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Development of Resilient Public Institutions: A Risk-Oriented Approach to Governance in Crisis Conditions

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Abstract

This article addresses the growing need for resilient public institutions capable of responding to complex global challenges, including pandemics, climate change, and infrastructure failures. It contributes to interdisciplinary scholarship by integrating perspectives from public governance, risk management, architecture, and engineering. The study aims to examine how risk-based approaches combined with architectural and engineering frameworks can strengthen the resilience of public institutions. The research adopts a qualitative design based on the analysis of secondary data drawn from academic literature and policy reports. Thematic analysis was used to identify key patterns and resilience-building mechanisms. The findings demonstrate that adaptive governance, effective coordination, knowledge sharing, and technological integration are essential for institutional resilience.

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Institutions characterized by flexible decision-making processes are better able to maintain operations and respond effectively during crises. The study also highlights the importance of cooperation among different levels of government in ensuring service continuity and improving crisis response capacity. Risk-based governance frameworks were found to play a central role in risk identification, assessment, mitigation, and response planning, while proactive risk management proved more effective than traditional reactive approaches. Infrastructure resilience emerged as another critical factor, with robust physical systems supporting faster recovery from disruptions. Engineering tools such as risk modeling and simulation help identify vulnerabilities and improve preparedness. In addition, infrastructure redundancy, including backup systems, enhances institutional reliability, while smart technologies and digital platforms improve real-time monitoring and crisis coordination. Overall, the study proposes an integrated framework linking governance, risk management, and infrastructure resilience to support the development of resilient public institutions.

Keywords: public institutions; crisis management; resilience; risk-based governance; architectonics; engineering.

Introduction

Worldwide, public institutions are confronted with challenging crises that often threaten their administrative ability and the stability of their functioning. The number and severity of disruptions affecting the world have become highly commonplace over the last few decades, with examples being climate-related disasters, emergencies in public health, technological breakdowns, and socio-economic shocks. Extreme weather patterns like floods, heatwaves, and hurricanes have increased with climate change, with a lot of strain on the regular system of infrastructure in the community and emergency responder institutions (IPCC, 2022). Concurrently, the COVID-19 pandemic revealed institutional vulnerabilities in the preparedness systems and crisis coordination between many governments (OECD, 2021).

Besides threats posed by the environment and health-related conditions, the vulnerability of infrastructure has become a major concern. Old infrastructure systems, urbanization, and rising interdependencies among the systems of energy, transport, and communication networks raise the likelihood of systemic failure in the event of crises (Ahern, 2011). All these pressures have exposed weaknesses of traditional forms of governance that are based on crisis control instead of risk-preemptive actions. This has led to the emergence of institutional resilience as an important concept in the modern-day research into the subject of public governance and policy through the abilities of the public organizations to anticipate, absorb, adjust, and respond to the crisis (Comfort *et al.*, 2010).

The design and construction of buildings and infrastructures on the basis of architecture and engineering is instrumental in enhancing the resilience of institutions in their capacity to bolster the physical and tech-driven infrastructure on which executing the governance systems among the populace lives. Government buildings, emergency operation centres, transport systems, and digital communication systems, together with several other infrastructures, are just a few examples of systems that are relied upon by public institutions. These systems are the backbones of the governance and crisis response operations (Bosher & Dainty, 2011).

The field of architectural planning helps in disaster preparedness by designing buildings resiliently, planning spaces so as to be strategic, and incorporating safety measures in public structures. To illustrate, earthquake-proof buildings, flood-proof urban designs, and climate-proof houses may greatly minimize the vulnerability of the institution to calamities (Vale & Campanella, 2005). The field of engineering also helps to achieve resilience through risk management methods, reliability models, and redundancy of infrastructure to ensure vital services to the public are continuous (Hollnagel *et al.*, 2006; Khomyn, 2025).

Of special importance is the interlinkage between physical infrastructure and the capacity of governance. The effectiveness of the institutions in dealing with crises does not always rely on the proper policy framework, but also on the dependability and stability of the built environment that helps in decision-making and delivery of services. Thus, there has been an increase in the need to incorporate architectural and engineering views in institutional management of crisis matters.

Although it is increasingly considered that institutional resilience is a concept with increasing prominence, most of the existing approaches used by public institutions to address life crises are still based on crisis response, despite handling risks proactively. They are usually ineffective in identifying systemic weaknesses found in institutional infrastructures and systems of governance. In addition, the mechanisms of risk assessment are often not carried out in the context of institutional decision-making, as well as infrastructure planning.

The other problem is a lack of interdisciplinary research studies that involve architecture, engineering, and public administration. Whereas engineering research concentrates on the resiliency of infrastructure and the modeling of risks, research in the governance area tends to concentrate on frameworks of policies and capacity in owning the institutions. Lack of coherent analytical frameworks to join these disciplines undermines the formulation of sustainable resilience policies for the institutions of the populace.

Therefore, this study aims to examine how a risk-based approach to crisis management, supported by architectural and engineering frameworks, can enhance the resilience of public institutions.

