

# Enhancing Crisis and Emergency Management in the Era of Climate

## Change: Exploring New Research Area in Crisisonomy

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### **Abstract**

This study aims to propose new research area in crisisonomy to build safer communities by analyzing the nuanced relationship between ‘safety’ and ‘crisis’. As extreme events such as heavy rains, heatwaves, snowstorms, severe cold spells, large wildfires, and crises become more frequent, the necessity for improved crisis management is clear. The study emphasizes that managing crises does not inherently create safe communities, as crisis & emergency management and safety strategies are related yet distinct. The research identifies three primary approaches. The vulnerability reduction approach involves risk assessments, infrastructure improvements, disaster preparedness education, and community involvement to protect lives and property. The resilience enhancement approach focuses on mental recovery, social connections, and effective crisis response policies to enable communities to withstand and recover from crises. The maintenance approach ensures the proper functioning of essential systems through preventive, corrective, and predictive measures, thereby reducing disaster likelihood and minimizing damage.

**Key words:** vulnerability, maintenance, resilience, crisisonomy, safety, crisis

### **I. Introduction**

Today, we live in an era of climate crisis. Extreme weather events like heavy rain, heatwaves, heavy snowfall, severe cold wave, and large-scale wildfires are happening more often and with greater intensity. As a result, many people are losing their lives, getting injured, losing their homes and belongings, and seeing bridges and buildings destroyed. This has led to growing demands for new strategies to improve crisis management systems. Moreover, to effectively deal with unexpected disasters and crises, we need to develop new research area in crisisonomy.

In the United States, a number of proposals have been presented to improve the government's response to natural disasters. These proposals explore a wide range of ideas. They come from various sources, including the media, disaster research experts, legislative committees, government agencies, and the emergency management community itself. In theory, the current disaster response system could be completely replaced with a new framework for handling disasters (Schneider, 2011: 226).

Due to the impact of the climate crisis, the frequency and severity of disasters are increasing, resulting in increased casualties and property damage. Natural disasters related to heavy rain, floods, heat waves, cold waves, abnormal temperatures, droughts, and forest fires are increasing due to the climate crisis. In particular, many climate-related natural disasters occur in Asia and Africa, and many people live in vulnerable areas such as rivers and the sea, which are prone to damage from climate crises (IPCC, 2021). In addition, the paralysis and collapse of the nation's critical infrastructure due to the increase in climate volatility and extreme weather events will pose a threat to ensuring national survival and maintaining the people's daily lives. For example, in February 2021, a winter storm led to a blackout in Texas, USA. Disasters in the era of climate crisis lead to rapid rises in sea levels, extreme droughts, water shortages, and declines in food production. Due to the increase in climate volatility, extreme disasters such as extreme heavy rain, extreme drought, extreme heavy snow, extreme cold waves, and extreme heat waves are occurring. And extreme droughts and extreme heat waves are causing massive forest fires, very long-term droughts, and the spread of infectious diseases (UN Climate Change, 2021).

Modern cities face significant vulnerabilities in their power, communications, and transportation infrastructure. Additionally, the built environment is increasingly at risk from structural fires, hazardous materials accidents, and other technological disasters. Climate change exacerbates these risks by contributing to rising sea levels, more frequent and powerful coastal storms, the spread of tropical diseases, and a higher incidence of flooding, wildfires, droughts, and heatwaves (Waugh, 2007: 5).

As extreme disasters like heavy rains, heatwaves, snowstorms, severe cold spells, large wildfires, and crises such as terrorism, fires, collapses, explosions, crashes, and sinkings occur more frequently, the need to improve crisis management to create safe communities is becoming more evident. This need is based on the understanding that effectively managing crises helps ensure safety. However, while crisis & emergency management plays a significant role in building safe communities, it is not the only aspect of safety. By analyzing the relationship between 'crisis' and 'safety,' we may discover new approaches to help create safer communities.

