Futures Study of Crises due to a Possible Earthquake in Tehran, Iran: Information Infrastructure Vulnerability and Possibility of Occurrence of Efficacy and Influence Crises

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Date of submission: 22 Jun. 2019, *Date of acceptance:* 24 Jul. 2019

Original Article

Abstract

INTRODUCTION: The density of the country's information infrastructure in Tehran, Iran, and the high vulnerability of these infrastructures raise the question of what effects the demolition of these infrastructures would have. Natural disaster management is entirely dependent on the capacity and efficiency of the central government in Iran and the government also mobilizes and organizes crisis management and resources through an almost monopoly and exclusively controlled information system. Therefore, the present study was accomplished to examine some of the likely impacts and consequences of an earthquake in Tehran from a prospective perspective.

METHODS: Using documentary data and the implementation of a two-round expert panel, it was examined whether the demolition of information infrastructures due to a potential earthquake in Tehran would impose efficacy and influence crises on the government. In this way, basic study information was collected using library documents and the futurological aspects of the problem, i.e. the probability of a severe earthquake, destruction of media infrastructure, and the subsequent possible crises were investigated using the Expert panel method.

FINDINGS: Taking into account the tectonic potentials and historical backgrounds, the occurrence of a major earthquake with magnitude greater than 7 is highly probable in Tehran. Given the density of information structures, installations, and trusted organizations in vulnerable areas, there is a high likelihood of destruction of a large part of the information infrastructure and networks. This situation, in the absence of measures and sufficient alternative networks, would increase the likelihood of severe disruptions in the information and crisis management process. Such a situation, given the social and political contexts, is likely to trigger or intensify the efficacy and influence crises.

CONCLUSION: Considering the drawbacks present in the information structure, i.e. the concentration in Tehran and the imminent destructive earthquake in Tehran, as well as the location of its physical buildings in the vicinity of earthquake faults, there would be many crises facing the country.

Keywords: Earthquake; Iran; Information Infrastructure; Crisis Management; Political Crisis

How to cite this article: Delavari A, Mahallati-Raini H, Mohseni RA. **Futures Study of Crises due to a Possible Earthquake in Tehran, Iran: Information Infrastructure Vulnerability and Possibility of Occurrence of Efficacy and Influence Crises.** Sci J Rescue Relief 2019; 11(2): 82-91.

Introduction

Natural and social disasters and crises are an integral part of human life with an increasing and diverse trend. On the other hand, human beings are being equipped with more knowledge and more sophisticated techniques and tools every day to deal with these disasters and crises. The development and application of various information tools and methods during disasters and crises is one of the primary needs to be aware of the dimensions and scope of these disasters and crises and to plan how to deal with

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[DOI: 10.52547/jorar.11.2.82]

their impacts and consequences. The role of the media today is beyond mere information. Media in the information and communications age are new tools to create, decrease, or increase crises. If an earthquake strikes an area of a country, not only will all the people of the country and much of the world become aware of it quickly, but also the national and sometimes international institutions will seek to help the affected areas and people.

The above-mentioned developments have been accompanied by conflicting dimensions and effects. In other words, today more opportunities of information, organization, and mobilization of resources to deal with natural and social disasters have been provided for human beings, but on the other hand, the accidents and crises have increased the scope and severity of potential vulnerabilities and decision-making and action risks. Today, the density of social life units, in particular in large cities, is much higher than in the past. Meanwhile, more focus is paid by the information and relief institutions and facilities on the crisis affected areas. This situation has increased the likelihood and extent of vulnerability of much larger populations than ever before. These vulnerabilities will be especially catastrophic when cities are exposed to these disasters and crises, which themselves are the main source of crisis management resources. This situation can be seen today in Tehran, Iran.

