Preparing governments for future shocks

Resilience in action

Crisis leadership through innovation, collaboration, and human-centered solutions

In collaboration with

National Academy of Public Administration

IBM Center for The Business of Government

IBM

How IBM can help

IBM is committed to serving governments and citizens around the globe—across segments including social services, government health, tax management, critical infrastructure, education, and national security. We work with stewards in federal as well as state and local agencies, building on decades of experience and trust. On a foundation of security and automation, our AI and hybrid cloud solutions help governments improve the citizen experience, optimize operations, and modernize infrastructure.

Visit us at https://www.ibm.com/thought-leadership/institute-business-value/en-us/industry/government

To learn more about the IBM Future Shocks initiative for governments visit https://www.ibm.com/thought-leadership/institute-business-value/en-us/specialinterests/futureshocks

Foreword

In an era of unprecedented disruptions, the ability to anticipate future uncertainties and navigate through crises is crucial for leaders in all sectors. Global pandemics, climate change, geopolitical tensions, and other disruptions are testing resilience like never before. A key lesson learned from these challenges is that collaborative, forward-looking planning is essential to safeguard constituents and provide operational continuity.

This report presents four case studies from around the world that demonstrate how innovative strategies and strong partnerships can enhance preparedness. These experiences offer critical insights for government leaders and other stakeholders as they prepare for an increasingly volatile future. They show how public and private entities join forces to address complex challenges, from emergency health coordination to leveraging digital tools for crisis management. And they go beyond technology to explore human factors, including social, organizational, and political dynamics, that should be included in any holistic approach for resilience.

As we face the ongoing threats of global shocks, we must continue to evolve our strategies and strengthen our collective resilience. As part of the Future Shocks initiative, we will continue to curate and share examples where governments and global partners have successfully built resilience to shock events. We would like to thank the authors behind these stories, and we hope the practices they share will inspire and guide leaders across all sectors in building a safer, more resilient future.

Cristina Caballe Fuguet
Vice President
Global Public Sector IBM
cristina.caballe@es.ibm.com
linkedin.com/in/cristina-caballe-77516938

Daniel Chenok
Executive Director
IBM Center for The Business of Government
chenokd@us.ibm.com
linkedin.com/in/chenokdan

Terry Gerton
President and CEO
National Academy of Public Administration
tgerton@napawash.org
linkedin.com/in/terry-gerton-b43aa73a/

Dave Zaharchuk
Research Director
IBM Institute for Business Value
david.zaharchuk@us.ibm.com
linkedin.com/in/David-zaharchuk-59564519/

Introduction

In 2022, the IBM Institute for Business Value (IBM IBV), the IBM Center for The Business of Government (the IBM Center), and the National Academy of Public Administration (the Academy) launched an initiative to help governments identify and develop core capabilities critical to building resilience. Since then, our “Future Shocks” initiative has included expert roundtable discussions, government executive survey research, and a series of reports on emergency preparedness, cybersecurity, supply chains, organizational resilience, and other domains.

In this report, we present four case studies from Europe and the US that show how collaboration, innovation, and technology can enhance governmental capacity to prepare for and respond to crises.

A recurring Future Shocks theme is the importance of coordination between public and private sector stakeholders before and after a shock-level event happens. Cross-organizational planning is critical to effective response in the aftermath of pandemics, wars, economic crises, and other disruptive events.

Before a disaster occurs, organizations need to engage in risk assessments, scenario planning, and capacity-building exercises to prepare for or mitigate the impact of major disruptions. For example, regular security audits and response drills help strengthen overall preparedness and resilience.

After a disaster strikes, coordination helps facilitate swift and effective mitigation, including disaster recovery and continuity of operations. This coordination helps essential services rebound quickly and limits long-term damage to critical infrastructure.

By integrating before and after approaches, stakeholders can build and manage more resilient systems that can better withstand and recover faster from future crises.

