

Business Continuity of the Organized Industrial Zone (OIZ) in the Kahramanmaraş Earthquake

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Abstract

This study focuses on the business continuity of the Organized Industrial Zones and companies affected by the Kahramanmaraş earthquake. OIZ is a special zone developed for investment incentives and it is considered as a key sector for economic development. In this study, four OIZs in the provinces of Gaziantep, Kahramanmaraş, Adıyaman and Hatay, which were affected by the earthquake, were surveyed in order to know the situation of business continuity and to identify effective disaster preparedness measures that enabled business resumption.

Key words: Organized Industrial Zone (OIZ), Business Continuity Plan (BCP), Kahramanmaraş earthquakes

1. Business Continuity of Organized Industrial Zones

The Kahramanmaraş earthquake of February 6, 2023, caused severe damages affecting 11 provinces in southeastern Türkiye¹⁾. The provinces that were affected by the earthquake were one of the major production areas of the textile and steel industries, which had a share of 9.8% of GDP in 2021 contributing national economic growth²⁾. It also had 8.6% share of exports in 2022. However, not only the direct damage caused by the earthquake, such as building collapses and human casualties, but also disruption of lifelines and supply chains, the massive population movement due to disaster, and lack of labor hinder economic recovery.

In order to mitigate the damage caused by disasters and resume businesses quickly, it is important to prepare for the emergency situation. Based on the experience of the 2011 Great East Japan Earthquake, the Japanese government encourages companies to prepare a Business Continuity Plan (BCP). The government first issued the Business Continuity Guidelines in 2004 and updated it based on disaster experience. The BCP guideline describes the necessity, effectiveness, implementation and improvement methods, including good practices in business continuity for Business Continuity Management (BCM) including Business

Continuity Plans (BCP). As for 2020, 68.4% of large companies in Japan have BCPs in place.

This study focuses on the business continuity of the Organized Industrial Zone (OIZ) and companies in OIZ affected by the Kahramanmaraş earthquake. It surveys their business continuity and identifies effective disaster preparedness measures that enabled resumption of business.

OIZ is one of the key economic development sectors in Türkiye. OIZ is a special zone developed for investment incentives. OIZ provides an environment and incentives for business to start operations. The basic infrastructure such as roads, water, natural gas, electricity, communications, waste treatment and other services are in place so that companies can start operations immediately. Each OIZ strives to attract investment and some provides good environment for employees by establishing hospitals, schools, sports facilities or providing social and welfare services. There are 392 OIZs and 274 are operating employing about 2 million people as of 2022³⁾. The World Bank started a new project of 300 million US dollars in 2021 to make OIZs more environmentally sustainable⁴⁾. The business continuity in OIZ therefore is particularly important for regional development and the prevention of economic losses due to disasters.

2. Damages and business resume in OIZs

2.1 Summary of the Survey

There were 38 OIZs in the 11 provinces affected by the earthquake employing 550,000 people in 4,997 companies²⁾. As a part of the study, we interviewed four OIZs and five companies in OIZs in disaster affected areas, as shown in **Table 1**. This section summarizes the situation of business continuity after the earthquake based on the interview survey.

Table 1 Name of OIZ and Companies Surveyed.

Category	Name	Interview Dates
Organized Industrial Zone	Gaziantep OIZ	9/10/2023
	Adiyaman OIZ	10/10/2023
	Iskenderun OIZ	6/3/2024
	Turkoglu OIZ	7/3/2024
Companies	Celenkler Zeytin Yagi	10/10/2023
	Beydag Textile	11/10/2023
	Aral	11/10/2023
	Nazar Textile	7/3/2024
	Salsirmaz Makina	6/3/2024

2.2 Gaziantep OIZ

The largest OIZ in the disaster affected provinces is the Gaziantep OIZ. Gaziantep OIZ was the fastest to resume business operations, reopening 15 days after the earthquake. There were 1,250 companies in Gaziantep OIZ and 22 buildings out of 2,500 buildings were damaged by the earthquake. In terms of lifelines, electricity and water were restored immediately after the earthquake. However, it took almost five days for the gas supply to be restored. Immediately after the earthquake, 5,000 employees working in the OIZ were resided temporarily in the exhibition hall building in the OIZ. The damage assessment of the damaged buildings was organized by the OIZ. In order to resume business, it was necessary to confirm that the buildings were safe after repairs and to obtain permits to operate. The most buildings in the OIZ were constructed using precast concrete, which differs from standard construction, and it was hard to find experts who were familiar with this type of construction.