Tehran is a capital city embracing approximately 15 million people (roughly 20% of the country's population) daily, with half of the total economic and financial facilities and nearly all major political and managerial institutions and media in the country. The city has, on the other hand, been built on several major and active earthquake faults, and the pattern of construction, housing, and distribution of critical facilities throughout its area is highly undesirable. Despite measures such as the establishment of crisis management organizations and staffs as well as modest public training on how to face and earthquake, what worries most earthquake experts is the severity of the probable crisis caused by a high density of population, construction, facilities, and even information and assistance facilities that may occur in the city. This situation always raises the concern that such a concentration would not only exacerbate the city vulnerability, but also increase the likelihood of national crises, including in the political and security areas.

There is little consensus on what the crisis is and the identification of the critical situation. However, some features can be considered for this situation. Rainer and Kahn have identified the following seven characteristics for a critical situation: 1. A turning point in the events and measures that bring unexpected consequences, 2. Conditions that require immediate action, 3. A serious threat to security, 4. Conditions that create high uncertainty, 5. Loss of event control, 6. Conditions where the existing information is severely reduced, 7. Creating new conditions due to the interaction of several events (1).

Charles Herman also considers three characteristics in the definition of crisis: 1. Threat, 2. Surprise, and 3. Time pressure. Acknowledging that the size of the threat, the time available, and the degree of surprise vary from one situation to another, he assumed that several combinations of different amounts of these three characteristics can be imagined. He draw these combinations in a cube that, apart from the critical state, differentiates at least seven other states; this cube is known as the crisis cube. Given the three factors of threat, time duration, and degree of awareness in crises, eight types of political crises can be conceived in terms of Hermann's breakdown (1). According to Lucin, countries have to pass some crises to reach a desirable level of development (2). Table 1 illustrates the comparison of each of the crises with the political crises caused by an earthquake that are affected by the three above-mentioned factors.

Table 1. Investigation of the earthquake-induced crises in a city

Crisis	Level of threat	Decision-making time	Degree of awareness
Severe crisis (legitimacy)	Severe	Short	Low
Emerging crises (distribution)	Severe	Long	Low
Slow crises (identity)	Poor	Long	Low
Special crises (security)	Severe	Short	High
Reflective crises (urbanization)	Poor	Short	High
Program crises (administrative)	Severe	Long	High
Normal crises (information)	Poor	Long	High
Administrative crises (legal)	Poor	Short	Low

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As discussed above, the reduced information levels and disruption of the information process, while being one of the features of a critical situation, is also important in two other aspects: First, it is itself a major challenge and an important obstacle to managing the crisis and coping with its direct consequences. Second, in major and pervasive crises such as earthquakes, due to the government's role and responsibility, the indirect consequences of the crisis, especially the security and political consequences, of the variables associated with media and information are of a paramount importance. In general, the effect of the information system in critical situations can be considered from the following points of view:

1. Creating a calming/realistic/disturbing image of the scope and dimensions of the crisis and management priorities;
2. Creating a reassuring/hopeful/disappointing environment of the ability of responsible institutions to manage crisis;
3. Creating synergies and alignments/ incongruity and divergences among forces and institutions involved in crisis management;
4. Providing correct/incorrect information about the areas and potentials of crisis escalation or mitigation.

What is important is the conception created when informing about the efficacy of the government and its level of control over the whole country in the face of such critical situations. Here, the psychological and social crises caused by unexpected events such as earthquakes can imply political crises such as efficacy crisis, legitimacy crisis, and influence crisis (government control over their entire political territory). These crises can change into each other in different ways. In other words, the inefficiency crisis in turn brings about the legitimacy crisis, and both of which can lead to an influence crisis under certain conditions, including when opposition and diverging forces are activated (3).

In the meantime, the influence crisis is more associated with the information capacity of the government on the whole territory of the country. In a critical condition, what the government wants to present is an image of itself that is balanced and reassuring. However, the influence crisis sometimes disrupts this image. The main indicator of the influence crisis is the lack of trust and acceptance by the people, especially those affected by the public programs and policies of the government. The main indicator of this crisis and the pervasive development process is the lack of trust and acceptance among the people, especially those affected by the development process, towards the government and the leaders. In these circumstances, urban violence may take place in an organized form, such as labor strikes, anti-government demonstrations, assassinations, and vandalism (4).