Nowadays, crises are increasingly large and complex. Since 2010, numerous lives and properties have been affected. In Korea alone, over 70,000 individuals are displaced annually due to floods and typhoons. Recently, there has been a rise in various human-made and social disasters, including hazardous chemical spills, large-scale wildfires, and terrorism. These recent crises are characterized by uncertainty and often do not fit neatly into traditional categories of natural, social, or human-made disasters; instead, they tend to be a complex combination of these types. For instance, the Great East Japan Earthquake on March 11, 2011, triggered a massive tsunami immediately following the earthquake, resulting in significant loss of life and the collapse of infrastructure. This disaster was compounded by the Fukushima nuclear accident, which led to power shortages, decreased consumption, and heightened public anxiety, evolving into a massive, complex disaster. As crises become more diverse and intricate due to climate change and technological advancements, there is an urgent need for a new crisis management paradigm to address these evolving challenges in climate and social structures (Yang, 2023: 441-442).

In this context, this paper aims to propose new research area in crisisonomy to build safer community. To achieve this goal, this study will first analyze the conceptual relationship between 'safety' and 'crisis.' Second, while current crisis & emergency management research has focused on reducing vulnerability and enhancing resilience, this study will identify new area that need further exploration.

## **II. Risk and Crisis**

The development of science and technology provides modern people with abundance and convenience in life, but as a by-product, it also brings new forms of technological risk that carry serious risks. As industrialization progresses, the proportion of natural disasters is rapidly increasing. In other words, risk can be said to be a typical characteristic of a society that grows along with the development of science and technology (National Academies of Sciences, Engineering, and Medicine, 1993).

However, risk itself cannot be clearly analyzed scientifically and implies diversity. Generally speaking, risk implies the possibility of a certain outcome and involves uncertainty. In particular, technological disasters in modern industrial society are mostly unfamiliar risks (Beck, 1992). A new type of risk that has not been experienced before is unfamiliar, so we do not know the cause of the disaster and cannot predict how it will progress. Because the size of these uncertain risks cannot be confirmed, technological risks cannot help but be an object of fear (Perrow, 1984). In the past, discussions about risk were treated as issues of probability related to objectivity or uncertainty. Recently, the subjective and evaluative nature of the concept of risk has been recognized. This proves that the concept of risk should also be discussed at the epistemological level (Slovic, 2000). In other words, previous studies on risk explain the cause of risk as a lack of scientific knowledge. However, the average person understands risk by comprehensively reflecting not only objective data but also various risk characteristics such as uncertainty, controllability, and catastrophic potential (Renn, 2008).

Risk is inherently subjective. Risk has characteristics that cannot exist separately from people's minds and culture. In other words, risk exists in the lives of humans who seek to understand and overcome threats and uncertainties in their lives. From this perspective, we should consider the concept of risk at various levels but treat it as a value judgment issue, and it is desirable to approach it as a matter of perception rather than existence (Douglas & Wildavsky, 1982).

In one word, we can say that what is safe is dangerous. If you believe that you have objectively secured safety by establishing a safety management system to prevent risks, you may end up in a more dangerous situation. There are many examples, from the sinking of the Titanic, which had the best safety facilities and systems, to nuclear power plant reactor accidents, which had multiple safety devices. Excessive or blind trust in safety is the greatest risk to safety. Even if you believe it is safe or have a well-established crisis management system, that is just another way of saying that it could be more dangerous (Perrow, 1999).

A crisis can be defined as an event or incident that threatens universal values such as human dignity, life, and rights, making normal life impossible. From this perspective, crisis and emergency management refers to the process of striving to respect and uphold human dignity. The field of crisisology is based on the academic premise that "humans should be respected simply because they are born" (Lee, 2018: 21).

In modern society, the advent of cutting-edge science and technology in the era of the Fourth Industrial Revolution has increased various inherent vulnerabilities, leading to greater inherent risks. As advanced technologies in fields like IT and BT develop rapidly, the risk of instability in social systems also increases. Critical infrastructure, such as financial systems, transportation systems, power systems, IT systems, energy systems, and nuclear power systems, relies heavily on advanced technology, making them susceptible to both internal and external risks. At the same time, the era of climate crisis makes social systems within human communities more vulnerable internally and increases external threats. Human communities are already vulnerable to risks, and with the frequent occurrence of climate crises and extreme disasters, they suffer even greater damage from external threats (WMO, 2021).