Literature Review

Concept of Institutional Resilience

The conceptualization of institutional resilience is significant in the study of the subject of public governance and crisis management. It can be defined as the capacity of the institutions to foresee, absorb, adjust, and recover the disruptions without having to lose the main functions and legitimacy of the institution (Comfort *et al.*, 2010). According to scholars, flexibility, capacity to learn, and adaptive governance mechanisms that allow such institutions to react efficiently to complex and uncertain crises characterize resilient institutions (Folke *et al.*, 2005). In more detail, adaptive governance identifies collaborative decision-making, distributed authority, and institutional learning as important characteristics of resilient governance systems. The attributes enable institutions to vary in policies and operational strategies whenever they are faced with new risks and unforeseen disruptions.

Institutional resilience is closely connected to organizational resilience in the case of public institutions. According to Lengnick-Hall *et al.* (2011), resource flexibility, the ability to process information quickly, and the flexibility to improvise strategies in a crisis are some of the resilience capabilities that could be found in resilient organizations. On the same note, Boin *et al.* (2017) underscore that effective crisis governance entails institutional capacity to undertake the task that entails leadership competence, coordination mechanisms, and communication networks. Nevertheless, even with these conceptual improvements, some of the studies criticize the resilience literature as having no definite operationalizations and objective measures. Duit (2016) believes that resilience is commonly regarded as a normative construct with an inadequate characteristic of empirical resources to assess institutional performance in the case of a crisis.

Redundancy, which is also known as the availability of backup systems, alternatives, and a number of decision paths, is another important dimension of institutional resilience. Redundancy allows the institutions to run even when the main systems are going down (Walker & Salt, 2006). Although redundancy enhances system reliability, opponents believe that when it is applied excessively, it will lower efficiency and raise the administrative expenses in government agencies (Tierney, 2014). As a result, there has been a tendency toward a moderate method where the resilience tactics merge the concept of flexibility, learning, and redundancy without compromising institutional effectiveness.

Crisis Management in Public Institutions

Traditionally, crisis management in public institutions is conducted in terms of structured models aiming at adaptation of decisions in the case of an emergency. The crisis lifecycle model is one of the most frequently used models because it

separates crises into multiple stages, such as prevention, preparedness, response, and recovery (Boin *et al.*, 2017). The model is systematic in the way that governments deal with disasters and institutional disruptions. The detractors observe, though, that classic models of crisis management usually assume a linear dynamic of crisis, whereas, in practice, crises develop irregularly and involve several interacting risks (Ansell *et al.*, 2010).

The other most important debate that exists in literature is that of reactive and proactive governance. Reactive crisis management is mainly concerned with the reaction to crises after they have happened, with the issue of crisis reaction systems and revival. Though this system is required in order to contain a crisis on the spot, they tend to overlook the root causes of vulnerabilities (Comfort, 2007). Proactive governance, on the other hand, has a focus on preventative measures, risk forecasting, and institutional readiness. The disaster risk management models created by international institutions in the framework of the United Nations and the World Bank gradually contemplate active government (including risk evaluation and resilience planning) within the framework of municipal policy (UNDRR, 2015).

Another important attribute of crisis governance is public sector emergency planning. Governments also tend to have emergency operation centers, contingency plans, and inter-agency coordination systems to deal with disasters (Enjolras *et al.*, 2024). Such mechanisms enhance the capacity to react to a crisis and communication between institutions. However, research indicates that coordination breakdowns and bureaucratic fragmentation often hurt crisis management efforts. As an illustration, the researchers note that a complicated system of governance can slow down the process of decision-making and lower the efficiency of the emergency response efforts (Boin *et al.*, 2017; Buryk *et al.*, 2025). Due to this, more and more scholars define the necessity to develop complex governance frameworks that could integrate crisis management planning with the overall resilience strategy.

Risk-Based Approaches to Governance

Risk-based governance has taken center stage as an alternative framework for dealing with complex societal risks as well as institutional vulnerabilities. Risk-based governance contrasts with more traditional methods of regulation that aim at compliance and demarcation of rules, in that aspects are systematically identified, judged, and dealt with as part of the policy-making process (Renn, 2008). This practice acknowledges that contemporary societies have intrinsic dangers such as climate change, technological malfunctions, and outbreaks of human health that necessitate proactive and reactive structures of governance.

Risk governance frameworks usually entail a number of processes such as risk identification, risk assessment, risk evaluation, and risk management. Such phases allow those who do the policymaking to place resources at a higher priority and

put up preventive measures that would lessen the threats (Aven & Renn, 2010). The evidence-based decision-making and the scientific risk analysis are two strengths of risk-based governance. Governments can create more knowledgeable and functional strategies in crisis management by combining quantitative risk evaluation with policy planning.

Critics, however, believe that risk-based governance can also pose certain difficulties, such as the issue of uncertainty, limitations of data, and politics. According to Hood and Rothstein (2001), risk-based regulatory systems have the potential to redirect the responsibility to risk management without effectively alleviating underlying vulnerability. Besides, overreliance on technical risk assessment may ignore social and institutional dynamics that determine the consequences of the crisis.

