.25 position out 5 which means that their Safety towards disaster is reliable. Furthermore, in Knowledge about emergency responsive department indicator they ranked 3.5 out of 5 means medium level. So overall, Icchara Bazar is up to the mark on preparedness phase.

INDEXING OF BAGHBANPURA BAZAR



Graph: 59 Web Graph Perception Indicator of IBaghbanpura Bazar

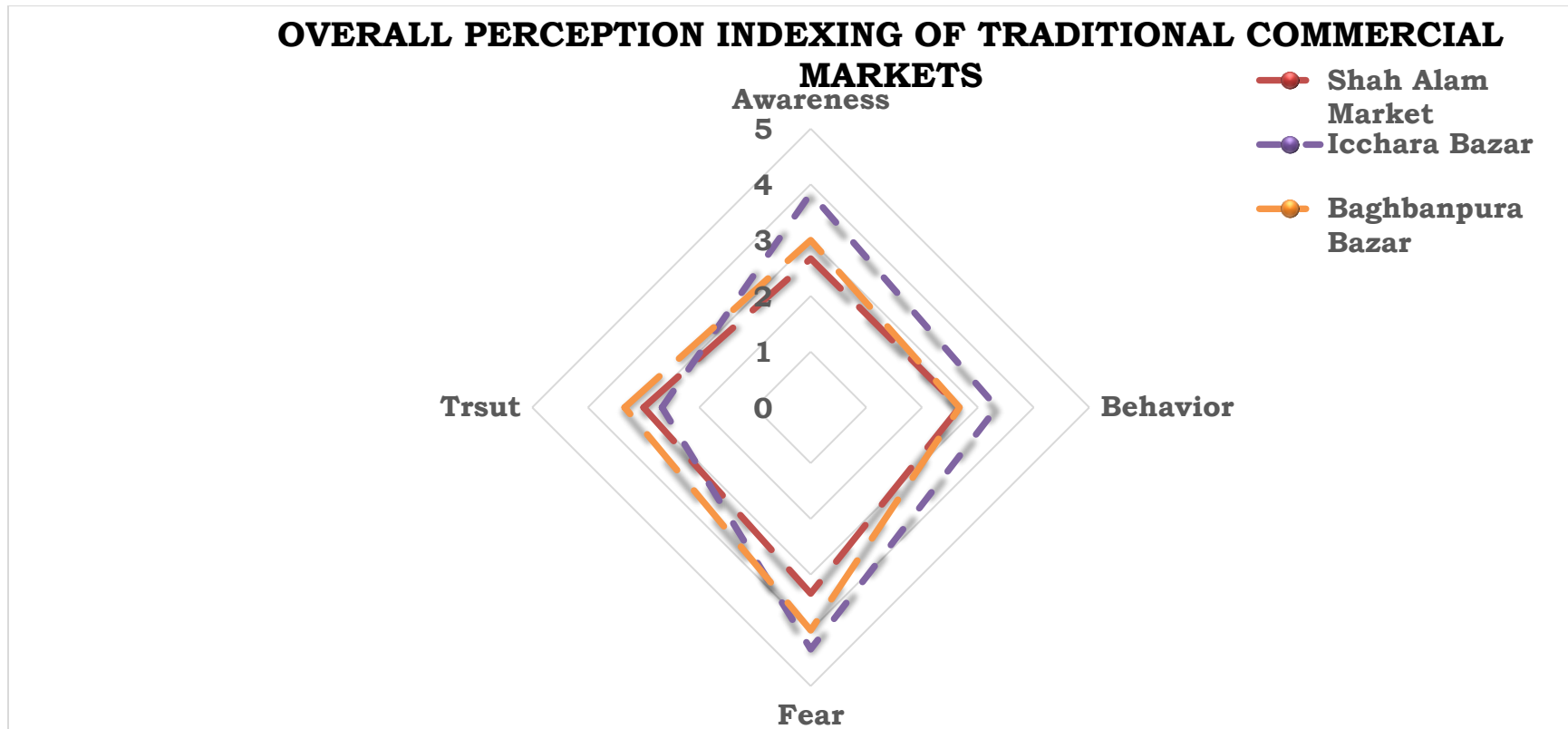
Bhagbanpura Bazar in perception phase lacks in Behavior are ranked in 2.67 position out 5 and Awareness and Trust indicator as both are ranked in 3 position out 5 which means that their behavior towards disaster is may be reliable or they know what to do in such situations, Furthermore, in fear indicator they ranked 4 out of 5 means fear is high level. So overall, Bhagbanpura Bazar is up to the mark on perception phase.



Graph: 60 Web Graph of Preparedness Indicator of Baghbanpura Bazar

Bhagbanpura Bazar in preparedness phase lacks in Emergency medical services and Safety indicator as both are ranked in 2 position out 5 which means that their Emergency medical services towards disaster is not reliable or they don't know what to do in such situations, Furthermore, in Knowledge about emergency responsive department indicator they ranked 3.5 out of 5 means medium level. So overall, Bhagbanpura Bazar is not up to the mark on preparedness phase.

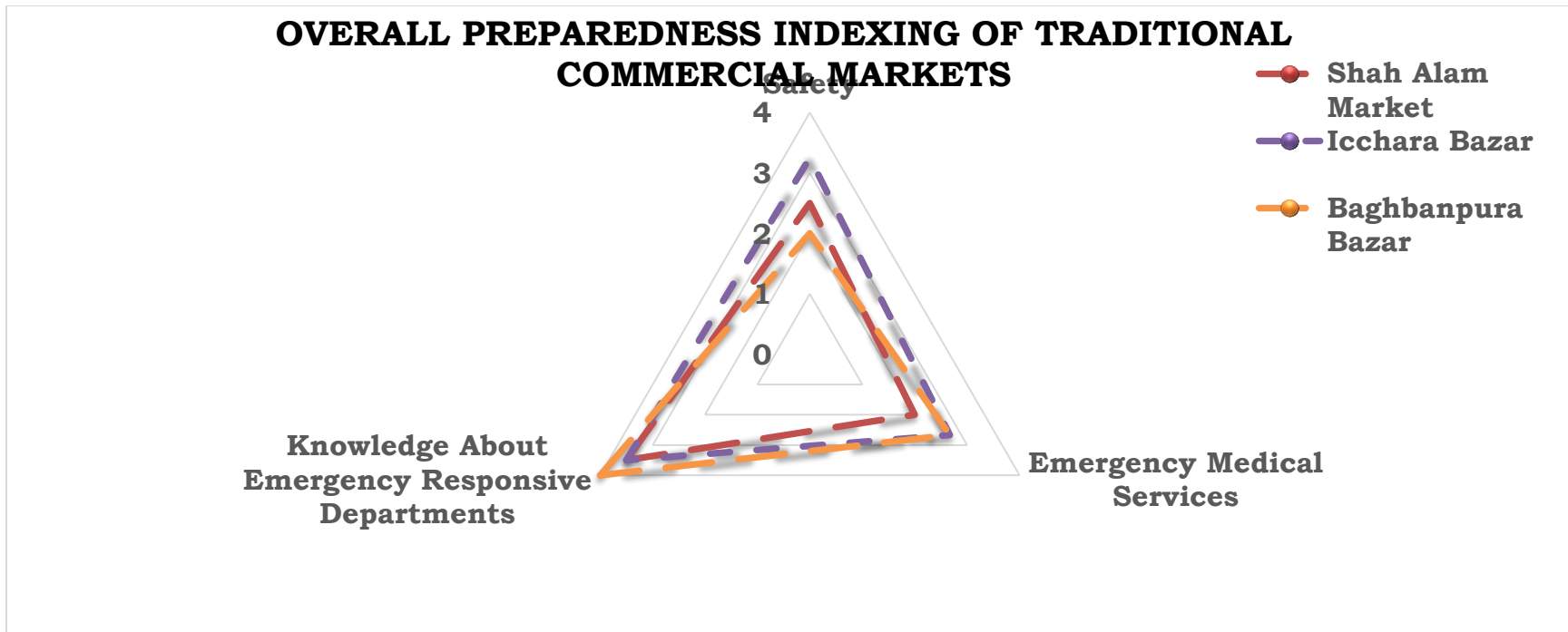
OVERALL PERCEPTION INDEXING OF TRADITIONAL COMMERCIAL MARKETS



Graph: 61 Overall Perception Web Graph of Traditional Commercial Markets

Overall Perception Phase of Traditional Commercial Markets (Shah Alam, Icchara Bazar and Bhagbanpura Bazar) lacks in Trust are ranked in lowest position, behavior and Awareness and as both are ranked in medium position which means that their behavior towards disaster is may be reliable. Furthermore, in fear indicator they ranked high level by overall.