Disasters or crises represent undesirable negative events, not the positive outcomes people hope for. Positivity and perfection exist only in an ideal society, like those created by machines or computers. Human society can never be perfect. Without disasters, crises, incidents, accidents, or dangers, society would no longer be human; it would be a mechanical or performance-driven society focused solely on calculations.

Negative events like crises and disasters are part of human life and affect every area, including home, economy, business, production, consumption, and leisure. Without such negative aspects, life would become an endless, meaningless extension of time. Only safety, convenience, and comfort would exist, which would merely be a passage of time for humanity. Thanks to crises, humanity enjoys the privilege of experiencing true "life," which includes thinking, worrying, and contemplating.

If humans are considered beings of negativity, then a world entirely positive might pose unavoidable dangers. According to Hegel, negativity is what sustains human existence in a dynamic state (Han, 2010: 52). Therefore, crises are the source of creativity needed to manage them, prevent injustice and corruption, and create communities equipped with crisis management systems that are more comfortable and can coexist with other communities. Thus, crises are both the source of positivity that negates negativity and a source of creation. A crisis is the starting point for creating a positive and safe society. To create a positive and safe society, it is essential in the field of crisisology to explore the relationship between safety and crisis.

### **III. Relationship between Safety and Crisis**

Crisis & emergency management is the first step to building a safe community. This means that safety begins with knowing crisis and emergency management. Crisis and emergency management is the most basic task for building a safe community, and it must be about building a foundation. Managing crises well is the foundation for building a safe

community. The government creates a crisis & emergency management organization and increases the number of disaster management personnel to build a safe community. And the government tries to find vulnerabilities that are prone to disaster damage.

At this point, we need to think once more about the relationship between 'crisis' and 'safety'. 'Managing a crisis' does not mean a 'safe community'. Strategies for managing a crisis and strategies for creating a safe community are not the same. It is true that the relationship between crisis and safety is closely related. However, these two are independent of each other.

Despite having a separate safety-building strategy, we have neglected the strategy of pursuing safety due to cognitive errors. Instead, we have only pursued crisis & emergency management and disaster management strategies. Due to errors in perception and assumptions, we were unable to think of new strategy or new perspective.

The assumption that the opposite of 'safety' is 'crisis' and the opposite of 'crisis' is 'safety' is wrong. The opposite of 'crisis' is not safety, but means 'no crisis.' The opposite of 'safety' is not crisis, but 'no safety.' This is like the relationship that the opposite of 'I have money' is not 'I have debt' but 'I have no money'. Let's consider that the opposite of 'I have debt' is not 'I have money' but 'I have no debt'.

As you know well, Frederick Irving Herzberg (18 April, 1923 – 19 January, 2000) was an American psychologist who became famous for the Motivator-Hygiene theory. According to the Herzberg's two-factor theory, humans are motivated by two things: motivators and hygiene factors. These two factors are both critical to motivation: motivators encourage job satisfaction and hygiene factors prevent job dissatisfaction.

Motivators are related to workplace satisfaction. They cover intrinsic needs such as achievement, recognition, and advancement. Motivators allow employees to be content in their jobs and promote growth. In the other side, hygiene factors are not related to workplace satisfaction but must be present in the workplace in order to prevent dissatisfaction. Hygiene factors cover extrinsic needs such as pay grade, workplace policy and relationships with their peers. Hygiene factors do not contribute to workplace satisfaction but must be present in order to prevent workplace dissatisfaction. Hygiene factors are closely related to extrinsic needs (Herzberg, 1968).

Herzberg's theory posits that job satisfaction and dissatisfaction arise from different sets of factors. Motivators, which lead to job satisfaction, include intrinsic elements like achievement, recognition, and the nature of the work itself. These elements promote personal growth and job contentment. In contrast, hygiene factors are extrinsic and necessary to prevent dissatisfaction but do not inherently create satisfaction. These include salary, company policies, supervision, and working conditions.

Medically speaking, "hygiene" this means maintaining good personal hygiene in order to prevent disease. Having good hygiene does not mean that you will never die; it means that you can hold off discomfort or disease in your lifetime. In an organization, maintaining good "hygiene" means that your employees remain productive; it does not mean that you will grow. Hygiene factors allow corporations to maintain their employees. This leads us to the second part of the two-factor theory: motivation. Just because employees are satisfied does not mean that they are motivated to brainstorm new ideas or take on a new project.