In spite of the above constraints, a significant number of researchers highlight the necessity to incorporate risk-based strategies into resilience planning. More precisely, OECD (2020) emphasizes that risk-informed governance allows governments to foresee cascading crises and build preventive institution-based policies. Risk-based governance, together with resilience planning, offers an overall system of risk management and institutional preparedness.

Architecture and Engineering for Institutional Resilience

The inability of public institutions to withstand is strongly related to the resilience of the built environment within which the system of governance functions. The field of architecture and engineering will greatly help in coming up with infrastructure systems that can withstand disasters and recover. The resilient infrastructure architectural design includes structural safety, redundancy, and flexibility to guarantee survival of vital services in case of crisis (Bosher & Dainty, 2011).

Sustainable architecture has also taken on relevance through disaster-resistant architecture construction, especially in those locations where there is a tendency for earthquakes, floods, and extreme weather conditions. As an example, government buildings and government facilities that are earthquake-resistant can be of great help in reducing the disruption of institutions in case of a seismic wave (Vale & Campanella, 2005). On the same note, urban planning approaches to climate adaptation or resiliency, e.g., flood-resistant infrastructures, green urban areas, boost the ability of cities to bear environmental risks (Ahern, 2011).

Risk modelling engineering also contributes to the resilience of an institution, as it can be used to evaluate the susceptibility of infrastructure to failures and the reliability of the system itself. The methods of engineering reliability, simulation modeling, and risk assessment enable engineers to determine possible points of failure within the infrastructure systems and come up with mitigation plans (Hollnagel *et al.*, 2006). Moreover, the technological advancements of smart infrastructure systems and digital communication networks should also be

mentioned to enhance the monitoring of the crisis and control the emergency response.

Although such developments were experienced, researchers indicate that in most instances, infrastructure resilience is dealt with outside the scope of governance studies. Boshier and Dainty (2011) posit that only with the support of governance frameworks and institutional coordination will resilience be achieved through engineering solutions. In their turn, the studies addressing governance do not always emphasize the relevance of physical infrastructure systems to the process of crisis response. Such a disciplinary disintegration restrains the formulation of holistic resilience approaches where both governance and infrastructure approaches are united.

Research Gap

Despite the fact that there is an extensive literature on institutional resilience, crisis management, and infrastructure resilience, the related fields are often studied independently of each other. Governance research often approaches the question of institutional capacity, higher leadership, and more policy coordination efforts in times of crisis, whereas engineering studies focus on the reliability of infrastructures and the ability to withstand disasters (Comfort *et al.*, 2010; Boshier & Dainty, 2011). This means that the interrelation among the governance systems and the built environment is not fully explored.

Inadequate liaison of risk-based governance structures with infrastructure planning and architectural design is another drawback in the available literature. Studies on risk governance focus on policy decision-making and regulatory processes, but do not give much consideration to engineering-based risk models or spatial planning strategies (Renn, 2008). On the other hand, the resilience research of infrastructure doesn't place sufficient emphasis on the institutional governance frameworks and policy on crisis management by focusing on technical answers.

This distance poses a gap in the conceptual knowledge on how risk-based governance and resilient infrastructure systems could be collaborative to enhance institutional resilience. In the absence of entrenched frameworks, policymakers might not be able to develop concerted plans that deal with both the governance and infrastructure weaknesses when dealing with a crisis.

This gap is filled by the current research in terms of introducing a conceptual model that incorporates risk-based governance with architectural and engineering viewpoints on the resilience of infrastructure. The research will attempt to become a more detailed manifestation of how the public institutions can enhance their capabilities to handle complex crises by combining the experiences of studying the domains of public administration, engineering, and urban planning. This kind of interdisciplinary integration is necessary to come up with effective resilience strategies in the global environment, which is becoming a lot more uncertain and exposure-prone.

Methodology

Research Design

The research design that will be employed in this study is qualitative, as it aims to study the role of risk-based crisis management strategies in enhancing the resilience of the public institution. Qualitative research can be effectively employed in studying the complex systems of governing and institutional processes since it allows interpreting the conceptual frameworks and policy developments in the existing literature (Creswell & Creswell, 2018). The qualitative approach is applied in this study to synthesize the knowledge on institutional resilience based on multidisciplinary literature on the topic of knowledge (public administration, engineering, and urban planning studies).

The study also incorporates a systematic literature review approach to ensure structured identification and analysis of relevant sources. The paper adopts an interpretive analytical approach, which is interested in the conceptualization of resilience, risk governance, and infrastructure preparedness presented by scholars in the framework of the public institutions. Instead of quantitatively measuring variables, interpretive research enables one to identify patterns and relationships and the development of concepts across various studies (Bryman, 2016). By so doing, the study attempts to understand the influence of governance structures, design, and the structure of infrastructure, and risk management mechanisms on institutional resilience.