Various tools can be employed to prevent the influence crisis, one of which being media. Dealing of the media with crisis and covering it is a very common issue. Because crises are an interesting source of news for them. In accordance with the experimental analysis, more than 25% of all media news is about natural, political, technological, and other crises (5). However, coverage of crises by media is selective and, in many cases, minor crises are exaggerated due to the attractiveness to the public, and on the other hand, important and dangerous crises are ignored due to the lack of media attention (6).

Focusing on the media system and information management in conditions of major crises, the present study was carried out to investigate the impact of media concentration and information management in Tehran on the political and security outcomes of a potential earthquake in this city. In addition, the study aimed at assessing the impact of a large possible earthquake in Tehran on the media and information management system of the country as well as the impact of the damage on the public security and the ability of the government to control the country.

Methods

This study was a futures study with a combination of documentary and studies using expert panel. The primary information of the study included the geological and morphological characteristics of Tehran, the backgrounds and potentials of an earthquake in this city, as well as the characteristics of the information infrastructure, national media and media system, and in particular the distribution pattern of buildings and facilities in this city was collected using library documents and then categorized. However, the futurological dimensions of the issue, such as the probability of a severe earthquake, the destruction of the media infrastructure, and the potential crises resulting from the incident, were

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determined by Expert panel method. The expert panel method is based on the consensus and alignment of experts on the study topic and problem. Repeating predictions, paying attention to minorities, and understanding alignment are the most important advantages of this approach. It also possible to formulate or extract the consensus of the group of experts with expert panel method (7).

To understand the expert panel method, it was necessary to understand three main trends in the futures study. Empirical futures research that focuses on predicting items by discovering the relationships among the natural or social phenomena, and predicting, generalizing, and control over the course of future events and trends. The assumption in this kind of futurism is the presence of a deterministic world. From this point of view, linear prediction methods are more considered. Second, the interpretive foresight, which looks at perception of the actors' mentality through focus on the dominant linguistic and semantic systems within the groups and communities under study. The objective of such futures studies is not to predict, but to understand the motivations and intentions of the actors. In this type of futures study, human is regarded as the main factor of insight-building, but at the same time, the socioeconomic structures involved in the creation of insight are also considered. Third, the critical foresight, which focuses on the foundation and heraldry of the epistemology systems. The purpose of this kind of futures studies is to challenge the assumptions and futuristic analysis methods. In a clearer sense, in this type of futures study, the researcher's aim and concern is not to anticipate the future or perception of the actors, but to explore the power relations and domination systems embedded in social and scientific discourses that lead to our knowledge of the status quo and our perceptions of the future. Since the expert panel seeks to understand the consensus of the experts, focuses on the linear process and is therefore an empirical method. This approach falls into the second category as it deals with understanding the opinions of the experts and seeks to understand the motivations and intentions of the actors.

Anonymity, iteration, controlled feedback, and statistical group response of the results are among the most important features of the expert panel technique (8). Thus, the main purpose of this method is to obtain the most reliable consensus through a series of centralized questionnaires with the controlled feedback (9).

In order to use the expert panel method in this study, a panel of 15 experts and managers related to the two fields of media and crisis management was formed using the non-probability sampling method. Of these, 10 had a PhD degree and were faculty members, eight of whom, along with academic activities had an employment experience or were currently occupied in one of the media management and crisis management areas. The other five panel members also had a master's degree, all of whom were employed in the field of crisis management. The research questionnaire was developed in consultation with three of the study consultants and arranged on three axes based on the results of previous research and documentary studies: A: Occurrence of a very severe and devastating earthquake in Tehran, B. Vulnerability of the information infrastructure and media system to such an earthquake (with emphasis on national media)., and C. Occurrence or exacerbation of managerial, social, and political crises caused by the destruction and damage of the information infrastructure and the media system (Table 2).

In front of the items of each question, two columns were provided for the respondents, one measuring the importance of the desired situation or process and the other measuring its certainty. The respondents were supposed to rate each item on a scale of 1 to 7, with scores of 1 and 7 indicating the lowest and highest importance and certainty, respectively. After collecting the experts' views in the first round of expert panel, the mean scores given to each item were calculated and provided to the experts to run the second round. According to the theoretical framework of the study, the consensus among the experts was achieved after the two rounds.