2.3 Adiyaman OIZ

Adiyaman OIZ was close to the epicenter of the earthquake and was severely damaged. 15 of its 158 buildings were collapsed (**Fig. 1**). Electricity, water, and gas were restored three days after the earthquake. However, the OIZ was unable to reopen for a month due to the problems with the wastewater treatment facility. Many of the employees lost their housings, so the OIZ worked with companies to arrange container housing, set up a warehouse to receive relief supplies from outside, and distributed those supplies. Population/human resource outflow had a major impact on the OIZ's business continuity. Before the disaster, there were 20,000 employees working in the OIZ, but the number of employees remained at around 8,000 after the earthquake.

The loss of highly skilled employees is particularly severe, and business operations have not recovered to pre-disaster levels. In Adiyaman city, the damage rate to buildings was as high as 70%. Immediately after the earthquake, some people changed their jobs because it was psychologically difficult for them to work inside of buildings. The city has been rebuilding infrastructure and housings damaged by the earthquake, and some people are changing jobs because of the high demand for high wage jobs in the construction industry. Some people are leaving the city because of lack of the housing and the high cost of rent caused by the slow pace of housing reconstruction.



Fig. 1 Damaged facility.

2.4 Turkoglu OIZ

Turkoglu OIZ is located in Kahramanmaraş Province. There were 15 companies and about two thousand people were working before the earthquake. After the earthquake, electricity was cut off about a day and a half. There were two companies that continued to work, producing oxygen and air separation units, as there was high demand from hospitals and institutions. These companies had factory automation systems that did not require a manpower, so they continued to operate from the day of the earthquake. As Kahramanmaraş Province was close to the earthquake's epicenter, the OIZ sustained severe damage. Four buildings collapsed completely, three buildings partially collapsed, and six buildings suffered heavy damage. The precast buildings, in particular, were badly affected. The warehouse unit required repairs, and the roof trusses of the precast factory buildings were also damaged.

The loss of labor was not just due to migration to other cities, but to the massive demand for labor in the construction industries as wages are higher in these sectors. People working at or slightly above minimum wage are moving to construction jobs, not realizing that this demand is temporary. One of the biggest investment incentives after the earthquake is that the government has decided to run the defense industry

in the area. The aircraft and helicopter parts manufacturing facility established by Turkish Aerospace Industries (TUSAŞ) in Turkoglu OIZ, in an effort to erase the traces of the February 6 earthquakes, is expected to make significant contributions to employment and exports.

2.5 Iskenderun OIZ

Iskenderun OIZ is located close to the Iskenderun port, in Hatay Province which was also severely damaged by the earthquake. Iskenderun OIZ has 208 hectares of areas and 35 companies with about 6,000 employees working. The main production is steel industry. The nearby port and major facilities were not severely damaged because they were built for steel industries (**Fig. 2**). There was destruction of electricity, natural gas, energy, water, and about 300 employees were lost by the earthquake. Approximately 1,000 employees are currently living in container housings.

After the earthquake, there was support from OIZs in other regions and countries. Each company made efforts to support their employees. Large companies built temporary container cities for their employees and their families. This helped to minimize the loss of labor. Social facilities such as schools and playgrounds were also provided. Thanks to efforts to reduce the psychological and economic needs of employees, the production was maintained. The director of the OIZ mentioned that the international support and social solidarity accelerated the recovery process.

The production loss was around 50% in the first month. This rate reduced to 20% in the second and third months. Three months later, production had returned to pre-earthquake levels.



Fig. 2 Company in Iskenderun OIZ.

3. Disaster Preparedness of Companies

In order to find out how companies prepared for disasters, the interviews surveys were conducted with the companies which located in the OIZs.

All companies interviewed had insurance before the earthquake and the damage caused by the earthquake was covered by the insurance. However, because of the inflation, the amount covered differed depending on when the damage assessment was carried out.

Several companies had carried out disaster preparedness studies before the earthquake, with fire as a main risk. Some were also preparing for windstorms, heavy snowfall, and other natural events. However, earthquakes did not receive much attention in these plans.

Labor shortages had a major impact on business continuity. There was a severe shortage of housing in the areas that were affected by the earthquake. Rents have increased due to the shortage of housing. Companies have tried to secure container houses for their employees, but there are peoples have left their jobs because of the high demand for employment in the construction industry. It is difficult to retain experienced and skilled workers, so measures to reduce turnover are important.