This research design focuses on the constructive application of institutional resiliency models as a part of architectural and engineering viewpoints. Scientific research has also mentioned that governance resilience may not be studied alone from the infrastructure systems that serve the operations of the institutions (Comfort *et al.*, 2010).

Data Sources

The research will use secondary data composed of academic publications covered by peer-reviewed journal articles and policy reports, as well as international institutional frameworks in crisis management and resilience governance. Analysis of secondary data is a typical approach in qualitative research to generalize the existing knowledge and identify trends through various studies (Johnston, 2014). The main sources under analysis are research articles covering the topics of institutional resilience, engineering risk management, disaster governance, and infrastructure planning.

To cover a wide range of multidisciplinary literature, academic articles were retrieved in high-level databases like Scopus, Web of Science, ScienceDirect, and Google Scholar. These databases offer access to peer-reviewed and high-quality studies regarding the study of in the field of the public governance,

risk management, and infrastructure resilience. Besides academic sources, the policy documents and resilience models of the international organisations are also considered (especially, the United Nations Office of Disaster Risk Reduction (UNDRR) and the Organisation of Economic Co-operation and Development (OECD)). These policy frameworks offer useful information on how the institution addresses disaster risk governance and resilience planning (UNDRR, 2015).

The literature used was chosen in accordance with certain inclusion criteria. To begin with, the publications were restricted to the time frame 2005–2025 to have the latest trends in resilience governance and infrastructure planning. Second, the identified literature was to cover crisis management or crisis risk-related themes, infrastructure resilience, or institutional preparedness. Lastly, only peer-reviewed sources, as well as international reports by recognized institutions, were considered in the interest of reliability and academic rigor.

Data Analysis Method

Analysis of the literature collected involved the use of thematic analysis combined with qualitative synthesis, that is very common in the identification of trends and common ideas within the text. Thematic analysis enables researchers to tabulate qualitative data systematically according to themes and accord meaning to the relationships among the themes (Braun & Clarke, 2006). Thematic analysis was used in this research to summarize information found in different disciplines that study institutional resilience and crisis governance.

It was analyzed in a number of stages. To begin with, the chosen literature was analysed to reveal the important concepts in resilience governance, infrastructure systems, and risk management. Second, the information was coded into thematic categories according to the recurrent topics, which were discussed in the literature. Four main coding groups were created, including the institutional resilience factors, the models of crisis governance, the resilience strategies of infrastructure, and mechanisms of risk assessment. These categories were based on the theoretical frameworks that are common in resilience and disaster governance studies (Renn, 2008; Comfort *et al.*, 2010).

After the coding process, thematic relationships were attempted to determine patterns in various studies. As an example, connections between the coordination of governance, the reliability of infrastructure, and the preparedness in crisis were studied. The process of qualitative synthesis presupposes that the study can pinpoint common drivers of resilient public institutions as well as highlight the points of intersection between research on governance and infrastructure.

Conceptual Framework Development

The paper constructs a conceptual framework through the thematic analysis to integrate three elements in governance resilience, risk-based decision, and

infrastructure preparedness. The model is based on the findings of institutional governance literature and resilience engineering research works to demonstrate the idea that risk assessment tools and infrastructure strategy enable the organization to cope with crisis management. These interdisciplinary approaches have been combined to bring out the interdependency between governance capacity and resilient infrastructure systems, as noted in the framework. The developed conceptual model of this study offers a perspective on the ability of public institutions to enhance their resilience with the help of the combined approach to risk governing and planning of infrastructure.

Results

The findings of this research are based on a thematic synthesis of the review of the literature on peer-reviewed articles on the subject of institutional resilience, risk governance, and infrastructure resilience. Applying the multidisciplinary study of governance studies, engineering resilience, and disaster risk management, it was possible to observe certain common patterns. All these results emphasize the factors of institutional resilience, the functioning of risk-based frameworks of crisis management, and the role of infrastructure and engineering solutions in reinforcing crisis preparedness. A theoretical framework of governance, infrastructure resilience, and risk management mechanisms has also been developed due to the results.

Key Drivers of Institutional Resilience

The literature review revealed a number of large engine forces that enhance the institutional resilience of the systems of government within society. The most notable ones are adaptive governance, institutional coordination, sharing of knowledge, and integrating technology. These drivers support institutions to be responsive to crises and the continuity of delivery of services to the citizens.

The concept of adaptive governance became a key determinant of the stability of the institutions of the state. Studies on institutional resilience in the context of the major crisis reveal that those institutions that can change policies and functional processes are in a better position to survive and preserve a stable condition in the face of disruption. Indicatively, comparative analyses of disaster responses in other nations like Australia, Japan, and the Netherlands have shown that the governance systems with a powerful adaptive capacity can better minimize the effects of disasters and enable a recovery process (Woodall, 2024). The adaptive capacity might enable institutions to change decision-making processes, allocate resources as needed, and incorporate what they have learned in the past in terms of crises.