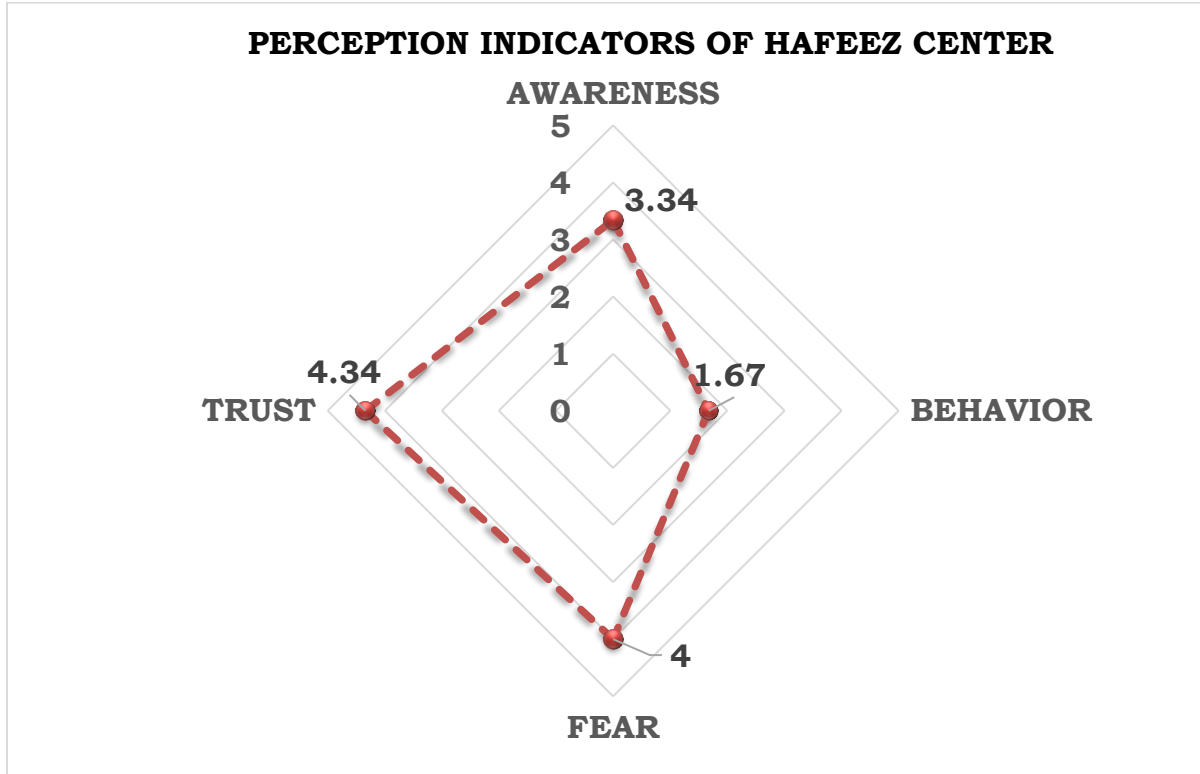
OVERALL PREPAREDNESS INDEXING OF TRADITIONAL COMMERCIAL MARKETS



Graph: 62 Overall Preparedness Web Graph of Traditional Commercial Markets

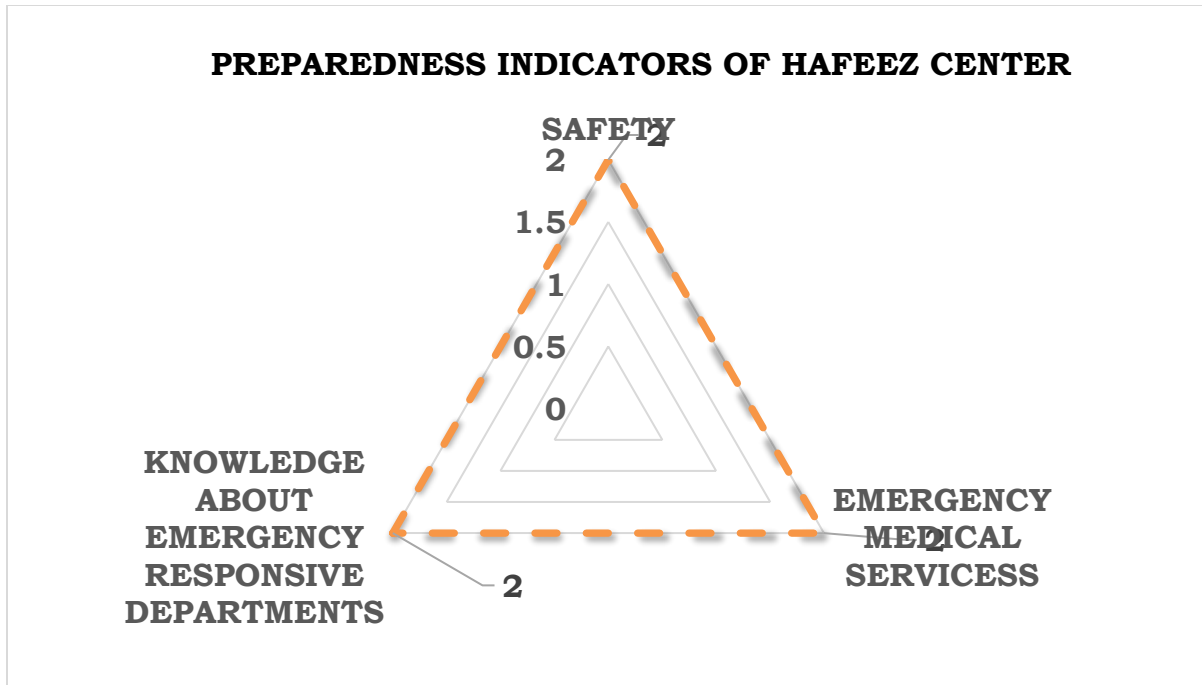
Overall Preparedness Phase of Traditional Commercial Markets (Shah Alam, Icchara Bazar and Bhagbanpura Bazar) lacks in Emergency medical services are ranked in lowest position, Safety is ranked different positions in different areas. Furthermore, in Knowledge about emergency responsive department indicator they ranked high level by overall. Bhagbanpura Bazar in preparedness phase lacks in Emergency medical services and Safety indicator as both are ranked in 2 position out 5 which means that their Emergency medical services towards disaster is not reliable or they don't know what to do in such situations, Furthermore, in Knowledge about emergency responsive department indicator they ranked 3.5 out of 5 means medium level. So overall, Bhagbanpura Bazar is not up to the mark on preparedness phase.

5.5. THE STAR MODELING ANALYSIS OF MULTI STORY COMMERCIAL PLAZA INDEXING OF HAFEEZ CENTER



Graph: 63 Perception Web Graph of Hafeez Center

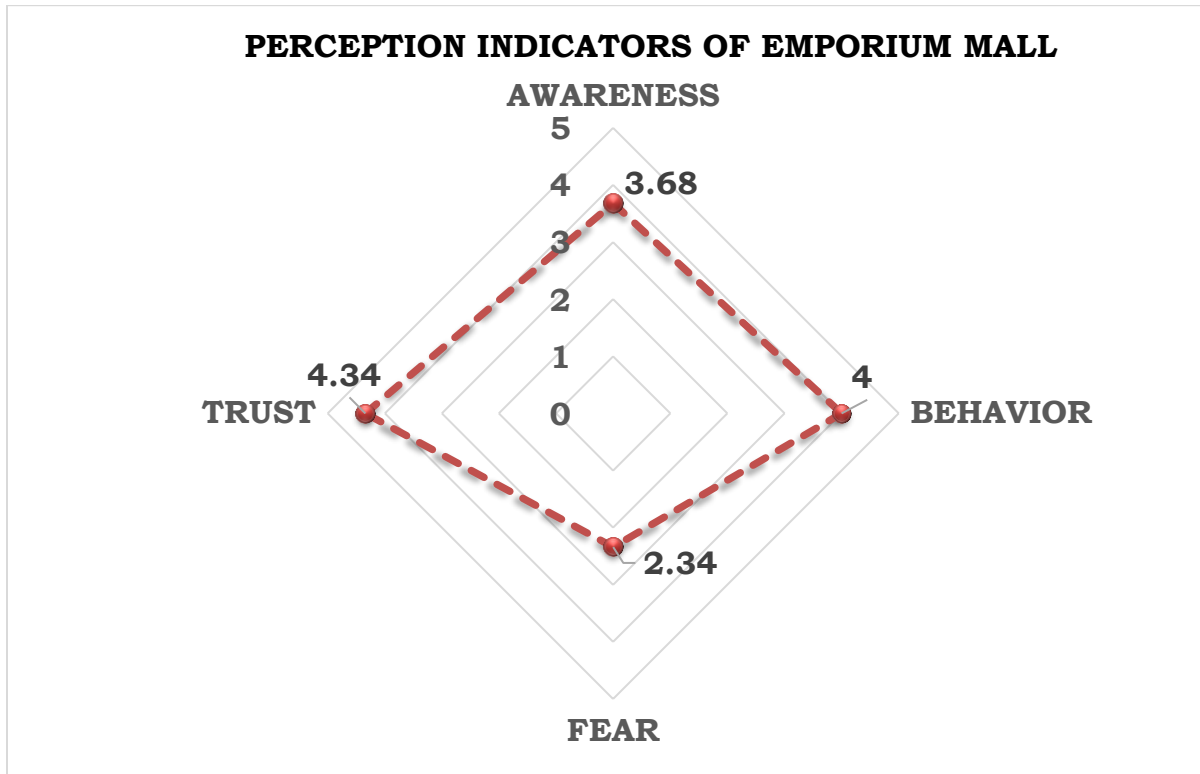
Hafeez center in perception phase lacks in Behavior are ranked in 1.67 position out 5 which means that their behavior towards disaster is not reliable or they don't know what to do in such situations, Awareness indicator are ranked in 3.34 position out 5 whereas community have awareness regarding such hazards. Furthermore, in fear indicator they ranked 4 out of 5 and in trust they also ranked 4.34 out 5. So overall, Hafeez center is up to the mark on perception phase.



Graph: 64 Preparedness Web Graph of Hafeez Center

Hafeez center in preparedness phase in Emergency medical services, Safety and Knowledge about emergency responsive department all indicator are ranked in 2 position out 5 which means that their all indicators towards disaster is not reliable or they don't know what to do in such situations, So overall, Hafeez center is not up to the mark on preparedness phase.