Findings

Documentary results: Iran is one of the countries with the highest incidence rate of earthquakes in the world, with 97% of its cities and villages located on the earthquake-prone faults always being exposed to earthquakes. Meanwhile, Tehran is in a more hazardous situation with large active faults on the three northern, eastern, and southern sides.

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Table 2. Questionnaire used in the study

Row	Possible situations and trends in case of a severe earthquake in Tehran, Iran
1	A massive earthquake (with an intensity of 7-Richter magnitude or higher) is likely to occur in Tehran.
2	National information infrastructure and national media facilities located in Tehran are resistant to a severe earthquake.
3	The structures of the administrative, management, political, and security centers and institutions in Tehran are resistant to possible earthquakes.
4	Urban public utilities (electricity, gas, water, and telecommunications networks) are resistant to possible earthquakes in Tehran.
5	The geographical organization and distribution of disaster relief services in Tehran are appropriate for a potential earthquake.
6	In case of disruption to the current information infrastructure, there are sufficient opportunities for alternative information mechanisms.
7	In the event of damage to national information and national media infrastructures, official rescue institutions and forces can operate in harmony.
8	In case of damage to the information infrastructure, social forces and voluntary organizations are able to operate in harmony.
9	Disruptions in information system cause severe disruption in identifying the dimensions of the earthquake-induced crises.
10	Disruptions in the information system would cause fear and psychological disorder in society.
11	Disruptions in information system would cause severe disruptions in the operations of providing relief to the earthquake-affected areas and individuals.
12	Disruptions in the information system would cause severe disruption to the crisis management system.
13	Disruptions in the information system would cause inefficiency of political, security, and law enforcement agencies throughout the country.
14	Disruptions in information system would activate destabilizing forces and diverging groups in the country.
15	Political and managerial systems of the country are adequately prepared for the consequences of a major earthquake in Tehran.
16	In critical situations, existing civil institutions would have the capacity to fill the gap resulting from weakness of the political and managerial institutions.
17	Necessary measures to restore institutions and replace officials and political agents in post-earthquake conditions are foreseen and would be fulfilled.
18	In the event of a severe earthquake, public insecurity and widespread social crisis would take place in Tehran.
19	A major and devastating earthquake in the city of Tehran would be followed by political instability and widespread violence in the country.
20	In critical conditions due to an earthquake, social convergence and people's willingness to work together would increase.
21	Following the probable earthquake in Tehran, the political integration of the people and the willingness to cooperate with governmental institutions would increase.
22	Following a possible earthquake in Tehran City, international cooperation and good relations of Iran with other governments would increase.
23	In a critical post-earthquake situation, foreign forces would be likely to intervene.

In case of activity of the northern and eastern faults, Tehran is expected to be shaken with earthquakes with a magnitude of 7 and 6 Richter, respectively. Investigations by foreign agencies such as the Japan International Cooperation Agency (JICA) have emphasized that if the Ray Fault is activated, the greatest damage due to earthquake in human history would occur in Tehran. The results of this study indicated that the energy discharged from the northern fault of Tehran (Masha-Fasham), fault of northern Tehran, and Ray Fault would create earthquakes with magnitudes of 8, 7.2, and near 7, respectively. The JICA report indicates that districts 11, 12, 16, and 20 of Tehran are severely vulnerable due to the earth structure and soil type of these areas. In addition to the soft soil type in these areas, there are many underground aquifers in these areas that sometimes cause subsidence and demolition of structures without an earthquake (10). Most of Tehran's power transmission facilities are located on these earthquake faults. Meanwhile, few areas of Tehran are less prone to large, active faults.

These faults have been activated many times in the past centuries, causing large and devastating earthquakes. For example, the northern Tehran

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fault caused the 1177 earthquake between Ray and Qazvin, as estimated by 7.2 Richter, and the Ray City fault has been attributed to the earthquake of 855-856. In general, it has been more than 170 years since the last earthquake in Tehran, and given the existing faults, it seems that this historic tranquility is an important alarm for Tehran (11).

