

Japan's Technology Investment Strategy And Innovative Approach To Enhancing Resilience And Sustainable Development In Indonesia

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Abstract

Technology and innovation play a crucial role in enhancing a country's resilience and sustainable development. Indonesia as a developing country has great potential to improve resilience and sustainable development through technology development and innovation. By adopting some of the technology investment strategies and innovative approaches that have been successfully implemented by Japan, Indonesia can accelerate progress and achieve sustainable development goals and simultaneously improve resilience in the face of disasters. This research uses descriptive qualitative methods through Focus Group Discussion (FGD) and literature study. As for the selection of resource persons, the technique was carried out by purposive sampling in the activities of the Study Abroad (KKLN) of the Disaster Management Study Program of the Republic of Indonesia Defence University in 2023. By adopting several initiatives that have been successfully implemented by Japan, Indonesia can accelerate progress and achieve sustainable development goals. The implementation of Japan's technology investment strategy in Indonesia can assist in the development and improvement of advanced early warning systems, which can provide quick and accurate information to the public about impending disaster threats.

Keywords: Technology Investment, Innovative Approach, Sustainable Development, Resilience.

INTRODUCTION

Japan is an island nation located in East Asia. It consists of 6,852 islands, with Hokaido, Honshu, Shikoku, and Kyushu as the 4 main islands. Japan has almost 97% of its total land area with 73% being mountainous terrain, some of which are volcanoes. With Japan's geographical and climatological conditions, plus weather and climate, Japan is currently one of the disaster-prone countries. Japan is located along the Pacific Ring of Fire or an imaginary zone where the earth's plates meet, especially in the Pacific region. Japan itself is located at the confluence of four tectonic plates, namely the Pacific Plate, Eurasian Plate, Philippine Sea Plate, and North American Plate, causing Japan to experience frequent earthquakes as a result of collisions or shifts between these plates (Naila Putri, 2022).

Japan and Indonesia share similarities as countries with high potential for disasters such as earthquakes, typhoons, tsunamis, landslides, and volcanic eruptions. The difference lies in the seriousness of the Japanese government in establishing various strategies as a form of response to existing disaster threats, including by establishing a special ministry of disaster mitigation. In addition, Japan, which is known as one of the centres of technology and innovation in the world, has succeeded in developing a number of advanced technologies including robotics, artificial intelligence, electric vehicles, and so on. Innovation and technology have not only been the main drivers of Japan's economic growth over the past few decades but also a source of Japan's resilience in the face of disasters (Taqia, 2021).

Indonesia as a developing country has great potential to improve resilience and sustainable development through technology development and innovation. By adopting some of the technology investment strategies and innovative approaches that have been successfully implemented by Japan, Indonesia can accelerate progress and achieve sustainable development goals and simultaneously improve resilience in the face of disasters.

RESEARCH METHODS

This research uses descriptive qualitative methods through Focus Group Discussion (FGD) and literature study. As for the selection of resource persons, the technique was carried out by purposive sampling in the activities of the Study Abroad (KKLN) of the Disaster Management Study Program of the Republic of Indonesia Defence University in 2023. The resource person chosen was Dr Mizan Busthanul Bisri Ph.D as Assistant Professor for the Graduate School of International Cooperation Studies at Kobe University. The purpose of this research is to analyse how the strategies carried out by the Japanese Government in Technology Investment and to evaluate the success of the strategies implemented by Japan to be implemented in Indonesia.

RESULT AND DISCUSSION

Historical Records of Disasters in Japan

In some instances, earthquakes that occur in Japan often trigger other disasters such as landslides, tsunamis, and so on. For example, in 2011, on 11 March, an earthquake with a magnitude of 9.1 triggered a tsunami wave that hit Japan (Mela Arnani, 2021). Based on recorded data, at least this event resulted in approximately 20,000 people dying and some were recorded as missing by the tsunami. Not only that, this major earthquake also triggered another disaster caused by a leaking nuclear reactor in Fukushima which became the second worst nuclear disaster in history which resulted in as many as 100,000 people being evacuated, and until now, some of the affected areas are still uninhabited by residents for fear of possible remnants of nuclear leaks (Widiandari, 2021).