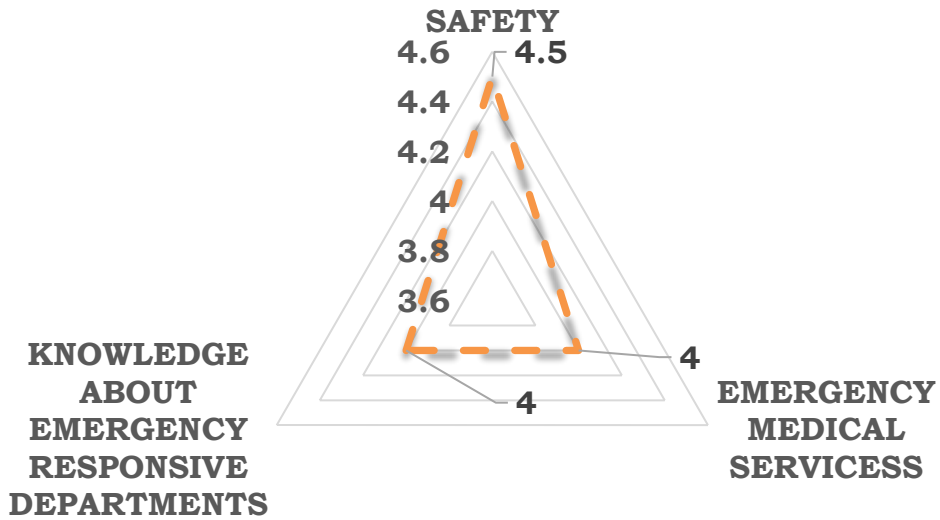
INDEXING OF EMPORIUM MALL



Graph: 65 Perception Web Graph of Emporium Mall

Emporium mall in perception phase lacks in fear are ranked in 2.34 position out 5, Awareness are ranked in 3.68 position out 5, behavior are ranked in 4 position out 5. Furthermore, in Trust indicator ranked 4.34 out of 5. So overall, Emporium mall is up to the mark on perception phase.

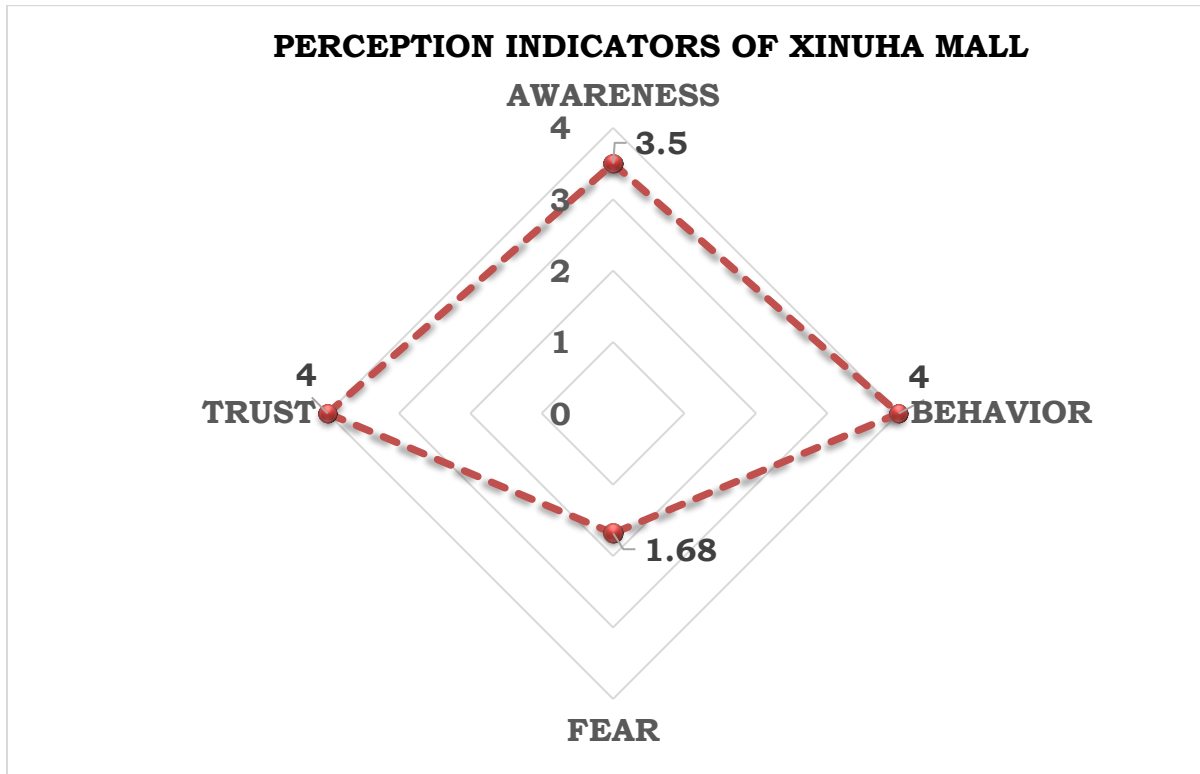
PREPAREDNESS INDICATORS OF EMPORIUM MALL



Graph: 66 Preparedness Web Graph of Emporium Mall

Emporium Mall in preparedness phase in Emergency medical services and Knowledge about emergency responsive department as both are ranked in 4 position out 5 which means that their Emergency medical services towards disaster is reliable or they know what to do in such situations, Safety indicator are ranked in 4.5 position out 5 which means that their Safety towards disaster is reliable. So overall, Emporium Mall is up to the mark on preparedness phase.

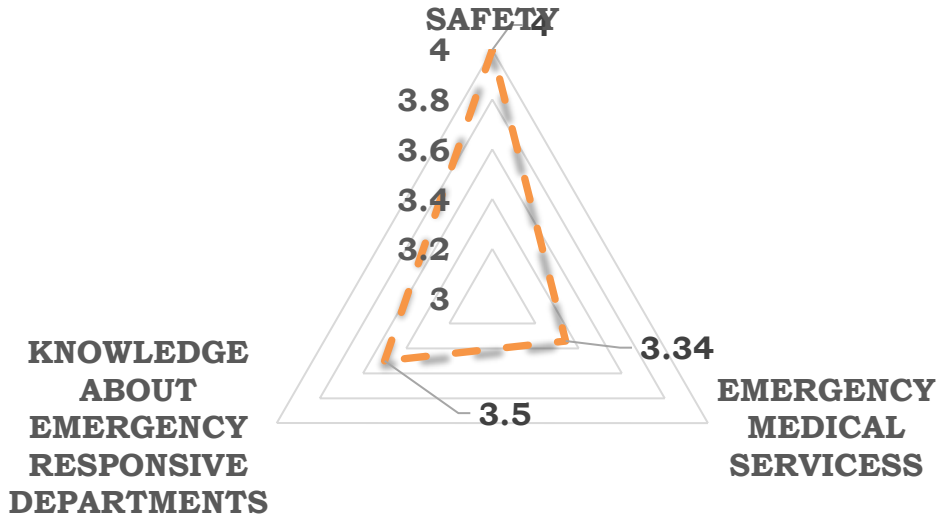
INDEXING OF XINUHA MALL



Graph: 67 Perception Web Graph of Xinhua Mall

Xinuha Mall in perception phase lacks in fear are ranked in 1.68 position out 5 Behavior and Trust indicator as both are ranked in 4 position out 5 which means that their behavior towards disaster is reliable or they know what to do in such situations, Furthermore, in Awareness indicator they ranked 3.5 out of 5. So overall, Xinuha Mall is up to the mark on perception phase.

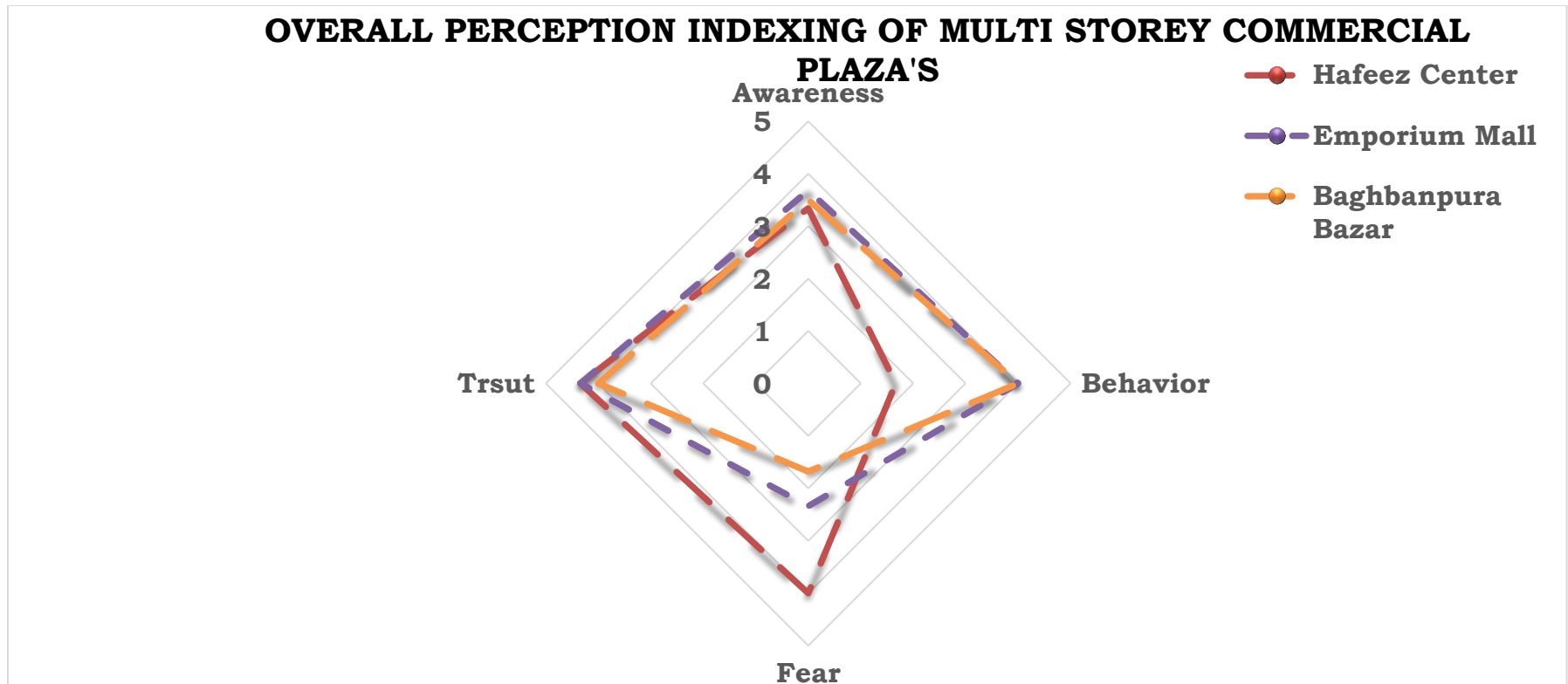
PREPAREDNESS INDICATORS OF XINUHA MALL



Graph: 68 Preparedness Web Graph of Xinhua Mall

It suggests that Xinhua Mall lacks in Emergency Medical Services ranks at 3.34, whereas they have knowledge at 3.5 level but the area is safely prepared at 4 ranking.