In this report, we present four case studies that illustrate leading practices in emergency preparedness and response actions. These examples reflect how strong collaboration and partnerships, coupled with innovative planning methods and advanced technologies, can enhance governmental capacity to prepare for and respond to crises and disruptive events. These cases also illuminate critical success factors that enable government leaders to learn from the teams that implemented these solutions and integrate that knowledge into future planning and preparation efforts.

Case study

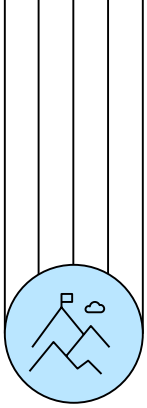
Breaking the cycle in Norway

How the Agder Health Community rewrote the crisis preparedness playbook after a global pandemic

Colin Eden
Professor
University of Stratchclyde Business School

Sigurd Paulsen
Crisis Manager
Kristiansand Municipality

Jose Julio Gonzalez
Professor
Center for Integrated Emergency Management, University of Agder

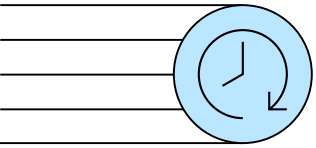


The challenge

Improving response and strengthening resources

When the COVID-19 pandemic struck in 2020, the crisis provided an opportunity to test a new method that could improve response and strengthen resources against future grand challenges.

Two challenges emerged: bringing together senior-level executives remotely from different locations to make decisions and managing evolving threats posed by variant strains of the coronavirus. In response to these challenges, the Community quickly launched a pilot program that could develop new capabilities, scale them, and improve preparedness for future pandemics and other crises. To foster better cooperation between municipalities and hospitals, the Agder Health Community (Helsefelleskapet Agder) in southern Norway was established.



The response

Strategyfinder software platform

The starting point was bringing together experts from the eight healthcare organizations most impacted by the pandemic, including hospital crisis managers, medical directors, and local government representatives. To understand systemic risks and develop impactful and practical strategies, the group adopted a special purpose group support software platform and risk management method based on strategy mapping.[1]

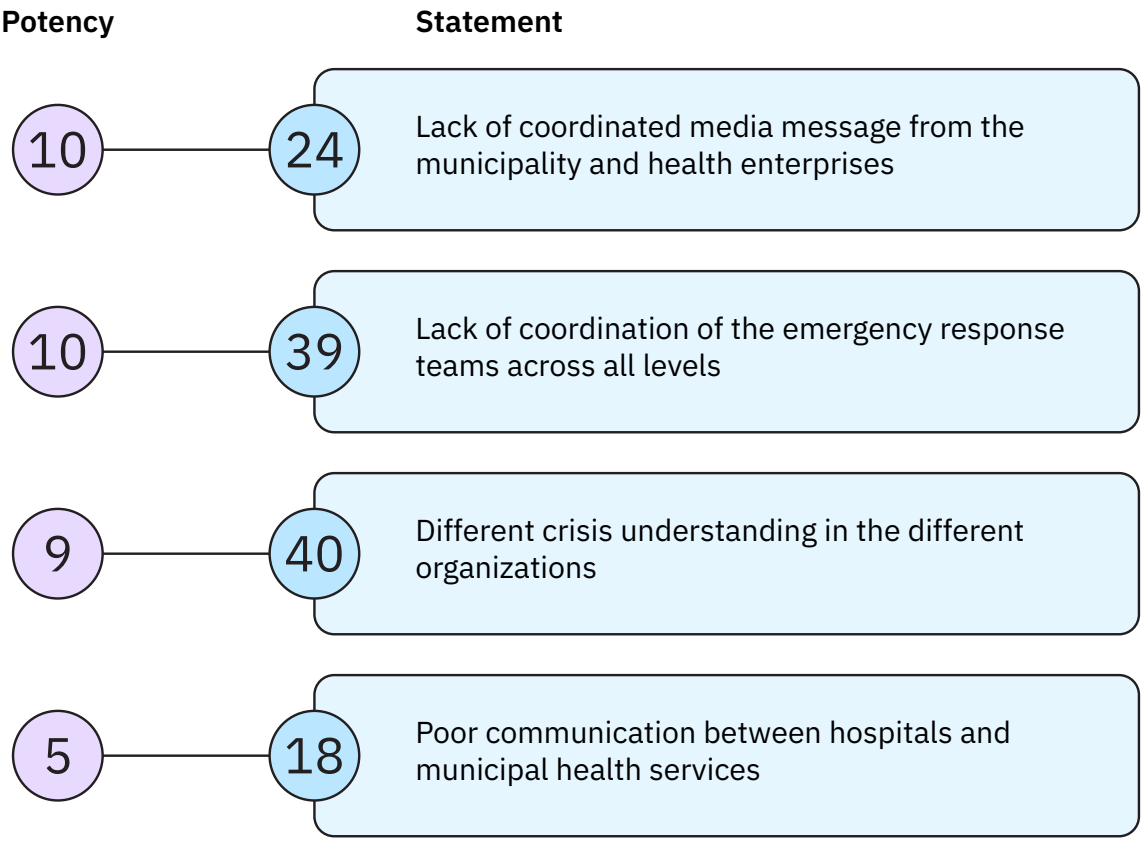
The software platform, called Strategyfinder, facilitates the ability, through analytical tools, to quickly identify the most potent risks and vicious cycles that escalate the risks.[2] The first stage starts by asking participants to contribute their views of the most significant risks. To prevent participants from being influenced by the views of others and reduce the dangers of “groupthink,” individual risks are submitted independently.