Some companies have made efforts to retain staffs. For example, Nazar Textile, a textile company in Kahramanmaraş, has made remarkable efforts. The factory was not damaged but they decided to close it for a week after the earthquake. When it started operating again, the company first provided psychological support to its employees. They invited a consultant from Istanbul to provide psychological support and therapy to employees. They built containers for the employees who had lost homes, and helped with housing rents and food. As they did not have any significant damage to the factory building and machinery, they were able to start production quickly. Around 70% of the employees started to work from the second week. Although some companies faced difficulties in convincing the workers to start working in the factory because people were afraid to stay in the building for fear that it would collapse, they did not face such problems because of the efforts they made. Seven employees lost their lives in the earthquake. The company commemorate those employees. After experiencing this disaster, they started to work on business continuity and set up an emergency response team (**Fig. 3**). They also they have an idea to get a car equipped with tools that could be used for disaster response.



Fig. 3 Fire and Emergency Management of the Nazar Textile.

4. The Necessity of BCM in OIZ

As described above, most OIZs started operating almost a month after the earthquake. Some OIZs had problems with electricity, water and gas supplies immediately after the earthquake, but they recovered quickly because they have their own lifeline and experts to repair. The OIZs showed a high potential for business continuity physically.

In terms of disaster response, all OIZs made efforts to provide support to disaster affected companies and employees. They coordinated to provide container housings, schools, hospitals, food and other supplies. This meant that OIZs have a function to coordinate support to disaster affected companies. However, OIZs are still not prepared for disaster management, so there is a need of Business Continuity Management of OIZ that includes the function of OIZ office in disaster, mutual coordination system among OIZs, and area coordination system with local government, other companies based on the experience obtained.

The outflow of labors and skilled human resources were common problems in all disaster affected areas, which made business continuity difficult. Therefore, it is essential to consider measures to secure employees after the earthquake. The industrial structure of the region also has an impact on the outflow of human resources. For example, in the case of Iskenderun OIZ, the outflow of human resources was relatively low because the main industry was the steel

industry, where wages were relatively high. In contrast, the textile industry is prone to outflow of human resources due to wages. In order to reduce the outflow of human resources, measures such as informing employees about the prospects for business resumption immediately after the earthquake, securing employment during non-operational periods, and providing psychological and physical support to employees affected by the disaster should be recommended.

Acknowledgments

We appreciate Oğuz Dal, Emel Sadikoğlu, Adem Eren Senturk, and Mehdil Bugra Ince for their collaboration in the surveys. We also appreciate all people who kindly collaborated with interviews. This research is supported by JST “Kahramanmaraş (Southeastern Turkey) Earthquake-related International Rapid Research and Investigation Support Program (J-RAPID) Grant Number JPMJRR2307”.

References

- 1) Toprak, S., Zulfikar, C., Mutlu, A., Tugsal, U.M., Nacaroglu, E., Karabulut, S., Ceylan, M., Ozdemir, K., Parlak S., Dal, O., Karimzadeh S. (2024): The Aftermath of 2023 Kahramanmaraş Earthquakes: Evaluation of Strong Motion Data, Geotechnical, Building and Infrastructure Issues. *Natural Hazards*. <https://doi.org/10.1007/s11069-024-06890-w>
- 2) Government of Türkiye (2023): Türkiye Earthquakes Recovery and Reconstruction Assessment.
- 3) Presidency of the Republic of Türkiye Investment Office, Investment Guide. <https://www.invest.gov.tr/en/investmentguide/pages/investment-zones.aspx>
- 4) The World Bank, Press Release (2021): Turkey’s Organized Industrial Zones to Become More Efficient, Environmentally Sustainable with Help from World Bank, January 25, 2021. <https://www.worldbank.org/en/news/press-release/2021/01/25/turkeys-organized-industrial-zones-to-become-more-efficient-environmentally-sustainable-with-help-from-world-bank>

(Received: August 20, 2024

Accepted: November 6, 2024

Published [online first]: December 27, 2024)

カフラマンマラシュ地震における工業団地 (OIZ) の事業継続について

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要 旨

本研究では、カフラマンマラシュ地震で被災した工業団地 (OIZ) に着目する。トルコ政府は産業振興を図るために地域別の投資インセンティブ制度を設けており、OIZ ではそれら投資インセンティブを享受することができる。カフラマンマラシュ地震で被災した 11 県には 38 カ所の OIZ において約 55 万人が雇用されており、OIZ の復興は地震からの産業復興と地域再生の要となる。そこで、本研究では被害を受けたガジアンテップ県、カフラマンマラシュ県、アドゥヤマン県、ハタイ県の OIZ とそこで操業する企業に対し事業継続に関する調査を行い、事業継続の実態を把握するとともに事業再開において効果的であった防災対策を検討した。

キーワード：工業団地 (OIZ)、事業継続計画 (BCP)、カフラマンマラシュ地震