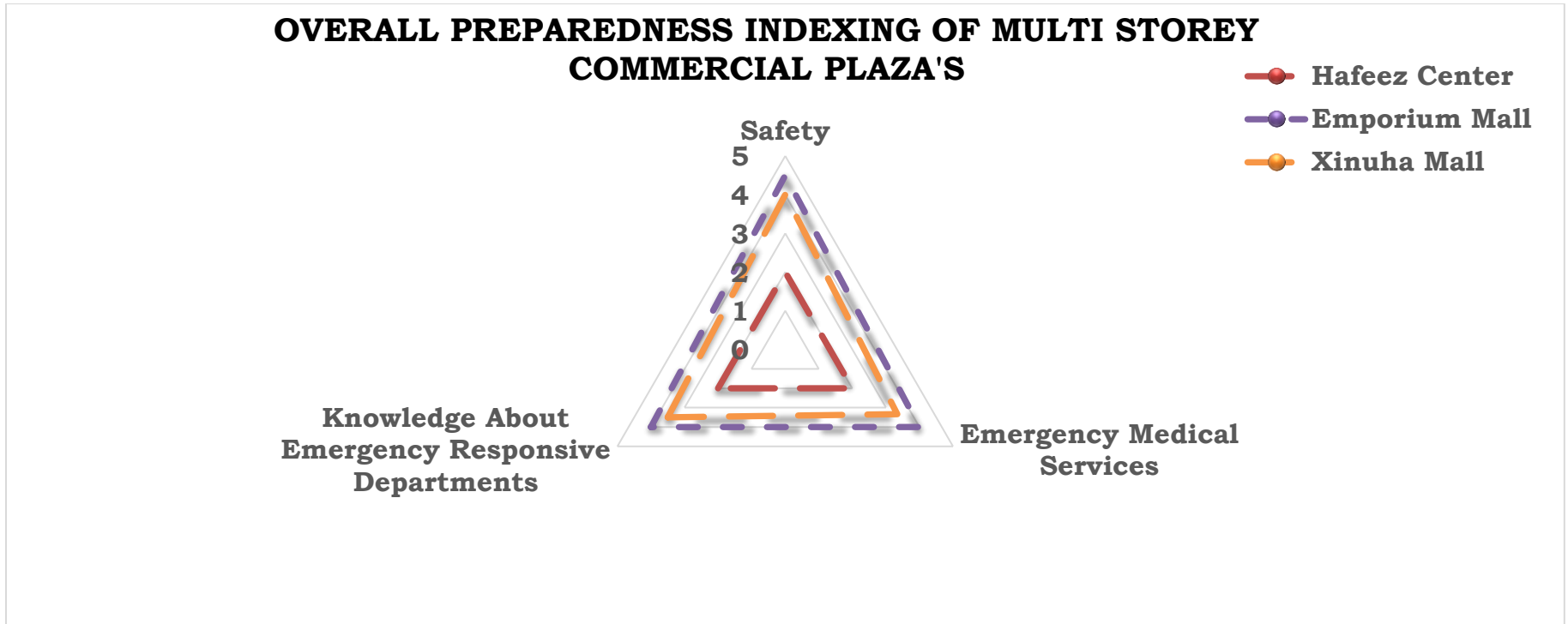
OVERALL PERCEPTION INDEXING OF MULTI STOREY COMMERCIAL PLAZA'S



Graph: 69 Overall Perception Web Graph of Multi Story Commercial Plaza

Overall Perception Phase of Multi Story Commercial Plaza's (Hafeez center, Emporium Mall and Xinuha Mall) lacks in Fare are ranked in lowest position. Means Emporium Mall and Xinuha Mall Fare level low rather than Hafeez center, behavior and Awareness as both are ranked in medium position which means that their behavior towards disaster is reliable. Furthermore, in Trust indicator they ranked high level by overall. They have trust on departments and shopping mall safety planes.

OVERALL PREPAREDNESS INDEXING OF MULTI STOREY COMMERCIAL PLAZA’S



Graph: 70 Overall Preparedness Web Graph of Multi Story Commercial Plaza

Overall Preparedness Phase of Multi Story Commercial Plaza’s (Hafeez center, Emporium Mall and Xinuha Mall) in Emergency medical services, Safety and Knowledge about emergency responsive department in different areas are ranked in different position. Means Hafeez Center in Emergency medical services, Safety and Knowledge about emergency responsive department they ranked lowest positions in every indicator. Furthermore, Emporium Mall in Emergency medical services, Safety and Knowledge about emergency responsive department they ranked Highest positions in every indicator

5.6. CROSS TABULATION

<u>CROSS TABULATION</u>						
	TRADITIONAL COMMERCIAL MARKETS	MULTI STORY COMMERCIAL PLAZAS			TRADITIONAL COMMERCIAL MARKETS	MULTI STORY COMMERCIAL PLAZAS
PERCEPTION INDICATORS	VALUES	VALUES	Correlation $= \frac{\sum T_{pe} M_{pe}}{\sum T_{pr} M_{pr}}$ \propto	PREPAREDNESS INDICATORS	VALUES	VALUES
<i>AWARENESS</i>	3.17	3.5		<i>SAFETY</i>	2.6	3.5
<i>BEHAVIOR</i>	2.9	3.2		<i>EMERGENCY MEDICAL SERVICES</i>	2.2	3.1
<i>FEAR</i>	3.9	2.7		<i>KNOWLEDGE ABOUT EMERGENCY RESPONSIVE DEPARTMENTS</i>	3.7	3.1
<i>TRUST</i>	3	4.2				

Graph: 71 Cross Tabulation Graph

Cross tabulation is done by multiplying risk preparedness indicators to risk perception indicators. Each Indicator has derived its own equation, these equations are derived by assuming the symbols and its indicators while considering the indicators.

Whereas;

$$\text{Correlation} = \sum T_{pe} M_{pe} \propto \sum T_{pr} M_{pr} \dots \dots \dots (i)$$

T_{pe} = Perception of Traditional Commercial Markets

M_{pe} = Perception of Multi Story Commercial Plazas

T_{pr} = Preparedness of Traditional Commercial Markets

M_{pr} = Preparedness of Multi Commercial Plazas

$$T_{pe} = \sum A_{pe} + B_{pe} + F_{pe} + T_{pe} \dots \dots \dots (ii)$$

Which means;

A_{pe} = Awareness in Traditional Commercial Markets

B_{pe} = Behavior in Traditional Commercial Markets

F_{pe} = Fear in Traditional Commercial Markets

T_{pe} = Trust of Traditional Commercial Markets

$$M_{pe} = \sum A_{pe} + B_{pe} + F_{pe} + T_{pe} \dots \dots \dots (iii)$$

Which means;

A_{pe} = Awareness in Multi Story Commercial Plazas

B_{pe} = Behavior in Multi Story Commercial Plazas

F_{pe} = Fear in Multi Story Commercial Plazas

T_{pe} = Trust of Multi Story Commercial Plazas

$$T_{pr} = \sum S_{pr} + E_{pr} + K_{pr} \dots \dots \dots (iv)$$

Which means;

S_{pr} = *Safety in Traditional Commercial Markets*

E_{pr} = *Emergency Medicial Services in Traditional Commercial Markets*

K_{pr} =

*Knowledge About Emergency Responsive Departments
in Traditional Commercial Markets*

$$M_{pr} = \sum S_{pr} + E_{pr} + K_{pr} \dots \dots \dots (v)$$

Which means;

S_{pr} = *Safety in Multi Story Commercial Plazas*

E_{pr} = *Emergency Medicial Services in Multi Story Commercial Plazas*

K_{pr} =

*Knowledge About Emergency Responsive Departments
in Multi Story Commercial Plazas*

5.7. CORRELATION ANALYSIS OF TRADITIONAL COMMERCIAL MARKET

- Exactly 1: A perfect downhill (negative) linear relationship
- -0.70. A strong downhill (negative) linear relationship
- -0.50. A moderate downhill (negative) linear relationship
- -0.30. A weak downhill (negative) linear relationship
- No linear relationship
- +0.30. A weak uphill (positive) linear relationship
- +0.50. A moderate uphill (positive) linear relationship
- +0.70. A strong uphill (positive) linear relationship
- Exactly +1. A perfect uphill (positive) linear relationship

CORRELATION 1. SAFETY INTO AWARENESS

Correlations			
		Safety	Awareness
Safety	Pearson Correlation	1	.270**
	Sig. (2-tailed)		.001
	N	150	150
Awareness	Pearson Correlation	.270**	1
	Sig. (2-tailed)	.001	
	N	150	150
** . Correlation is significant at the 0.01 level (2-tailed).			