Risks are rarely independent of each other. The second stage adds causal links between the identified risks and creates a risk system. The group validated the co-created risk model by adding risks not initially identified. This process of validation was designed also to create greater ownership of the risk model. Strategyfinder enables users to view individual risks, see interconnected loops that create the risk system, and identify individual nodes that have a high impact on other risks (see Figure 1). The model analyzed the risk system in order to achieve two emergent goals: develop adequate health service preparedness and match public expectations to health service offerings.

FIGURE 1

Strategyfinder finds the most potent risks.

Top 4 potency nodes:

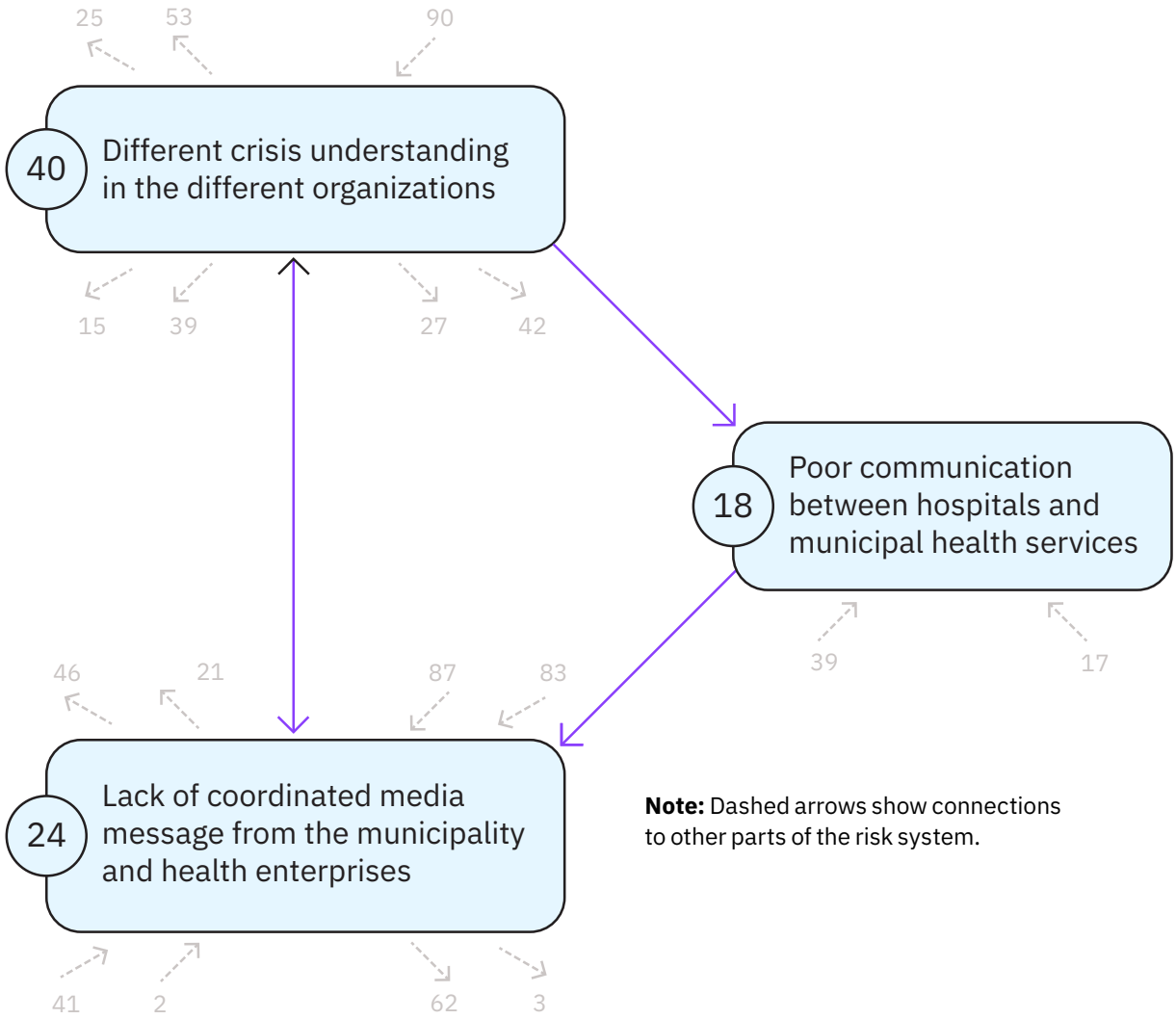


Note: Risk potency score shows the number of vicious cycles—loops—where the risk appears. In this example, Risk No. 24 appears in 10 loops.

Using analytical tools in Strategyfinder led to the identification of 18 vicious cycles, where the risks reinforce each other. Vicious cycles also interact with each other, making mitigation more difficult (see Figure 2).

FIGURE 2

Examples of two vicious cycles identified in Agder Health Community pandemic response.



Note: Dashed arrows show connections to other parts of the risk system.

Fundamentally, the analysis tool identified and distilled the risks with the greatest potential to mitigate the impact of the most vicious cycles. The map structure created did not determine the strength of the causal links, so these analyses could not be taken as conclusive, but they did point to the risks requiring the most attention. Nevertheless, given the need for high productivity, finding ways to help the group focus on the highest-ranking risks was crucial.

The final stage was exploring ways to mitigate the most significant risks, circumvent loops, and deliver on both goals. The group started by addressing mitigation of the potent vicious cycles through agreed strategies, actions, and optional actions that are not priorities (see Figure 3).

This successful exercise raised awareness for greater collaboration between organizations and experts when making crisis response decisions. Strategy mapping allowed input from virtually all stakeholders, promoted group discussions, enabled risk scenario visualization, and elicited strategies that otherwise would have been overlooked.