Previously in 1923, the Great Kanto Earthquake shook Japan and caused severe damage to the Tokyo and Yokohama areas and killed more than 100,000 people. After that in 1995 Japan was again rocked by the great Hanshin-Awaji earthquake or better known as the Kobe Earthquake. In the official document of the Fire System Service in Japan, after the Kobe earthquake, a Fire Service organisation was formed, as a serious response from the Japanese government regarding efforts to reduce disaster risk and form a disaster-responsive society.

Disaster Mitigation in Japan Through Technological Innovation

Considering the disaster aspect in Japan where earthquakes are a frequent phenomenon and often become a disaster and trigger other disasters such as tsunamis, landslides, and nuclear leaks. . The Japanese government has made various efforts and strategies as a form of response that shows that disaster problems in Japan are serious. One of the Japanese government's strategies is to optimise innovation, especially in the field of technology. There are several implementations of innovation and technology applied in Japan as a form of mitigation (Widiandari, 2021), including:

1) Earthquake Resistant Buildings

The frequency of Japan being hit by earthquakes has made the Japanese government think seriously and make innovations and rules that can be used for its people in dealing with natural

disasters, especially earthquakes. Therefore, since 1971, the Japanese government has made earthquake-resistant buildings mandatory, which was seriousised in 1981 after the Miyagi Prefecture earthquake. Based on the law, building standards in Japan are required to withstand earthquakes above 6 magnitude.

2) Mobile phone warning system

Japan, as a developed country in terms of technological development, makes great use of technology for the common good in terms of earthquake warnings and rapid response. Every Japanese resident's mobile phone is installed with a rapid earthquake warning system with an estimate of five to ten minutes before the earthquake. With these warnings, Japanese residents can of course immediately take shelter without panic because Japanese residents are equipped with disaster mitigation.

Innovation and Technology to Increase Resilience and Sustainable Development in Japan

The Japanese government has taken a number of initiatives to strengthen disaster resilience and awareness but also to promote sustainable development. Among them are investing significant funds in the development of technological infrastructure, the development of renewable energy (solar, wind, and geothermal) as an energy efficiency effort to reduce dependence on fossil energy sources, in the transportation sector itself there are innovations such as the Shinkansen fast train as a form of Japanese technological sophistication that creates environmentally friendly and efficient transportation in reducing congestion and greenhouse gas emissions, then there is a commitment from the Japanese government to increase the accessibility of technology and encourage digitalisation in every sector that reaches all regions, especially in rural areas, this aims to realise equitable public services.

Japan's success in terms of technology investment is influenced by several main factors including (Budianto, 2017):

- 1) Close partnerships between government, industry and research institutions in Japan have been one of the keys to success in implementing technology investment strategies. Partnerships based on strong trust between parties produce collaborations that are conducive to innovation and the development of new technologies.
- 2) Japan's disaster awareness is relevant because knowledge of disasters and how to deal with them is an important factor. Individuals who have adequate knowledge about disasters are better able to identify risks, take precautions, and respond appropriately when disasters occur.
- 3) A high-quality education and research system is an important foundation in creating a skilled and innovative workforce. Japan has invested substantial resources in education and research, creating a favourable environment for innovation growth.
- 4) Japan has a strong culture of innovation, where new ideas and technological development are widely valued and supported. Japanese people have an open attitude towards change and have the spirit to constantly seek new solutions to challenges.