Based on the available maps of faults in Tehran, three important seismic zones can be identified: the fault zone, the fault surrounding, and the area of the severe shocks.

In the first zone, which is the most dangerous area in terms of earthquakes in Tehran, creation of faults and displacement of sub-faults caused by faults are possible, and in fact the construction of important buildings and institutions should be avoid. According to experts, this area should even be completely vacant and be dedicated to green space. Based on the existing maps of the area along the North Tehran Fault, this area covers part of the Ray Fault and part of the Eastern Fault. However, these areas are among the most populous areas of Tehran, including some of the country's most important centers.

The second zone is the area surrounding the major faults and includes some ministries and institutions such as the Ministry of Defense, the Ministry of Culture and Islamic Guidance, the Ministry of Economy, and so on. The important point is the location of the Ministry of Culture and Islamic Guidance in the region, the complete destruction of which in the event of a possible earthquake could have a devastating effect on the information structure of the country. In addition to being in charge of an important part of newspapers and the press, and even part of the Internet-based activities in Iran, the ministry is also responsible for the Islamic Republic News Agency.

The third area, or zone of severe shocks with widespread devastation mainly includes north of central Tehran, which generally due to the relative weakness of the land and the lack of use of concrete, and especially the outdated buildings on which it is likely to show little resistance and there is a high potential for demolition. It should be noted that the buildings of Islamic Republic of Iran Broadcasting (IRIB) organization are located in this area, which is considered as the most important news elements in Iran. Moreover, the offices of most of the active news agencies and press in Tehran are located in this zone, which, given the assessments, part of which can be expected to remain healthy if buildings are properly founded and reinforced depending on the severity of the earthquake. However, given the high population density in this area, and especially the high burnout of most of the buildings in Tehran, a high rate of damage to the area can be expected. This is more remarkable, especially for the buildings and facilities of the IRIB.

In summary, the high density of the country's information infrastructure in the central and northern parts of Tehran, which are considered to be vulnerable and high-risk areas, is very important and may cause demolition of a significant portion of these infrastructures in a possible earthquake.

Expert panel results: As mentioned in the study methodology, the panel of 15 experts was formed to complete and scrutinize the findings of the study, in which in two rounds, the experts responded to 23 questions on the effects and political consequences of a major potential earthquake in the near future. The results of the expert panel technic are summarized in Table 3.

As it can be seen in the Table, the panelists were very confident (close to 7) about the probability of a severe earthquake in Tehran, the vulnerability of urban structures and facilities, the potential for the destruction of existing information infrastructures, and the inadequacy of alternative information systems in the event of a severe earthquake in Tehran. They pointed out the failure and inefficiency of the crisis management system in the event of demolition of the information infrastructures with a relatively high confidence (4-5), and finally with a relatively high confidence (3-5), they raised the likelihood of transformation of the earthquake-related social and management crises into the political crises, in particular, the efficacy and influence crises.

Discussion and Conclusion

In Iran, the media information structure has a unique status that is not comparable to almost any other country. The main shortcoming with this structure seems to be the centralization of the media and press in Tehran, as the operation of the independent media in other cities seems impossible. Due to the centralized political and administrative structure, this situation would lead to crisis in the country during events like an earthquake in Tehran.

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Table 3. Expert panel results in the present study