The opposite of dissatisfaction is not satisfaction, but rather the absence of dissatisfaction. Eliminating the cause of employee dissatisfaction does not mean that the employee is satisfied and motivated, but only means that the dissatisfaction disappears. Therefore, in order to increase employee productivity, organizations need to provide motivators rather than eliminate dissatisfaction factors. This is because the relationship between satisfaction and dissatisfaction is independent. Therefore, eliminating crisis vulnerability factors will not be effective in building a safe community. In contrast, it is necessary to provide a resilience factor to build a safe community.

Expanding the concept from Herzberg's Two-Factor Theory to the field of crisisology suggests that merely eliminating vulnerabilities is not sufficient to build a safe community. Therefore, to effectively build a safe community, it is necessary to introduce elements that actively contribute to the community's resilience, enabling it to withstand and

overcome various crises.

#### **IV. A New Research Area in Crisisonomy**

There is a nuanced relationship between 'safety' and 'crisis & emergency management'. For instance, when 'crisis' and 'safety' are not placed on a continuum but are distinguished as separate concepts, it becomes clear that 'managing a crisis' is not the same as 'ensuring safety'. Effective crisis & emergency management addresses the immediate and unpredictable nature of crises and requires strategies beyond simple safety measures. By moving away from the traditional view that if one side of the coin is safety, the other side is crisis, we can approach the fields of crisisonomy and disastry with a new perspective. Traditionally, we have viewed 'safety' and 'crisis' as concepts on an unbroken continuum, closely related to each other. However, by observing the relationship between 'safety' and 'absence of safety', and 'crisis' and 'absence of crisis', we discover a new domain, an empty space. This means there is a space between the concepts of 'absence of safety' and 'absence of crisis'.

If a situation characterized by neither safety nor crisis is effectively managed, safety can be ensured. Conversely, improper management of such a situation may precipitate a crisis. This underscores the importance of the concept of maintenance, which entails preserving something in its original state or condition. Maintenance generally encompasses regular care, upkeep, and repairs to prevent deterioration or failure.

Maintenance can be defined as the systematic process of ensuring that essential functions, roles, machines, equipment, facilities, and systems necessary for the operation of society function correctly. This includes regular inspections of societal components, repairing parts prone to issues, and proactive efforts to predict and prevent future failures. Maintenance also involves keeping systems up-to-date and operational. For facilities, this includes activities such as cleaning, repairs, and general upkeep. In essence, maintenance is the process of preserving the original state as much as possible while ensuring continuous and efficient operation.

Based on the above discussion, the research approaches in the field of crisisonomy can be categorized into three types: the vulnerability reduction approach within the 'crisis domain', the resilience enhancement approach within the 'safety domain', and the maintenance approach within the domain where neither safety nor crisis is present. The 'vulnerability reduction approach', the 'resilience enhancement approach', and the 'maintenance approach' can be described as follows.

First, we have worked hard to find and address weaknesses in people, buildings, and systems that are vulnerable to disasters or crises. These efforts are part of 'vulnerability reduction' within crisis and emergency management. Crisis and emergency management includes actions to prevent or lessen the impact of disasters, prepare for emergencies, respond effectively, and recover afterward. This process also involves respecting and protecting human dignity during crises and minimizing harm when disasters occur. The main goal of the vulnerability reduction approach is to identify potential risks and manage them beforehand to lessen the damage if those risks become real. To achieve this, it is crucial to carry out risk assessments, improve infrastructure, provide disaster preparedness education and training, train professionals, strengthen building codes, create emergency plans, encourage community involvement, and establish cooperative networks. Therefore, the 'vulnerability reduction approach' aims to protect lives, property, health, facilities, and systems by reducing vulnerabilities to 'crisis situations or threat factors.'