Graph: 72 Correlation 1. Safety into Awareness of Tradition Commercial Markets

The correlation analysis exists in Safety-Awareness as well as the given values of Pearson Correlation depicts a weak uphill positive linear relationship among these two variables.

CORRELATION 2. SAFETY INTO BEHAVIOR

Correlations			
		Safety	Behavior
Safety	Pearson Correlation	1	.379**
	Sig. (2-tailed)		.000
	N	150	150
Behavior	Pearson Correlation	.379**	1
	Sig. (2-tailed)	.000	
	N	150	150

** . Correlation is significant at the 0.01 level (2-tailed).

Graph: 73 Correlation 2. Safety into Behavior of Tradition Commercial Markets

Safety and Behavior has strong correlation on significant value 0 whereas the Pearson correlation value (.379) depicts that they a weak uphill positive linear relationship.

CORRELATION 3. SAFETY INTO FEAR

Correlations			
		Safety	Fear
Safety	Pearson Correlation	1	.188*
	Sig. (2-tailed)		.021
	N	150	150
Fear	Pearson Correlation	.188*	1
	Sig. (2-tailed)	.021	
	N	150	150

*. Correlation is significant at the 0.05 level (2-tailed).

Graph: 74 Correlation 3, Safety into Fear of Traditional Commercial Markets

The correlation analysis exists in Safety-Fear (0.21) at the significant value of 0.05 as well as the given values of Pearson Correlation (.188) depicts a weak uphill positive linear relationship among these two variables.

CORRELATION 4. SAFETY INTO FEAR

Correlations			
		Safety	Trust
Safety	Pearson Correlation	1	-.410**
	Sig. (2-tailed)		.000
	N	150	150
Trust	Pearson Correlation	-.410**	1
	Sig. (2-tailed)	.000	
	N	150	150

** . Correlation is significant at the 0.01 level (2-tailed).

Graph: 75 Correlation 4. Safety into Fear of Traditional Commercial Market

Safety and Trust has strong negative correlation analysis at .000 significant values where as Pearson Correlation(-.410) value depicts a moderate downhill (negative) linear relationship.

CORRELATION 5. EMERGENCY MEDICAL SERVICES INTO AWARENESS

Correlations			
		EMS	Awareness
EMS	Pearson Correlation	1	.133
	Sig. (2-tailed)		.105
	N	150	150
Awareness	Pearson Correlation	.133	1
	Sig. (2-tailed)	.105	
	N	150	150

Graph: 76 Correlation 5. Emergency Medical Services into Awareness of Traditional Commercial Markets

Emergency Medical Services and Awareness do not have any correlation relationship.

CORRELATION 6. EMERGENCY MEDICAL SERVICES INTO BEHAVIOR

Correlations			
		EMS	Behavior
EMS	Pearson Correlation	1	.314**
	Sig. (2-tailed)		.000
	N	150	150
Behavior	Pearson Correlation	.314**	1
	Sig. (2-tailed)	.000	
	N	150	150

** . Correlation is significant at the 0.01 level (2-tailed).

Graph: 77 Correlation 6. Emergency Medical Services into Behavior of Traditional Commercial Markets

Emergency Medical Services and Behavior have a strong positive relation at p value (.000) whereas Pearson Correlation (.314) depicts to have a weak uphill positive linear relationship among these two variables.

CORRELATION 7. EMERGENCY MEDICAL SERVICES INTO FEAR

Correlations			
		EMS	Fear
EMS	Pearson Correlation	1	.254**
	Sig. (2-tailed)		.002
	N	150	150
Fear	Pearson Correlation	.254**	1
	Sig. (2-tailed)	.002	
	N	150	150

** . Correlation is significant at the 0.01 level (2-tailed).

Graph: 78 Correlation 7. Emergency Medical Services into Fear of Traditional Commercial Markets

The correlation among these two variable does not exist as the significant value of this particular analysis in 0.02 where as correlation is significant at the 0.01 level. Though the Pearson correlation analysis (.254) depicts to have a weak uphill positive linear relationship among these two variables.

CORRELATION 8. EMERGENCY MEDICAL SERVICES INTO TRUST

Correlations			
		EMS	Trust
EMS	Pearson Correlation	1	-.198*
	Sig. (2-tailed)		.015
	N	150	150
Trust	Pearson Correlation	-.198*	1
	Sig. (2-tailed)	.015	
	N	150	150

*. Correlation is significant at the 0.05 level (2-tailed).

Graph: 79 Correlation 8 Emergency Medical Services into Trust of Traditional Commercial Markets

The correlation between Emergency Medical Service and Trust is exist at .015 level though it has negative relationship as Pearson correlation is at (-.198) which shows that a weak downhill (negative) linear relationship.

CORRELATION 9. KNOWLEDGE ABOUT EMERGENCY RESPONSIVE DEPARTMENT INTO AWARENESS

Correlations			
		KERD	Awareness
KERD	Pearson Correlation	1	.171*
	Sig. (2-tailed)		.037
	N	150	150
Awareness	Pearson Correlation	.171*	1
	Sig. (2-tailed)	.037	
	N	150	150

*. Correlation is significant at the 0.05 level (2-tailed).

Graph: 80 Correlation 9 Knowledge About Emergency Responsive Department into Awareness of Traditional Commercial Markets

The correlation between these two variables positively exists at significant level of (.037) whereas Pearson correlation is (.171) which says that there is a weak uphill positive linear relationship.

CORRELATION 10. KNOWLEDGE ABOUT EMERGENCY RESPONSIVE DEPARTMENT INTO BEHAVIOR

Correlations			
		KERD	Behavior
KERD	Pearson Correlation	1	.225**
	Sig. (2-tailed)		.006
	N	150	150
Behavior	Pearson Correlation	.225**	1
	Sig. (2-tailed)	.006	
	N	150	150
** . Correlation is significant at the 0.01 level (2-tailed).			

Graph: 81 Correlation 10 Knowledge about emergency responsive departments into Behavior

Knowledge about emergency responsive departments and behavior has a positive correlation between them at significant level 0.006 where as Pearson correlation (.225) depicts that a weak uphill (positive) linear relationship.

CORRELATION 11. KNOWLEDGE ABOUT EMERGENCY RESPONSIVE DEPARTMENT INTO FEAR

Correlations			
		KERD	Fear
KERD	Pearson Correlation	1	.228**
	Sig. (2-tailed)		.005
	N	150	150
Fear	Pearson Correlation	.228**	1
	Sig. (2-tailed)	.005	
	N	150	150
** . Correlation is significant at the 0.01 level (2-tailed).			

Graph: 82 Correlation 11. Knowledge About Emergency Responsive Department Into Fear Of Traditional Commercial Markets

These two variables has positive correlation relationship at significant level of 0.005 where as Pearson correlation (.228) shows that it has weak uphill positive linear relationship.

CORRELATION 12. KNOWLEDGE ABOUT EMERGENCY RESPONSIVE DEPARTMENT INTO TRUST

Correlations			
		KERD	Trust
KERD	Pearson Correlation	1	-.444**
	Sig. (2-tailed)		.000
	N	150	150
Trust	Pearson Correlation	-.444**	1
	Sig. (2-tailed)	.000	
	N	150	150

** . Correlation is significant at the 0.01 level (2-tailed).

Graph: 83 Correlation 12. Knowledge About Emergency Responsive Department Into Trust Of Traditional Commercial Markets

Knowledge about Emergency responsive department and trust has strongly negative correlation relationship at significant level at 0 whereas the Pearson correlation (-.444) predicts a moderate downhill negative linear relationship.

5.8. CORRELATION ANALYSIS OF MULTI STORY COMMERCIAL PLAZA

- Exactly 1: A perfect downhill (negative) linear relationship
- -0.70. A strong downhill (negative) linear relationship
- -0.50. A moderate downhill (negative) linear relationship
- -0.30. A weak downhill (negative) linear relationship
- No linear relationship
- +0.30. A weak uphill (positive) linear relationship
- +0.50. A moderate uphill (positive) linear relationship
- +0.70. A strong uphill (positive) linear relationship
- Exactly +1. A perfect uphill (positive) linear relationship

CORRELATION 1. SAFETY INTO AWARENESS

Correlations			
		Safety	Awareness
Safety	Pearson Correlation	1	.433**
	Sig. (2-tailed)		.000
	N	151	151
Awareness	Pearson Correlation	.433**	1
	Sig. (2-tailed)	.000	
	N	151	151
** . Correlation is significant at the 0.01 level (2-tailed).			

Graph: 84 Correlation 1. Safety Into Awareness Of Multi Story Commercial

There is a strong positive correlation between safety and awareness at significant level 0 where as Pearson correlation (.433) depicts that it is a moderate uphill positive relationship.

CORRELATION 2. SAFETY INTO BEHAVIOR

Correlations			
		Safety	Behavior
Safety	Pearson Correlation	1	.474**
	Sig. (2-tailed)		.000
	N	151	151
Behavior	Pearson Correlation	.474**	1
	Sig. (2-tailed)	.000	
	N	151	151
** . Correlation is significant at the 0.01 level (2-tailed).			

Graph: 85 CORRELATION 2. SAFETY INTO BEHAVIOR of Multi Story Commercial Markets

Safety and Behavior has a very strong positive relation at significant level 0 where as Pearson correlation (.474) depicts that it is a moderate uphill positive linear relationship among these two variables.

CORRELATION 3. SAFETY INTO FEAR

Correlations			
		Safety	Fear
Safety	Pearson Correlation	1	.384**
	Sig. (2-tailed)		.000
	N	151	151
Fear	Pearson Correlation	.384**	1
	Sig. (2-tailed)	.000	
	N	151	151
** . Correlation is significant at the 0.01 level (2-tailed).			