Another major source of resilience is institutional coordination at the government levels and sectors. Proper communication among the national institutions, the

regional institutions, and the local institutions will help improve the capacity of crisis management and continuity of basic services. The empirical studies in the Lisbon Metropolitan Area that occurred during the COVID-19 pandemic also prove that the use of metropolitan institutions was critical in the process of the emergency measures and ensuring the provision of services to vulnerable groups (Goncalves, 2025). These coordination mechanisms also enable institutions to pool the resources, coordinate policy responses, and prevent duplication of efforts during crises.

Mechanisms of knowledge sharing and learning are also helpful factors in institutional resilience. International agencies also underscore the fact that governments would need to enhance knowledge sharing among sectors to enhance disaster preparedness and disaster resiliency planning (OECD, 2026). Educational institutions can study previous crises, examine their weak points, and include the lessons in the new policy frameworks (Elbrekht *et al.*, 2022; Bobro *et al.*, 2025).

Technological integration also plays the role of strengthening institutional resilience through greater management of information, communication, and real-time monitoring of crises. Data analytics tools and digital governance platforms can help institutions work faster with the information and coordinate emergency responses more efficiently (Table 1).

Table 1. Key Drivers of Institutional Resilience Identified in Literature

Driver	Description	Key Sources
Adaptive governance	Flexible decision-making and policy adaptation during crises	Woodall (2024)
Institutional coordination	Collaboration across government levels and agencies	Gonçalves <i>et al.</i> (2025)
Knowledge sharing	Learning mechanisms and information exchange	OECD (2026)
Technological integration	Use of digital systems and data-driven governance	UNDRR (2015)

These drivers collectively enhance institutional capacity to anticipate risks and maintain operational continuity during complex crises.

Risk-Based Crisis Management Frameworks

The findings also show that risk-based crisis management models are more central in enhancing institutional resilience. These models reverse the tendency to react to the crisis instead of preventing it through risk identification and preventive measures.

The initial step of risk-based frameworks of governance is risk identification. Potential threats that can come into play in institutions are evaluated by institutions through determining the probable occurrence of a disaster and its probable effects. The international disaster governance frameworks underscore the fact that to have an effective resilience planning, the initiation point is perfect awareness of disaster risk (UNDRR, 2015). Governments are coming to depend more on hazard mapping, vulnerability assessment, and predictive modelling so that the risk is identified before the crisis strikes.

Risk assessment will be the next step after the identification and will entail the determination of the likelihood and impact of possible threats. Models of infrastructure risk assessment, including them, examine the riskiness of interdependent infrastructure systems like transportation, water, and energy supplies. Resilience studies in urban infrastructure draw our attention to the fact that the latter are highly interdependent, i.e., a breakdown in a particular sector would lead to a series of failures in other sectors (Enjolras *et al.*, 2024).

The implementation of risk mitigation strategies is meant to minimize vulnerabilities that have been noted during the process of risk assessment. These plans can involve reinforcing the infrastructure systems, emergency contingency plans, and investing in thousands of disaster-resiliency technologies. The policy frameworks advocated by the international organizations suggest that disaster risk reduction strategies should be incorporated into the process of national planning and development of policies to build infrastructure (OECD, 2026).

Lastly, planning of crisis response makes sure that institutions are ready to respond efficiently in case they encounter a crisis. Emergency response plans usually incorporate the strategy of resource allocation, communications strategy, and coordination of agencies between the government agencies. Evidence of crisis governance suggests that well-structured response plans play a big role in limiting institutional disturbance during crises (Table 2).

Table 2. Stages of Risk-Based Crisis Management

Stage	Description	Example Tools
Risk identification	Identification of hazards and vulnerabilities	Hazard mapping, scenario analysis
Risk assessment	Evaluation of risk probability and impact	Infrastructure vulnerability assessments
Risk mitigation	Preventive strategies to reduce risks	Disaster risk reduction policies
Crisis response planning	Preparedness for emergency response	Emergency operation plans

Source: UNDRR (2015), Enjolras *et al.* (2024), OECD (2026)

These frameworks demonstrate that risk-based governance approaches enable institutions to anticipate crises and implement preventive resilience strategies.

Role of Infrastructure, Architecture, and Engineering

The other important discovery of the literature is the significant contribution of institutional resilience by the infrastructure systems, architecture, and engineering. The infrastructural base of crisis response is constituted by the physical infrastructure serving public institutions such as government buildings, the transport system, energy supply, and communication systems.

The design of resilient infrastructure has the effect of ensuring that the most critical facilities are still available during times of disaster. According to engineering research, the principles that should be used in developing robust civil infrastructure systems to ensure that such systems remain functional during disruptions include redundancy and modularity, as well as adaptability (Naderpajouh *et al.*, 2020). As an illustration, structural layouts that are resistant to earthquakes help incredibly to limit the destruction that government buildings and emergency hospitals face in times of a seismic wave.