Second, resilience means the ongoing effort to stay strong and positive when facing crises or disasters and to tackle various challenges within a community or system. It's about the ability of a community or system to withstand stress and crises and bounce back to its original state quickly. To support resilience, it's crucial to offer counseling and psychological services to help people recover mentally and minimize trauma after a crisis. It's also important to strengthen social connections among family, friends, and neighbors and to establish effective policies for crisis response and recovery. To enhance resilience, individuals should focus on maintaining good health, strong family relationships, and financial stability. Communities can increase resilience by promoting economic growth, building

social networks, and encouraging cultural inclusion. On an environmental level, it's essential to focus on infrastructure recovery, maintaining effective government functions, and restoring natural environments (Lee, 2023: 4-7).

Third, 'maintenance' refers to the process of ensuring that the essential systems, facilities, and infrastructure needed to operate and maintain a society function properly. Maintenance can take several forms: preventive, corrective, and predictive. The goal is to keep the community's functions, facilities, and systems running smoothly through preparation and prevention before a crisis, and effective response and recovery afterward. Maintenance involves regular inspections and servicing to ensure that equipment and systems are functioning correctly and to prevent unexpected breakdowns. By identifying and addressing potential problems in advance, the likelihood of disasters or crises is reduced. Maintenance also includes activities like using sensors and data analysis to monitor the condition of equipment and systems in real-time, allowing for issues to be predicted and addressed before they occur. Regular maintenance activities help to remove potential risks before they cause disasters, minimizing damage if a crisis does happen. For example, identifying and repairing structural defects in buildings can reduce the risk of collapse during an earthquake. Effective maintenance increases the reliability of systems and equipment, ensuring they operate stably even in disaster situations, thus enhancing the community's ability to respond to emergencies. When maintenance is done well, systems can respond quickly and effectively during crises.

## **V. Conclusion**

As extreme events like heavy rains, heatwaves, snowstorms, severe cold spells, large wildfires, and crises such as terrorism, fires, collapses, explosions, crashes, and sinkings occur more frequently, it has become increasingly clear that we need to improve crisis & emergency management to build safer communities. This necessity stems from the recognition that effectively managing crises is essential for ensuring safety. However, while crisis and emergency management is crucial for building safe communities, it is not the only factor. By examining the relationship between 'crisis' and 'safety,' we can potentially uncover new methods to enhance community safety.

The purpose of this study propose new research area in crisisonomy to build safer community. To achieve this goal, this study first analyzed the conceptual relationship between 'safety' and 'crisis.' Second, while current crisis & emergency management research has focused on reducing vulnerability and enhancing resilience, this study identified new research area 'maintenance' in Crisisonomy.

The government has established a crisis and emergency management organization and increased disaster management personnel to build safer communities by identifying vulnerabilities. However, it's crucial to reconsider the relationship between 'crisis' and 'safety'. Managing a crisis does not inherently mean creating a safe community; the strategies for each are related but distinct. We have often neglected comprehensive safety strategies due to cognitive errors, focusing instead on crisis & emergency management alone. This oversight stems from the incorrect assumption that 'crisis' is the opposite of 'safety'. In reality, the opposite of 'crisis' is 'no crisis,' and the opposite of 'safety' is 'no safety,' similar to the relationship between having money and not having debt.

Herzberg's Motivator-Hygiene theory posits that humans are motivated by two main factors: motivators and hygiene factors. Motivators, such as achievement, recognition, and advancement, lead to job satisfaction and promote personal growth. On the other hand, hygiene factors, including pay grade, workplace policies, and relationships with peers, prevent job dissatisfaction but do not create satisfaction. This distinction is crucial as it highlights that eliminating dissatisfaction does not equate to creating satisfaction. Thus, providing motivators is essential to increase employee productivity. Applying Herzberg's theory to crisis & emergency management, merely eliminating vulnerabilities (akin to hygiene factors) is insufficient to build a safe community. Effective crisis & emergency management must also introduce resilience factors (akin to motivators) that actively enhance the community's ability to withstand and recover from crises. This approach ensures that the community not only prevents crises but also remains robust and adaptive in the face of potential threats.

Building a safe community requires more than just managing crises. It necessitates a balanced approach that addresses both the prevention of vulnerabilities and the enhancement of resilience, thereby fostering a secure and adaptable environment.