Futures study of political consequences of Tehran earthquake in next 10 years (importance level)																						
Row	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7	Question 8	Question 9	Question 10	Question 11	Question 12	Question 13	Question 14	Question 15	Question 16	Question 17	Question 18	Question 19	Question 20	Question 21	Question 22
1	7	6	6	6	6	6	6	6	6	6	6	5	4	5	5	7	6	6	6	6	6	6
2	7	7	7	7	7	7	6	6	6	7	6	6	6	7	6	7	7	7	7	6	7	7
3	7	6	7	7	6	7	7	7	6	7	7	6	5	6	6	7	7	7	6	6	6	6
4	7	7	7	7	7	7	6	6	7	7	7	6	7	7	6	7	7	6	6	5	6	6
5	7	6	6	7	7	7	7	7	7	6	6	6	7	6	7	7	6	7	6	7	7	7
6	7	7	7	7	6	7	7	7	6	7	6	7	6	7	6	7	7	7	6	7	7	6
7	7	7	7	7	6	7	7	7	6	6	6	6	6	6	6	7	7	7	6	6	6	7
8	7	7	7	7	7	7	7	7	7	7	7	5	7	6	6	7	7	7	7	7	7	7
9	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	7	7	7	7	7	7	7
10	7	6	6	6	5	6	6	6	6	7	5	5	6	5	6	7	6	5	5	5	5	6
11					7	7	7	7	7	7	6	6	6	6	5	7	7	6	6	6	7	6
12	7	7	7	7	7	7	7	7	7	6	7	7	6	7	6	7	6	7	7	7	7	7
13	7	7	7	7	7	7	7	7	7	7	7	7	6	6	7	7	7	6	7	7	7	7
14	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
15	7	6	6	7	7	7	7	7	6	7	7	6	7	6	7	7	7	7	5	7	7	7
Mean	7	6.64	6.71	6.86	6.60	6.86	6.73	6.73	6.53	6.73	6.47	6.13	6.13	6.27	6.20	7	6.73	6.60	6.27	6.33	6.60	6.60
Min	7	6	6	6	5	6	6	6	6	6	5	5	4	5	5	7	6	5	5	5	5	6
Max	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Mode	7	7	7	7	7	7	7	7	7	7	7	6	6	6	6	7	7	7	6	7	7	7

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Table 3. Expert panel results in the present study (continue)

Futures study of political consequences of Tehran earthquake in next 10 years (certainty level)																							
Row	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7	Question 8	Question 9	Question 10	Question 11	Question 12	Question 13	Question 14	Question 15	Question 16	Question 17	Question 18	Question 19	Question 20	Question 21	Question 22	Question 23
1	6	3	3	3	3	3	4	5	4	4	4	4	4	3	4	5	4	5	3	3	5	5	5
2	6	5	6	4	5	4	6	6	6	4	5	3	4	4	5	6	4	5	3	4	5	6	7
3	7	6	5	6	7	6	4	5	4	7	7	6	6	7	5	5	6	4	6	6	5	5	5
4	6	4	4	3	4	3	6	6	6	6	6	6	4	3	3	3	6	6	4	3	3	3	3
5	7	5	4	4	4	4	4	5	4	4	4	4	4	4	3	4	4	6	6	4	4	4	4
6	5	4	4	4	5	5	4	4	4	4	3	3	4	5	4	4	4	6	4	3	5	4	4
7	7	4	4	4	5	5	4	4	3	4	3	6	6	2	3	3	3	6	3	4	6	6	5
8	7	3	4	3	4	1	7	7	7	4	7	6	4	1	7	7	1	5	2	7	7	7	7
9	5	4	3	3	4	5	3	5	4	3	4	7	7	5	4	5	3	6	3	3	7	7	7
10	5	4	4	3	3	4	5	4	5	6	5	5	5	3	4	5	3	5	5	5	5	5	4
11					4	5	4	5	4	5	4	5	5	5	4	3	4	7	4	3	4	4	4
12	6	5	5	4	4	4	7	4	7	3	6	7	3	3	4	6	6	7	3	4	7	7	4
13	7	4	5	4	4	4	6	7	7	4	3	4	3	3	5	5	3	5	3	5	7	7	6
14	5	3	4	3	3	4	5	5	5	4	7	3	4	3	5	5	3	5	4	3	5	6	5
15	5	3	4	4	3	3	5	5	7	5	5	3	5	2	6	6	5	6	7	7	7	6	6
Mean	6	4.0714	4.2143	3.7143	4.1333	4	4.9333	5.1333	5.1333	4.4667	4.8667	4.8	4.5333	3.5333	4.4	4.8	3.9333	5.6	4	4.2667	5.4667	5.4667	5.0667
Min	5	3	3	3	3	1	3	4	3	3	3	3	3	1	3	3	1	4	2	3	3	3	3
Max	7	6	6	6	7	6	7	7	7	7	7	7	7	7	7	7	6	7	7	7	7	7	7
Mode	7	4	4	4	4	4	4	5	4	4	4	3	4	3	4	5	4	5	3	3	5	6	4