The risk model engineering is becoming a better tool to understand vulnerability in infrastructure and forecast the failure of the system. High-order modeling simulations enable policymakers and engineers to simulate a disaster situation and analyse the infrastructure resilience under various conditions (Enjolras *et al.*, 2024). Interconnected infrastructure models. Simulation models of interconnected infrastructure systems have been used to show how failures or disruptions in networks such as water supply, electricity supply, or transportation networks can cause failures across urban infrastructure networks. These tools help the decision-makers to discover the most serious points of vulnerability and priorities of resilience investments.

The other resilience strategy that is critical is infrastructure redundancy. Redundancy systems are the reserves that ensure the critical services are not disrupted during the failure of the primary infrastructure. These can be the backup power system in a hospital, alternative transportation, and backup communication networks (Naderpajouh *et al.*, 2020). The technologies of a smart city also help to ensure institutional resilience, as they will provide the opportunity to track the infrastructure systems and the environmental situation in real-time. Digital sensors, data analytics platforms, and combined systems of communication networks provide law enforcement with the opportunity to more accurately detect possible threats and coordinate emergency (rescue) actions.

Table 3. Infrastructure and Engineering Contributions to Institutional Resilience

Infrastructure Strategy	Description	Example Application
Resilient building design	Disaster-resistant construction methods	Earthquake-resistant government buildings
Engineering risk models	Infrastructure vulnerability simulations	Infrastructure failure modeling
Infrastructure redundancy	Backup systems for critical services	Emergency power supply systems
Smart city systems	Digital monitoring and communication networks	Real-time disaster monitoring

Source: Naderpajouh et al. (2020), Enjolras et al. (2024)

These findings demonstrate that resilient infrastructure systems are essential for maintaining institutional functionality during crises (Table 3).

Proposed Conceptual Model for Resilient Public Institutions

This research suggests a synergetic idea concerning resilient public institutions, based on the findings of the literature survey. The model brings together four integrated elements, which include risk assessment systems, structural institutional governance, infrastructure resiliencies, and crisis responses.

Risk assessment systems are the basis of the analysis of potential threats and assessments. Such systems allow institutions to foresee risks and already develop strategies for preventing them. The organizational governance systems or models coordinate the decision-making process and promote proper cooperation between governmental agencies and other stakeholders.

The measures of infrastructure resilience are combined in the form of resilient building design, engineering risk modeling, and infrastructure redundancy strategies that ensure continuity in operations in case of disasters. Lastly, the supporting mechanisms in the event of crises will make sure that the institutions are equipped to mobilize resources and deploy emergency plans successfully in case of a crisis.



Figure 1. Integrated Institutional Resilience Model

The offered Integrated Institutional Resilience Model (Figure 1) illustrates that to make public institutions resilient, they are to be integrated into the governance frameworks, risk management strategies, and infrastructural resilience systems. This interdisciplinary integration enhances institutional capacity to deal with complex crises, and it is a guarantee that vital public services will be sustainably maintained.

Discussion

Interpretation of Findings

The research results presented in this paper can be added to the expanding collection of literature on institutional resilience because of the interdependent nature of its governance systems, risk management processes, and infrastructure design to respond to a crisis. The traditional concept of resilience theory is used to refer to the ability of systems to take a hit and get back to normal operations without losing the key processes that benefit the system (Walker & Salt, 2006). This theoretical view can be furthered by the findings of this study, which revealed that institutional resilience is not only a governance challenge but also parallel to the infrastructure reliability and technological capacity. Institutional resilience is multidimensional in nature, which is reflected in the integration of the engineering resilience framework with the governance frameworks.

The paper also broadens the research on the topic of crisis governance as it demonstrates the role of adaptive governance patterns and institutional relationships. According to previous studies, the key to effective crisis governance lies in flexible decision-making arrangements and the network of collaboration between institutions of the population (Boin *et al.*, 2017). These findings are also justified by the results of this study, which additionally state that institutional coordination needs to be facilitated by well-developed infrastructure systems and the latest technological platforms.

Moreover, the results add to the domain of institutional risk management because they prove how risk-based governance models enhance crisis preparedness. Risk governance models focus on identifying and evaluating possible threats and reducing them before they completely occur (Renn, 2008). This paper validates the fact that organizations that implement risk-based methods can more easily predict interference and prepare containment tactics. The paper has proposed a holistic approach to institutional capacity building in complex crisis environments that involves risk governance and infrastructure resilience alongside technological systems.

Comparison with Previous Studies

Findings of this study are aligned with various research conducted on disaster governance and infrastructure resilience in the past. Indicatively, studies into crisis management reveal that disaster governance is an effective element that entails well-coordinated decision-making structures, as well as effective communication modalities among institutions (Comfort *et al.*, 2010). This argument is backed by the current results that might see institutional coordination and adaptive governance as the two important forces behind resilience.

On the same note, the area of infrastructure resilience studies also underlines the role of resilient infrastructure systems in ensuring the stability of societies even in the case of a disaster. Boshier and Dainty (2011) contend that resilient infrastructure planning helps in making institutions vulnerable by ensuring continuity of the important services in times of crisis. This view is supported by the findings of this research, which also indicate that engineering risk models and infrastructure redundancy are very important in institutional preparedness.