The relationship between 'safety' and 'crisis & emergency management' is complex and not linear. When 'crisis' and 'safety' are seen as distinct concepts, it becomes evident that 'managing a crisis' is not the same as 'ensuring safety'. Effective crisis & emergency management addresses immediate and unpredictable crises, requiring strategies beyond simple safety measures. Traditionally, 'safety' and 'crisis' were viewed as closely related on a continuum, but observing 'safety' versus 'absence of safety', and 'crisis' versus 'absence of crisis', reveals an intermediate space where maintenance becomes critical.

Properly managing situations that lack both safety and crisis can ensure safety, while mismanagement can lead to crises. Maintenance, which involves preserving systems in their original state, is crucial. It includes regular care, upkeep, and repairs to prevent deterioration or failure, ensuring essential functions, roles, machines, equipment, facilities, and systems operate correctly. This involves inspections, repairs, and proactive measures to prevent future failures.

This study explored three approaches within the field of crisonomy to enhance community safety and resilience in the face of disasters and crises. First, the vulnerability reduction approach focuses on identifying and addressing weaknesses in people, buildings, and systems susceptible to disasters. Key strategies include risk assessments, infrastructure improvements, disaster preparedness education, professional training, building code reinforcement, emergency planning, community involvement, and the establishment of cooperative networks. The primary goal is to mitigate potential risks and minimize damage.

Second, the resilience enhancement approach emphasizes the ability of communities to endure stress and crises while quickly returning to their original state. This involves providing counseling and psychological services, strengthening social connections, and establishing effective crisis response and recovery policies. Individual resilience is supported through good health, strong family relationships, and financial stability, while community resilience is bolstered by economic growth, social networks, and cultural inclusion. Environmental resilience focuses on infrastructure recovery, effective government functions, and natural environment restoration.

Third, the maintenance approach ensures the proper functioning of essential systems, facilities, and infrastructure through preventive, corrective, and predictive measures. Regular inspections, servicing, and real-time monitoring using sensors and data analysis are crucial. This proactive maintenance reduces the likelihood of disasters, minimizes damage, and enhances the reliability of systems and equipment, ensuring stable operation even during crises. By integrating these approaches, the study aims to develop a comprehensive framework for building safer and more resilient communities.

## References

- Han, Byung-Chul. 2012. *Müdigkeits Gesellschaft*. Seoul: Moonji Publishing Co.,Ltd.
- Herzberg, F. 1968. One More Time: How Do You Motivate Employees? *Harvard Business Review*. 46(1): 53-62.
- IPCC. 2021. *Climate Change 2021: The Physical Science Basis*. Working Group: Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.
- Lee, Jae Eun. 2018. *Crisisonomy*. 2nd ed. Seoul: Daeyoungmunhwa-sa.
- Lee, Jae Eun. 2023. Disaster Resilience Model for Establishing the Sustainable Society in the Era of Climate Crisis. *Journal of Safety and Crisis Management*. 13(6): 1-10.
- National Academies of Sciences, Engineering, and Medicine. 1993. *Science, Technology, and the Federal Government: National Goals for a New Era*. Washington, D.C.: National Academies Press.
- Perrow, C. 1984. *Normal Accidents: Living with High-Risk Technologies*. New York: Basic Books.

- Perrow, C. 1999. *Normal Accidents: Living with High-Risk Technologies*. 2nd ed. Princeton: Princeton University Press.
- Renn, O. 2008. *Risk Governance: Coping with Uncertainty in a Complex World*. London: Earthscan Publications.
- Schneider, Sandra K. 2011. *Dealing with Disaster: Public Management in Crisis Situations*. 2nd ed. New York: M. E. Sharpe.
- Slovic, P. 2000. *The Perception of Risk*. London: Earthscan Publications.
- UNFCCC. 2021. Climate Change Leads to More Extreme Weather, but Early Warnings Save Lives. UN Climate Change News. 1 September, 2021.
- Waugh, William L., Jr. 2007. *Local Emergency Management in the Post-9/11 World*. William L. Waugh Jr. and Kathleen Tierney. eds. *Emergency Management: Principles and Practice for Local Government*. 2nd ed. Washington, D.C.: ICMA Press.
- WMO. 2021. Climate and Weather Related Disasters Surge Five-fold over 50 Years, But Early Warnings Save Lives. UN News. 1 September 2021.
- Yang, Gi Geun. 2023. *Disastronomy*. Seoul: Yoonseongsa.