Graph: 86 Correlation 3. Safety Into Fear Of Multi Story Commercial Markets

Safety and Fear has a very strong positive relation at significant level 0 where as Pearson correlation (.384) depicts that it is a weak uphill positive linear relationship among these two variables.

CORRELATION 4. SAFETY INTO TRUST

Correlations			
		Safety	Trust
Safety	Pearson Correlation	1	-.497**
	Sig. (2-tailed)		.000
	N	151	151
Trust	Pearson Correlation	-.497**	1
	Sig. (2-tailed)	.000	
	N	151	151

** . Correlation is significant at the 0.01 level (2-tailed).

Graph: 87 Correlation 4. Safety Into Trust Of Multi Story Commercial Plaza

Safety and Trust has a very strong negative relation at significant level 0 whereas Pearson correlation (-.497) depicts that it is a moderate downhill negative relationship among these two variables.

CORRELATION 5. EMERGENCY MEDICAL SERVICES INTO AWARENESS

Correlations			
		EMS	Awareness
EMS	Pearson Correlation	1	-.211**
	Sig. (2-tailed)		.009
	N	151	151
Awareness	Pearson Correlation	-.211**	1
	Sig. (2-tailed)	.009	
	N	151	151

** . Correlation is significant at the 0.01 level (2-tailed).

Graph: 88 Correlation 5. Emergency Medical Services Into Awareness Of Multi Story Commercial Plaza

Emergency medical services and Awareness does have negative relationship at significant level 0.009 where as Pearson correlation (-.211) shows that it is a weak downhill negative linear relationship exists in these two variables.

CORRELATION 6. EMERGENCY MEDICAL SERVICES INTO BEHAVIOR

Correlations			
		EMS	Behavior
EMS	Pearson Correlation	1	-.282**
	Sig. (2-tailed)		.000
	N	151	151
Behavior	Pearson Correlation	-.282**	1
	Sig. (2-tailed)	.000	
	N	151	151

** . Correlation is significant at the 0.01 level (2-tailed).

Graph: 89 Correlation 6. Emergency Medical Services Into Behavior Of Multi Story Commercial

There is a strong negative correlation between emergency medical services and behavior at significant level 0 whereas Pearson correlation (-.282) depicts that it is a weak downhill negative linear relationship exists in these two variables.

CORRELATION 7. EMERGENCY MEDICAL SERVICES INTO FEAR

Correlations			
		EMS	Fear
EMS	Pearson Correlation	1	-.142
	Sig. (2-tailed)		.083
	N	151	151
Fear	Pearson Correlation	-.142	1
	Sig. (2-tailed)	.083	
	N	151	151

Graph: 90 Correlation 7. Emergency Medical Services Into Fear Of Multi Story Commercial Plaza

The correlation does not exist in these two variables which are emergency medical services and fear because of significant level at .083.

CORRELATION 8. EMERGENCY MEDICAL SERVICES INTO TRUST

Correlations			
		EMS	Trust
EMS	Pearson Correlation	1	.206*
	Sig. (2-tailed)		.011
	N	151	151
Trust	Pearson Correlation	.206*	1
	Sig. (2-tailed)	.011	
	N	151	151

*. Correlation is significant at the 0.05 level (2-tailed).

Graph: 91 Correlation 8. Emergency Medical Services Into Trust Of Multi Story Commercial Plaza

The correlation between emergency medical services and trust positively exists at significant level of (.011) where as Pearson correlation (.206) says that there will be a weak uphill positive linear relationship among these two variables.

CORRELATION 9. KNOWLEDGE ABOUT EMERGENCY RESPONSIVE DEPARTMENT INTO AWARENESS

Correlations			
		KERD	Awareness
KERD	Pearson Correlation	1	.276**
	Sig. (2-tailed)		.001
	N	151	151
Awareness	Pearson Correlation	.276**	1
	Sig. (2-tailed)	.001	
	N	151	151

** . Correlation is significant at the 0.01 level (2-tailed).

Graph: 92 Correlation 9. Knowledge About Emergency Responsive Department Into Awareness Of Multi Story Commercial Plaza

Knowledge about emergency responsive departments and Awareness has positive relation at significant level .001 though the Pearson correlation (.276) predicts that it is a weak uphill positive linear relationship among these two variables.

CORRELATION 10. KNOWLEDGE ABOUT EMERGENCY RESPONSIVE DEPARTMENT INTO BEHAVIOR

Correlations			
		KERD	Behavior
KERD	Pearson Correlation	1	.340**
	Sig. (2-tailed)		.000
	N	151	151
Behavior	Pearson Correlation	.340**	1
	Sig. (2-tailed)	.000	
	N	151	151
** . Correlation is significant at the 0.01 level (2-tailed).			

Graph: 93 Correlation 10. Knowledge About Emergency Responsive Department Into Behavior Of Multi Story Commercial Story

There is a strong positive correlation between Knowledge about Emergency Responsive Department and Behavior at significant level 0 where as Pearson correlation (.340) depicts that it is a moderate uphill (positive) linear relationship exists in these two variables.

CORRELATION 11. KNOWLEDGE ABOUT EMERGENCY RESPONSIVE DEPARTMENT INTO FEAR

Correlations			
		KERD	Fear
KERD	Pearson Correlation	1	.437**
	Sig. (2-tailed)		.000
	N	151	151
Fear	Pearson Correlation	.437**	1
	Sig. (2-tailed)	.000	
	N	151	151
** . Correlation is significant at the 0.01 level (2-tailed).			

Graph: 94 Correlation 11. Knowledge About Emergency Responsive Department Into Fear Of Multi Story Commercial Plaza

Knowledge about emergency responsive departments and fear has a very strong positive relation at significant level 0 where as Pearson correlation (.437) depicts that it is a moderate uphill positive linear relationship among these two variables.

CORRELATION 12. KNOWLEDGE ABOUT EMERGENCY RESPONSIVE DEPARTMENT INTO TRUST

Correlations			
		KERD	Trust
KERD	Pearson Correlation	1	-.298**
	Sig. (2-tailed)		.000
	N	151	151
Trust	Pearson Correlation	-.298**	1
	Sig. (2-tailed)	.000	
	N	151	151
**. Correlation is significant at the 0.01 level (2-tailed).			

Graph: 95 Correlation 12. Knowledge About Emergency Responsive Department Into Trust Of Multi Commercial Story

Knowledge about emergency responsive departments and fear has a very strong negative relation at significant level 0 where as Pearson correlation (-.298) depicts that it is a weak downhill negative linear relationship between these variables.

CHAPTER NO. 6

FINDINGS

CHAPTER 6 FINDINGS

- **Objective 1 and Objective 2** of this study refers to reviewing and analyzing the existing policies or evacuation plans of pre disaster fire hazards, to carry out these objectives, the collected data analyzed in “**Descriptive Analysis**” phase. The Descriptive Analysis put light on the responses of each respondent from 0 to 5 in Likert scale. The findings of this analysis are that mostly public (customers and shopkeepers) are not satisfied with existing infrastructure situation, existing community participation as well as existing pre disaster training. To which, the descriptive analysis then performs indexing under objective 3.
- **Objective 3** says to evaluate the existing situation of both study areas (i) Traditional Commercial Markets and (ii) Multi Story Commercial Plaza, for this, **indexing analysis** has done in which ranking has been given to the indicators of each domain of Perception and Preparedness. The findings of this analysis are that in Traditional Markets both the preparedness and perception ranks in dissatisfactory level which shows that there is lack of awareness, lack of trainings and absence of every disaster precautionary equipment’s, whereas in Multi Story Commercial Plaza the respondents are satisfied in two areas which are (i) Emporium Mall and (ii) Xinhua Mall, although Hafeez Center which has already been victim of this disaster in recent times which is why they have more fear and less pre disaster training which leads them to be unsatisfactory.
- **Objective 4** refers to assessment of pre disaster preparedness of the community and the respective departments, whose collected data performed **the web analysis or star modeling analysis**, which compared the average value of every area against its respective indicator. The findings of this modeling analysis are that the Perception phase of Traditional Commercial markets of all three areas which are (i) Shah Alam Market, (ii) Icchara Bazar and (iii) Baghbanpura Bazar lacks in trust indicators, which means that those areas needs to work to develop trust in departments and in other factors, where as in Preparedness phase of Traditional Commercial markets three of the areas lacks in emergency medical services due to the lack of training of first aid and even absence of first aid kits in shops or during the hour of need. Furthermore, the modeling analysis has done on Multi Story Commercial Plaza as well, which shows the output as in perception phase, one of three markets which are Hafeez Center lacks in public behavior which means that those areas needs to create awareness regarding pre disaster fire hazard events. Where

as in preparedness phase Hafeez Center also lacks in all three indicators, resultantly there is no preparedness in this area which is important to create.

- **In objective 5**, the recommendations are needs to develop after **the analysis of cross tabulation and correlation analysis**. In cross tabulation, each preparedness phase correlate with every perception phase indicator with an equation derived, mentioned as equation (i) in data analysis chapter. The correlation analysis has been carried out to analyze whether the relation between these both phases exists or not, from which few relations are strongly exists, few doesn't exist and in few there are negative relations. The findings suggest that which indicator helps to flip up the other indicator in according to its relationship nature.