Potential and Opportunities for Implementation of Japan's Technology Investment Strategy and Innovative Approach in Indonesia

Technology investment strategy as an approach taken by a country or organization to allocate funds and resources in the development, research, and application of technology in various sectors. The main objective of this strategy is to increase productivity, efficiency, and innovation in order to achieve sustainable economic growth. By studying strategies that are successfully implemented in Japan, the implementation of Japanese technology investment strategies and innovative approaches in Indonesia has significant potential and opportunities. Some of these potentials and opportunities include:

- 1) Transfer of knowledge and experience where Japan has rich experience in dealing with various types of natural disasters such as earthquakes, tsunamis, and storms. The potential for cooperation with Japan is the transfer of their knowledge and experience to Indonesia. Through the exchange of information, technology and best practices, Indonesia can gain a better understanding of disaster management and implement it effectively at home.
- 2) Advanced early warning system, Japan has developed a highly effective early warning system in dealing with earthquakes and tsunamis. The implementation of Japan's technology investment strategy in Indonesia can assist in the development and improvement of advanced early warning systems, which can provide quick and accurate information to the public about impending disaster threats. This will allow more time for residents to take appropriate evacuation measures, thereby saving many lives.
- 3) Development of disaster-related infrastructure and technology, with advanced technology and disaster-resilient infrastructure in place. A potential implementation of Japan's technology investment strategy and innovative approach in Indonesia is the development of disaster-resistant infrastructure. For example, such as earthquake-resistant buildings, sturdy bridges, effective drainage systems, and water supply systems that can withstand disasters. This robust infrastructure will minimise the physical damage and negative impacts caused by disasters.
- 4) Capacity building and training of experts, with structured and effective training programmes in disaster management. The potential for cooperation with Japan is capacity building and training of Indonesian experts in the field of disaster management. Through intensive training, Indonesia can produce more experts who are trained and prepared to face disasters with relevant knowledge and skills.
- 5) Innovative approaches in disaster management, as a potential implementation of Japan's technology investment strategy and innovative approaches in Indonesia is the adoption of new methods and practices that can improve the efficiency and effectiveness of disaster management. For example, the use of drones and satellite technology for disaster monitoring and evaluation, the development of mobile applications for early warning, and the utilisation of artificial intelligence (AI) for data analysis and faster decision-making.
- 6) Collaboration between the public and private sectors by having close cooperation between the public and private sectors in dealing with disasters. This potential collaboration can be applied in Indonesia by involving the active participation of the private sector in technology investment and innovative approaches to disaster management. This collaboration can create synergies between knowledge and resources from both sectors, which will ultimately strengthen Indonesia's capacity to deal with disasters.

Although the chances of success in implementing Indonesia's technology investment strategy are quite large, we must also take into account the challenges and obstacles that can be inhibiting factors in adopting Japan's Technology Investment Strategy and innovative approach. Some of these challenges and obstacles include:

- 1) Limited financial resources are one of the main challenges The implementation of technology investment strategies and innovative approaches requires significant funds for the development of disaster-resistant infrastructure, procurement of equipment and technology, and training of experts. Indonesia needs to find adequate funding sources to overcome this challenge.
- 2) Indonesia's geographical complexity (Atmojo & Muhandhis, 2019), as it has high geographical diversity, including large archipelagic areas and mountainous regions. This adds complexity to disaster management and the implementation of technology investment

strategies. Infrastructure development and technology delivery to remote and isolated areas pose significant logistical challenges.

- 3) Inter-Agency Coordination and Complex regulations and high bureaucracy in Indonesia (Muktaf & Santoso, 2018), pose a challenge in implementing technology investment strategies and innovative approaches, requiring good coordination between government agencies, research institutions, the private sector and civil society. This challenge involves policy synchronisation, information sharing and effective inter-agency collaboration, and efforts are needed to simplify regulations and speed up bureaucratic processes so that technology investment to achieve the desired goals can be done more efficiently and quickly.
- 4) Public awareness and education on the benefits of technology investment strategies and innovative approaches to disaster management. Education on preventive measures, knowledge of early warning systems and understanding of new technologies need to be improved so that people can take appropriate steps when facing disasters.
- 5) Infrastructure sustainability and maintenance Implementing a technology investment strategy requires the care and maintenance of the infrastructure that has been built. This challenge involves long-term financing, effective maintenance planning, and capacity building in managing and keeping the infrastructure functioning properly over a long period of time.
- 6) Limited human resources with skills and knowledge in technology are also an obstacle (Rahma, 2018). This is also related to the lack of awareness of technological literacy in Indonesia, which is certainly a challenge in this implementation. For this reason, the community needs to be given a better understanding of technology and its benefits in everyday life through socialisation and training programmes on technology that can increase awareness and technological literacy in Indonesia, as well as strengthen collaboration between educational institutions, industry and government in developing a skilled workforce in the field of technology.