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The occurrence of a devastating earthquake in Tehran may destroy the national information system, the IRIB and news agencies, which based on the evidence, are located in close proximity to the earthquake faults. IRIB is one of the most important means of information provided for the government, as there are no private television and radio stations in Iran except those related to the IRIB. It is the most influential part of the information field for the Islamic Republic of Iran. Given the monopoly on information dissemination in the framework of this organization, IRIB is considered as one of the key elements of the political system. As, in case of destruction or demolition of this organization, the Iranian political system will face numerous crises, particularly the legitimacy crisis.

In the event of an earthquake, two types of damages threaten the country's information structure: the destruction of information centers adjacent to Tehran's faults that are considered to be hardware damages, and the inefficiency of the information system to reinforce the political system and provide the ideological influence in the event of an earthquake, which is called software damage. The major potential weakness of the country's information system is the centralization of the information centers and institutions in Tehran, especially in earthquake-prone areas. Based on the known evidence, IRIB is equipped with software technically required to cover information across the country. Therefore, in the event of an accident in Tehran and the vulnerability of the IRIB organization, no center in the country is able to provide information coverage, so with such a crisis, the information system structure of the country would practically collapse and the society would turn to foreign media, especially the opposition media; a situation that would challenge the legitimacy of the political system in the long run.

In addition to the official information networks, national media and IRIB, many other ministries and institutions that are responsible for part of the information sector functions based on their own needs and roles are also located in the vulnerable areas. These bodies include police, fire, emergency and military centers and government offices. In these circumstances, the crisis in the field of information due to a possible earthquake would be widespread and severe.

The occurrence of a devastating earthquake in Tehran may damage the information system, especially the national media, which are often located in the vicinity of the earthquake faults given the evidence available, and, given the lack of proper pre-earthquake management, would impose major challenges on the political system. The vulnerability of the information infrastructures in Tehran will impose numerous social and political crises on the country. In particular, the likelihood of an efficiency crisis (government efficacy in crisis management) and an influence crisis (dominance of state institutions and agencies over the entire territory of the country) would be high. Based on this probable and risky scenario, the following recommendations are made to counter the adverse and probable situation:

1. Taking necessary measures to prevent media centralization in Tehran as a vulnerable city
2. Considering a crisis information center in one of the country's safest provinces which would carry out the task of providing information to the entire country in the short term as soon as IRIB is eliminated due to an earthquake.
3. Transfer of major information centers in whole or in part to other cities less vulnerable to natural disasters in the long run.
4. Considering centers in other cities as stand-by to take on the task of providing information in the event of a crisis in the center.
5. Supporting independent media activity in the private sector along with strengthening and equipping the government information structure throughout the country.
6. Improving facilities to use new information technologies and tools including the Internet and satellite networks for all segments of the population.
7. Public education for the use of modern media in receiving information and news. In this case, it is particularly suggested that a social network based on the "location-based news" technology be set up at the national level similar to that implemented on Tehran City Map service set up at the Tehran municipality website since a long time ago, so that everyone would easily publish information and news of critical areas on this website. This network can even be fed regularly in terms of content with other social media information.

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Training media staff to provide information in times of crisis such as earthquakes (crisis management training). In this case, in particular, the whole country is necessary to be equipped with an incident command system (ICS). ICS is a national standard model of operational disaster management that is applicable to all incidents. This system enables disaster management officials to be integrated in a unified and coordinated structure without damage to their areas of competence, regardless of the complexity and multiplicity of the incidents.

Acknowledgments

None

Conflict of Interests

Authors have no conflict of interests.

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