CHAPTER NO. 7

CONCLUSION

CHAPTER 7. CONCLUSION

Risk perception and risk preparedness studies are important as they are interlinked with each other because this study refers to create ways to aware or prepare the community towards pre disaster management when it comes to fire hazard. Fire hazard is a kind of manmade disaster which results into huge loss of lives, infrastructure and community. To evaluate the perception and preparedness of community, a study has conducted in commercial areas of Lahore. The commercial areas then segregated into two categories which are (i) Informal Markets (Traditional Commercial Markets) and Formal Markets (Multi Story Commercial Plaza). Informal markets consist further three areas, (i) Shah Alam Market, (ii) Icchara Bazar, and (iii) Baghbanpura Bazar, whereas formal markets are, (i) Emporium Mall, (ii) Hafeez Center and (iii) Xinhua Mall. To acknowledge the study, literature review of different articles having same context has been studied, moreover institutional frameworks of Pakistan has also undergone during the study.

The methodology of this study is consist of quantitative approach whereas questionnaire has been developed by also studying different articles of perception and preparedness of disaster. Every question has connected to its attribute. In risk perception phase there are four indicators (i) awareness, (ii) behavior, (iii) fear, and (iv) trust. Whereas, in preparedness phase there are three indicators which are (i) safety, (ii) emergency medical services, and (iii) knowledge about emergency responsive departments. The sampling of the area calculated on known population formula from which 300 sample size are provided. The further division of sample size are done as 150 surveys had done in formal markets while other 150 surveys had done in informal markets. Each market of informal area covers 50 questionnaire responses from which the segregation has done in a way that 20 questions covers shopkeeper's perspective and 30 questionnaire responses covers perspective of customers, and the same hierarchy performed in informal markets. The data of this study has been collected by using ODK app, which is an offline app to collect data accurately.

Collection of data is always an important step of every study. As after the collection, the data has analyzed in five forms. Firstly, the collected has analyzed through "Descriptive Analysis" phase, the data has analyzed on the frequency of responses. Then the data moved towards "Indexing" phase, in which the descriptive data converted into ranking system. The ranking values then shifted to "Web Analysis", in web analysis every indicator has some average value out of 5. Those average

values then multiply in a way that each indicator of preparedness phase multiply every indicator of perception way in a “Cross Tabulation” form. In the end, all the data then move to SPSS to perform correlation analysis. All the analysis helps to find out the existing situation of commercial areas of Lahore and also to cater the possible future scenarios.

The key findings of these analysis, says that public of formal markets are more prepared then the public of informal markets, but in perception phase both stands almost equal which means that majority of the public needs awareness and training, where as in terms of preparedness they need more responsive departments and available first aid kit services. In accordance to these key findings, the recommendations suggest that by pre disaster management in most hazard prone areas of Lahore could save them from future hazards and then shift city into a disaster resilient and sustainable city.

CHAPTER NO. 8

RECOMMENDATIONS

CHAPTER 8. RECOMMENDATIONS

The formal commercial areas of Lahore may plan in future that every story of plaza has its significant parking area, which results in easy and accessible escape in disaster situation. In informal markets, the markets may have planned according to some standards in which setbacks and segregations are required. In infrastructure context, every building whether its formal or informal, it should be planned with exit doors and evacuations plans, as well as every shop should be well equipped with fire alarms, fire extinguishers and water pipes. To change the perception of the community, it is important to change their perspective for that awareness campaign may start in the areas as well as they should provide with the training sessions in which general public may learn how to cope with fire hazard situations. Moreover, in case of Multi Story Plaza's all the stories should be well planned and have emergency exit which means backside stairs, every floor has at least 2 to 3 fire extinguisher, fire blankets, escape ladders, dry hydrants and fire hoses. Whereas in Traditional commercial markets, every shop has its own setbacks, one emergency exit door, must fire extinguisher and all the other fire blocking equipments.

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Annexure

Plot Size/zone	Building Line	Rear Space	Side Space
Less than 5-Marla	5 ft (1.52 m)	Not required	Not required
5 Marla's & above but less than 10 marlas	5 ft (1.52 m)	5 ft (1.52 m)	Not required
10 Marlas to 30 Marlas	10 ft (3.05 m)	7-ft (2.13 m)	5 ft (1.52 m) (on one side)
Above 30 Marlas but less than 2-kanals	10 ft (3.05 m)	7-ft (2.13 m)	5 ft (1.52 m) (on both sides)
2-kanals & above	20-ft (6.1m)	10 ft (3.05m)	10-ft. (3.05) (on both sides)

II. RESPONSE, RECOVERY & REHABILITATION			
	Areas	Actions & Activities	Responsibilities
1.	Safety & Security	<p><u>Pre - Disaster Phase</u></p> <p>1. Develop a 'Check-List' catering to the special needs of each of the Target Group separately and respectively especially the women and children including their safety & protection from abductions, exploitation, and threats of trafficking</p> <p>2. Special monitoring & vigilance mechanism needs to be established for the protection of unaccompanied children (girls & boys) or</p>	<p>Under the supervision of NDMA & PDMAs:</p> <ul style="list-style-type: none"> - DDMA's - Local Government & Community Development Departments - District Management - Housing, Urban Development & Public

		<p>children with single parents, and for children headed households</p> <p>3. Train selected group of women from within the communities for vigilance & provision of immediate first aid response</p> <p>4. Two Gender Focal Points need to be identified (one from the camp/community and one from the Rescue Team in Camps) to monitor the safety and security arrangements</p> <p>5. Referral mechanism should be put in place for reporting any case of violence, harassment or exploitation by any segment of the VG</p> <p>6. Design responsive evacuation & relocation measures for easy access to safe/ protective transportation</p> <p>7. Develop SOPs for the missing, separated & unaccompanied women, children, older persons and persons with disabilities including their identification, location, and re-unification with their families</p> <p>8. Develop a comprehensive standardized data collection mechanism for camps to monitor and document the emerging needs</p> <p>Pre, During & Post Disaster Phase</p> <p>9. Issuance of special directives for acknowledging households headed by women, children, older persons and persons with disabilities and making well thought out efforts that are responsive to their needs;</p> <p>10. Develop special mechanism to provide specific assistance to the elderly persons and persons with disabilities catering to their specific needs</p> <p>11. Develop a Referral mechanism for reporting any case of violence, harassment or exploitation of girls and boys or any other person with disability</p>	<p>Health Engineering Departments - Social Welfare & Special Education Departments - Human Rights Departments - Home Departments - Health Departments - Local Communities representatives - Relevant experts from the private sector, and - Relevant credible Civil Society Organisations/ NGOs working in the field</p>
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		<p>12. Earmark and Provide for special transportation and special handling assistance for the persons with disabilities and the elderly persons</p> <p>During & Post Disaster Phase</p> <p>13. Set up independent toilets and bathing areas for women that are close to their residential area, with secured locks, adequate electricity/ light system, provision of water & sanitation facilities;</p> <p>14. Create special living spaces, ramps, paths and walk ways for the elderly and persons with disabilities with adequate electricity & lighting arrangements</p> <p>15. Develop special mechanism to provide specific assistance to the elderly persons and persons with disabilities catering to their specific needs</p> <p>16. Provide for special transportation and special handling assistance for the persons with disabilities and the elderly persons</p> <p>17. Create special living spaces, ramps, paths and walk ways for the elderly and persons with disabilities with adequate electricity & lighting arrangements</p>	
2.	Wash & Health	<p>Pre - Disaster Phase</p> <p>1. Create a pool of pediatricians & paediatric counselors and trauma counselors for children with similar arrangements for other segments of the VGs</p> <p>2. Train an extensive pool of persons (men & women) to technically assist and care for the persons with disabilities of all natures and the elderly</p> <p>3. Design and impart Orientation Programs for effected community women, children and their assistants and assistants of the persons with disabilities and the elderly on how to maintain their respective hygiene and sanitation and basic healthy living standards</p>	<p>NDMA & PDMA's:</p> <ul style="list-style-type: none"> - DDMA's - Social Welfare & Special Education Departments - Health Departments - Human Rights Departments - Women Development Departments - Energy Departments - Relevant experts from the private sector, - District Management, and - Relevant credible Civil Society Organisations/ NGOs working in the field - Local Communities Representatives

		<p>Pre, During & Post Disaster Phase</p> <p>4. Make health & WASH facilities accessible for the VGs</p> <p>5. Ensuring access to lady doctors, psychological councilors, mobile health units catering to women's special needs</p> <p>6. Establish mobile health/rehab/relief units catering to the needs of these two categories of VGs in DRR in particular</p> <p>7. Orientation sessions on energy/ water conservation for the communities, esp. women</p> <p>During & Post Disaster Phase</p> <p>2. Establish safe interim care arrangements unit for persons with disabilities and the children catering to the differential and special needs of girls & boys</p> <p>3. With special attention to the persons with disabilities and older persons (men & women differently) create separate special toilets, and bathing areas catering to their special needs (ramps, wall handles etc)</p>	
3.	Shelter, Food, & NFIs	<p>Pre - Disaster Phase</p> <p>1. Develop a responsive relief distribution mechanism that ensures zero tolerance on exploitation</p> <p>2. Special mechanism/ SOPs for providing relief assistance to the children headed households to be developed.</p> <p>3. Develop a responsive Code of Conduct for ensuring independent & adequate access for the recipients to relief goods, food, & NFIs</p> <p>Pre, During & Post Disaster Phase</p> <p>4. Arrangements for special nutritional needs of children with differential girls and boys needs should be made, with</p>	

		<p>similar catering to the needs of pregnant women</p> <p>5. Similarly, special arrangements should be made for the households headed by elderly and persons with disabilities</p> <p>During & Post Disaster Phase</p> <p>6. Designated special shelter areas need to be constructed for persons with disabilities and older persons catering to their special needs including building of ramps</p> <p>7. Adequate responsive relief aid should be provided to cater for their special needs</p>	<p>Under the supervision of NDMA & PDMAs:</p> <ul style="list-style-type: none"> - DDMA's - Food Departments - Local Government & Community Development Departments - District Management - Social Welfare, Bait-ul-Maal & Special Education Departments - Human Rights Departments - Relevant experts from the private sector, and - Relevant credible Civil Society Organisations/ NGOs working in the field
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PPAF's Role in Relief, Recovery, Reconstruction, and Preparedness

Earthquake 2005: A disaster management committee represented by Partner Organisations, Pakistan Army, and Government of Pakistan set out a framework for PPAF relief activities that started within 24 hours of the 2005 earthquake in AJK and northern Khyber Pakhtunkhwa. Trucks loaded with relief goods carrying tents, beddings, and liquid milk were successfully delivered to affected communities spread over intractable distances and altitudes.