Nevertheless, an important difference is also pointed out in the study compared to some previous studies. Although the previous research seems to analyze the resilience of governance and the infrastructure resilience since they are two different aspects, the outcomes of the research conducted reinforce the idea that integrated approaches are necessary to integrate both outlooks. Institutional adaptation research indicates that setting governance reforms is ineffective in ensuring the resilience process without the attendant enhancement of infrastructure systems (Tierney, 2014). This argument forms the basis of this research, which offers an

integrated institutional resilience model that connects governance mechanisms, risk management strategies, and infrastructure planning.

Implications for Public Institutions

The results of this research could have various practical implications for the general institutions in charge of crisis management and governance. First, the findings underscore the need to consider resilience in the infrastructure planning procedures. The governments must focus on resilient building construction, multiple infrastructure networks, and the implementation of intelligent technologies to allow the sustainability of the most vital services in the event of a crisis. These infrastructure investments will also be necessary in enhancing the institutional capacity to deal with disruptions (Ahern, 2011).

Second, the analysis can prove the importance of the involvement of engineering risk models in institutional decision-making. Risk modeling tools may facilitate the policy makers in exposing the weaknesses that might exist in infrastructure systems and also the effectiveness of alternative resilience measures. Including engineering risk examination in governance systems, the institutions will be able to design more factual approaches to disaster preparedness policies and measures to tackle the crisis (Renn, 2008).

Third, the results suggest that there is a need to reform the institutions to promote interdisciplinary work between policymakers, engineers, architects, and urban planners. Tight collaboration of various fields and professions is a prerequisite for successful resilience. Such policymakers should then put governance systems in place that enable an inter-relationship between technical skills and the public government. These systems of integrated governance can lead to more resilience of the institutions and greater capabilities to respond to the crisis in urban settings of a complicated nature.

Conclusions

This study has explored the implementation of risk-based governance, infrastructure resilience, and engineering practices as important measures to enhance the resilience of public institutions. The results reveal that the notion of institutional resilience is multifaceted and involves a need to combine the governance models, the infrastructure facilities, and technological competencies. The environment in which the public institutions are working is becoming more complex and unpredictable, and proactive approaches can help these organizations to prevent risks and address them efficiently in case of a crisis.

Finding the major drivers of institutional resilience, adaptive governance, institutional coordination, knowledge sharing, and technological integration were the main contributions of this research. These drivers would empower institutions

to react to a crisis effectively without compromising the services provided. This research also pointed out the significance of risk-based crisis governance frameworks that include risk identification, risk assessment, and preventive planning as the essential ingredients of institutional resilience.

Another important finding is the role of architecture and engineering in crisis preparedness. Resilient infrastructure, disaster-resistant architectural designs, and sophisticated engineering risk models provide the physical framework that supports the work of institutions during a crisis. Governance structures alone will not do the job of managing a crisis situation if reliable infrastructure is not in place.

References

- Ahern, J. (2011). From fail-safe to safe-to-fail: Sustainability and resilience in the new urban world. *Landscape and Urban Planning*, 100(4), 341–343. <https://doi.org/10.1016/j.landurbplan.2011.02.021>
- Ansell, C., Boin, A., & Keller, A. (2010). Managing transboundary crises: Identifying the building blocks of an effective response system. *Journal of Contingencies and Crisis Management*, 18(4), 195–207. <https://doi.org/10.1111/j.1468-5973.2010.00620.x>
- Aven, T., & Renn, O. (2010). *Risk management and governance: Concepts, guidelines and applications*. Springer. <https://doi.org/10.1007/978-3-642-13926-0>
- Bobro, N., Ivanova, D., Pyvovarov, K., Shatskaya, Z., & Kucheriavyi, V. (2025). Investment approach of higher education institutions to the development of educational platforms. *Salud, Ciencia y Tecnología – Serie de Conferencias*, 4, Article 1392. <https://doi.org/10.56294/sctconf20251392>
- Boin, A., 't Hart, P., Stern, E., & Sundelius, B. (2017). *The politics of crisis management: Public leadership under pressure*. Cambridge University Press. <https://doi.org/10.1017/9781316339756>
- Bosher, L., & Dainty, A. (2011). Disaster risk reduction and 'built-in' resilience: towards overarching principles for construction practice. *Disasters*, 35(1), 1–18. <https://doi.org/10.1111/j.1467-7717.2010.01189.x>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Bryman, A. (2016). *Social research methods* (5th ed.). Oxford University Press.
- Buryk, Z., Buryk, M., & Ogorodniichuk, M. (2025). The interaction between local self-government bodies and the population as a factor of effective governance. *Public Management and Policy*, 10(14). <https://doi.org/10.70651/3041-2498/2025.10.12>
- Comfort, L. K. (2007). Crisis management in hindsight: cognition, communication, coordination, and control. *Public Administration Review*, 67(s1), 189–197. <https://doi.org/10.1111/j.1540-6210.2007.00827.x>
- Comfort, L., Boin, A., & Demchak, C. (2010). *Designing resilience: Preparing for extreme events*. University of Pittsburgh Press. <https://doi.org/10.2307/j.ctt5hj0c>
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative and mixed methods approaches* (5th ed.). Sage Publications.
- Duit, A. (2016). RESILIENCE THINKING: LESSONS FOR PUBLIC ADMINISTRATION. *Public Administration*, 94(2), 364–380. <https://doi.org/10.1111/padm.12182>