Recommendations for Implementing Japan's Technology Investment Strategy and Innovative Approach in Indonesia

To successfully adopt Japan's technology investment strategy and innovative approach in Indonesia, there are several recommendations that can be considered, namely:

- 1) Enhancing bilateral cooperation between Indonesia and Japan in the field of technology and innovation is an important step (Japan et al., 2018). This cooperation includes the exchange of knowledge and experience, collaboration in research and technology development, and expert exchange programmes. By strengthening this cooperation, Indonesia can utilise Japan's experience in dealing with disasters and apply innovative approaches that have proven effective.
- 2) Close collaboration between government, industry and educational institutions is essential in developing a skilled workforce and supporting technological innovation (Japan et al., 2018). The government needs to facilitate this collaboration through integrated education, training and research programmes. Especially encourage foreign direct investment in the technology sector by providing attractive incentives and facilities for investors. This will encourage technology transfer and the development of the technology industry in Indonesia.
- 3) Improving technology awareness and literacy in society is an important factor in adopting technology investment strategies (JICA, 2018). The government and educational institutions need to conduct socialisation and training programmes to improve people's understanding of technology and its benefits.

- 4) **Building Disaster Resistant Infrastructure** (Miswar Tumpu, 2023): In implementing technology investment strategies and innovative approaches, the Indonesian government needs to focus on developing disaster-resistant infrastructure. This includes the construction of strong and safe buildings, effective drainage systems, earthquake-resistant transport networks, and telecommunications infrastructure that can function during disasters. The government needs to ensure careful planning, appropriate site selection, and the use of appropriate technology.

Establish Supportive Policies and Regulations (BNPB, 2023), The Government of Indonesia needs to establish policies and regulations that support the implementation of technology investment strategies and innovative approaches. This involves developing policies that facilitate technology investment, protection of intellectual property rights, and incentive mechanisms for industry players. The development of standards and technical guidelines is also important to ensure the quality and interoperability of the technologies used.

CONCLUSION

Japan's technology investment strategy and innovative approach have great potential to enhance resilience and sustainable development in Indonesia. By adopting several initiatives that have been successfully implemented by Japan, Indonesia can accelerate progress and achieve sustainable development goals. The implementation of Japan's technology investment strategy in Indonesia can assist in the development and improvement of advanced early warning systems, which can provide quick and accurate information to the public about impending disaster threats.

For example, the use of drones and satellite technology for disaster monitoring and evaluation, the development of mobile applications for early warning, and the utilisation of artificial intelligence (AI) for data analysis and faster decision-making. This potential collaboration can be applied in Indonesia by involving the active participation of the private sector in technology investment and innovative approaches to disaster management. This collaboration can create synergies between knowledge and resources from both sectors, which will ultimately strengthen Indonesia's capacity to deal with disasters. This challenge involves policy synchronisation, information sharing and effective inter-agency collaboration, and efforts are needed to simplify regulations and speed up bureaucratic processes so that technology investment to achieve the desired goals can be done more efficiently and quickly.

Education on preventive measures, knowledge of early warning systems and understanding of new technologies need to be improved so that people can take appropriate steps when facing disasters. This challenge involves long-term financing, effective maintenance planning, and capacity building in managing and keeping the infrastructure functioning properly over a long period of time. By strengthening this cooperation, Indonesia can utilise Japan's experience in dealing with disasters and apply innovative approaches that have proven effective.

The government and educational institutions need to conduct socialisation and training programmes to improve people's understanding of technology and its benefits. This includes the construction of strong and safe buildings, effective drainage systems, earthquake-resistant transport networks, and telecommunications infrastructure that can function during disasters. This involves developing policies that facilitate technology investment, protection of intellectual property rights, and incentive mechanisms for industry players.

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