With winter approaching, provision of temporary shelter was prioritized. While other agencies were still in relief phase, PPAF moved to reconstruction phase within a month of the earthquake and managed to deliver CGI sheet kits to 15,000 families.

Earthquake Reconstruction and Rehabilitation Authority chose PPAF as its leading partner for reconstruction and rehabilitation. Following ERRRA guidelines, PPAF incorporated earthquake resistant standards and design in housing reconstruction. PPAF then also set out a comprehensive plan to train and orient house owners, skilled laborers, and PO staff in earthquake resistant building designs and techniques. Over 122,000 housing structures were constructed. The transfer of funds was done according to the official assistance strategy with a single installment of Rs. 50,000 per household for a partially damaged housing structure and Rs. 150,000 with a completely damaged housing structure.

CECP Funded Health and Education Facilities: With funds from Community Encouraging Corporate Philanthropy (CECP), 6 health centres and 10 schools in AJK and KP were reconstructed on built operate and transfer model. The construction followed ERRRA standards and Pakistan environmental management laws.

Floods 2010: The floods affected around 20 million people spread over approximately 796,000 square km—one fifth of the area of Pakistan. Between August and November PPAF provided food and adequate shelter, tents, and hygiene kits to over 550,000 affected people in 18 flood affected districts. Besides, PPAF installed 140 hand pumps and pit latrines near shelters/camps of displaced population. Critical medical assistance was provided to over 300,000 patients through 110 medical camps in 20 flood affected districts from Kohistan, Shangla, Swat, and Dir Upper in the mountainous north all the way down to Sukkur and Thatta in the plains of Sindh.

Under rehabilitation activities, PPAF planned 774 schemes in 13 flood affected districts. Of these, 107 schemes have been completed. To rehabilitate livelihoods, PPAF provided 2655 trainings, 2411 wage compensations, 1735 asset transfers, and 36 community investment grants. PPAF made provisions for blended feed and pallets for 70,000 animals while over 20,000 animals were vaccinated and drenched. Bottles were provided for another 9,480 animals.

Rainfall 2011: The heavy torrential rain spell of August and September compounded by numerous breaches caused vast inundation in the southern districts of Sindh. Standing crops were destroyed and over 1.2 million people turned homeless. Badin was the worst hit district, while 13 other districts of Sindh were significantly affected. Responding rapidly to this disaster, PPAF through its POs carried out relief activities in 14 Union Councils of Badin and benefited over 61,000 families.

The Sindh Coastal Areas Development (SCAD) programme: SCAD is known around the country for its positive impacts and as an example of a brave intervention that helped contain a massive ecological disaster through development of protective and productive infrastructure, CBDRM trainings, health, and education, administered in tandem with a workfare program and livelihood, employment and enterprise development interventions in 52 Union Councils in five southern districts of Sindh - Karachi, Badin, Thatta, Tharparkar and Sanghar covering a population of over 1.55 million. PPAF has spent Rs. 2.1 billion (Sept 2015) on the rehabilitation and preparedness of these coastal communities.

2013 Earthquake: PPAF carried out relief operations in Awaran, Balochistan providing 6,000 earthquake resistant transitional shelters using indigenous material (bamboo and mud) having low carbon footprint. Here also, PPAF in partnership with Sussex Partnership NHS Foundation Trust is providing post trauma counseling of people hit by disaster.

Bugti IDPs Assistance Programme 2015: Through provision of nonfood items of Rs. 3.5 million, PPAF has enhanced coping capacity of internally displaced 900 families of Bugti tribe who have migrated to Rajanpur to escape the military operation in Balochistan.

Questionnaire

<u>Awareness</u>	
<i>Fire disaster in buildings is among the known man-made disasters:</i> Qno 1. Do you know about disaster?	(Kihila, 2017)
<i>Disaster preparedness is one of the important elements:</i> Qno 2. If fire disaster occurs, how well are you prepared?	(Kihila, 2017)
<i>Perceived extent of knowledge about rescue and evacuation procedures:</i> Qno 3. How much do you know about rescue and evacuation procedures against these fire hazards?	(Johnson J. R., 2014)
<i>Perceived understanding of disaster cause:</i> Qno 4. How much can you understand causes of these fire hazards?	(Sjöberg & Gianotti, 2017)
<i>Previous disaster has affected the victims in different manners:</i> Qno 5. How much past experience effects you?	(Armaş & Avram, Ho et al., & Sjöberg, 2000)
<i>Fire safety is essential component and requirement in building infrastructure plans:</i> Qno 6. Is there any fire safety plan in building?	(Yeturu1)
<i>Four types of extinguishers viz. water, dry powder, foam and oxygen:</i> Qno 7. Do you know about the types of fire extinguishers?	(Yeturu1)
<u>Behavior</u>	
<i>Awareness on the presence and position of the escape ways for use in case of outbreak:</i> Qno 1. Where is the assembly point you will go to following a fire alarm evacuation?	(Kihila, 2017)
<i>Perceived capacity to deal:</i> Qno 2. How much are you capable to deal with such fiery hazards?	(Chan, 2018)
<i>Fire emergency plan is provided for the people in the premises know what to do if there is a fire:</i> Qno 3. In case of emergency will you follow the evacuation plan?	(Chan, 2018)
<u>Fear</u>	
<i>Perceived extent of fear:</i>	(Armaş & Avram & Miceli et al., 2008)

Qno 1: How much are you afraid of fire hazard?	
<i>Increase Occurrence:</i> Qno 2. Does fire disaster has occurred already in the area?	(Ho et al., 2008)
<i>Fear on the basis of current knowledge:</i> Qno 3. How much afraid are you about fire hazards based on current knowledge?	(Wachinger et al., 2010)
<u>Trust</u>	
<i>Reliability of information acquired from different sources:</i> Qno 1. How much are you reliable on the information about fire hazards which you obtain from different sources?	(Cvetkovich, 2000)
<i>Contacting emergency departments is the prime action in such cases:</i> Qno 2. Do you know any emergency contact numbers?	(Yeturu1)
<i>Trust in disaster management agencies:</i> Qno 3. How much do you trust in disaster management agencies in dealing with fire hazards?	(Slovic & Gianotti, 2017)

<u>Safety</u>	
<i>To ensure fire safety and enable effective fire emergency planning:</i> Qno 1. Are you being provided with the proper safety measures?	(C. SIVAKUMAR1, 2018)
<i>To suggest measures to enhance fire safety in commercial buildings:</i> Qno 2. Do you have any knowledge about the safety measures?	(C. SIVAKUMAR1, 2018)
<i>To suggest strategies to enhance fire safety in commercial buildings:</i> Qno 3. What strategies has been adopt by respective building/plaza's administration to enhance your safety during fire hazard?	(C. SIVAKUMAR1, 2018)
<i>Managers/site in-charges, floor supervisors, and workers regardless of their level:</i> Qno 4. Is your shop is well attended by building/plaza's staff or workers to maintain the fire hazard precautions?	(C. SIVAKUMAR1, 2018)
<i>Commercial buildings satisfy overall structural feature parameters:</i> Qno 5. Are you satisfied with your building/plaza's feature regarding to fire hazard?	(Ho et al., 2008)
<u>Emergency Medical Services</u>	
<i>First aid kit is one of the most integral part for disaster preparedness:</i> Qno 1: Are you being provided with first aid kit?	(Nizam Ismail1 DrPH (candidate), 2016)
<i>In some cases it is required that a designated first aid attendant be on duty:</i> Qno 2. Does your shop/plaza has designated first aid attendant for such situations?	(Wachinger et al., 2010)
<i>All workers should know how to apply first aid kit in time of hour:</i> Qno 3. Do you know how to apply first aid kid to yourself and also to the injured one?	(C. SIVAKUMAR1, 2018)
<i>There are different types of first aid measures which are being used in such disaster:</i> Qno 4. Mention the type of first aid measure that you know how to apply.	(Nizam Ismail1 DrPH (candidate), 2016)
<u>Knowledge about Emergency Responsive Departments</u>	
<i>Receiving rapid response from fire protection department is the main objective:</i>	(Murphy, 2005)

Qno 1. How much time Rescue 1122 did take last time to response?	
<i>Fire protection departments should be helpful for the victims:</i> Qno 2. During the occurrence of the previous disaster, was fire protection department such as rescue 1122 was helpful?	(Murphy, 2005)

Response Time

<i>Prompt response time:</i> Qno 1. Do you response efficiently towards hazard occurrence area?	(Reliege, 2019)
<i>The standard response time is 9 minutes and 20 seconds:</i> Qno 2. How much time do you take for arriving ?	(Reliege, 2019)

Search and Rescue

<i>First aid providing facility:</i> Do you keep check on the buildings about first aid availability or do you provide it to yourself during hazard occurrence?	(Gillian, 2014, 2017)
<i>Fire handling training sessions:</i> Do you give training sessions in Commercial areas (to their staff or management), how to escape or take primary actions in such situations?	(Johnson R. , 2016)
<i>Disability friendly rescue facility:</i> How much do you facilitate the disabled persons during disaster occurrence?	(Johnson R. , 2016)