- Elbrekht, O., Bakhov, I., Sytnik, T., & Radziievska, I. (2022). Theory and practice of interaction of subjects of the system of supplying textbooks to educational institutions in the USA. *Relações Internacionais no Mundo Atual*, 3(36). <https://doi.org/10.21902/Revrima.v3i36.5729>
- Enjolras, B., Hansen, V. W., & Winsvold, M. S. (2024). Collaborative governance and effectiveness during emergency response actions in Norway. *International Journal of Disaster Risk Reduction*, 111, 104651. <https://doi.org/10.1016/j.ijdr.2024.104651>
- Folke, C., Hahn, T., Olsson, P., & Norberg, J. (2005). Adaptive governance of social-ecological systems. *Annual Review of Environment and Resources*, 30(1), 441–473. <https://doi.org/10.1146/annurev.energy.30.050504.144511>
- Gonçalves, J., Spolaor, S., & Lebedeva, L. (2025). Institutional resilience and crisis governance in the EU: insights from the Lisbon Metropolitan Experience. *Frontiers in Political Science*, 7. <https://doi.org/10.3389/fpos.2025.1700468>
- Hollnagel, E., Woods, D., & Leveson, N. (2006). *Resilience engineering: Concepts and precepts*. Ashgate Publishing.
- Hood, C., & Rothstein, H. (2001). *The government of risk: Understanding risk regulation regimes*. Oxford University Press. <https://doi.org/10.1093/0199243638.001.0001>
- IPCC. (2022). *Climate change 2022: Impacts, adaptation and vulnerability*. Intergovernmental Panel on Climate Change. <https://www.ipcc.ch/report/ar6/wg2/>
- Johnston, M. P. (2014). Secondary data analysis: A method of which the time has come. *Qualitative and Quantitative Methods in Libraries*, 3, 619–626. <https://www.qqml-journal.net/index.php/qqml/article/view/169>
- Khomyn, O. (2025). Digitalization of local government: current challenges and prospects. *Philosophy and Governance*, 5(9). <https://doi.org/10.70651/3041-248X/2025.5.15>
- Lengnick-Hall, C. A., Beck, T. E., & Lengnick-Hall, M. L. (2011). Developing a capacity for organizational resilience through strategic human resource management. *Human Resource Management Review*, 21(3), 243–255. <https://doi.org/10.1016/j.hrmr.2010.07.001>
- Naderpajouh, N., Choi, J., Yu, D. J., & Kwak, Y. H. (2020). Management of Resilience in Civil Infrastructure Systems: an interdisciplinary approach. *Journal of Management in Engineering*, 37(1). [https://doi.org/10.1061/\(asce\)me.1943-5479.0000871](https://doi.org/10.1061/(asce)me.1943-5479.0000871)
- OECD. (2020). *Strategic Foresight Toolkit for Resilient Public Policy*. OECD Publishing. https://www.oecd.org/en/publications/foresight-toolkit-for-resilient-public-policy_bcdd9304-en.html
- OECD. (2021). *Building resilience to global shocks: Pandemic preparedness and response*. OECD Publishing. https://www.oecd.org/content/dam/oecd/en/publications/reports/2021/11/building-resilience_6b655137/354aa2aa-en.pdf
- OECD. (2026). *Building resilient public institutions for crisis preparedness*. OECD Publishing. https://www.oecd.org/en/publications/building-resilience-through-disaster-risk-management-in-intermediary-cities_b2f1efb1-en.html
- Renn, O. (2008). *Risk Governance: Coping with Uncertainty in a Complex World* (1st ed.). Routledge. <https://doi.org/10.4324/9781849772440>
- Tierney, K. (2014). *The social roots of risk: Producing disasters, promoting resilience*. Stanford University Press.

- UNDRR. (2015). *Sendai framework for disaster risk reduction 2015–2030*. United Nations Office for Disaster Risk Reduction. <https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030>
- Vale, L. J., & Campanella, T. J. (2005). *The resilient city: How modern cities recover from disaster*. Oxford University Press. <https://doi.org/10.1093/oso/9780195175844.001.0001>
- Walker, B., & Salt, D. (2006). *Resilience thinking: Sustaining ecosystems and people in a changing world*. Island Press.
- Woodall, B., Amekudzi-Kennedy, A., Inchauste, M. O., Sundararajan, S., Medina, A., Smith, S., & Popp, K. (2024). Institutional resilience and disaster governance: How countries respond to Black Swan events. *Progress in Disaster Science*, 22, 100329. <https://doi.org/10.1016/j.pdisas.2024.100329>