A three-hour pilot exercise showed how Strategyfinder could help people collaborate while working from different locations. It identified key challenges including:

— Common situational awareness

— Communication and influence with political actors

— Communication with the public

— Adapting health service organizations

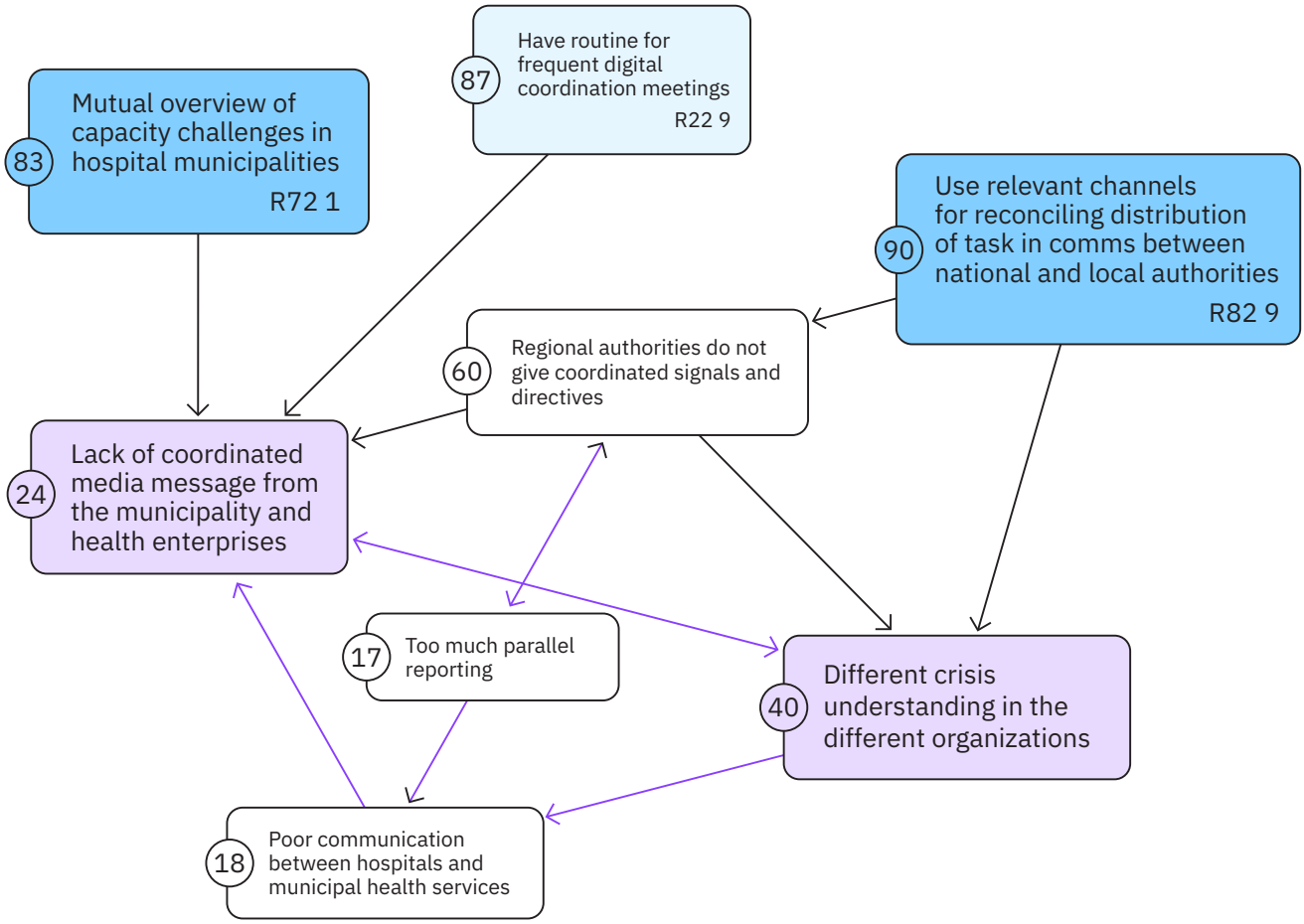
— Infection control and contact tracing

— Patient transport and interaction of patient flow

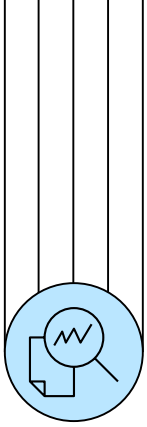
— Personnel shortages and supply challenges

FIGURE 3

Extract from the focus on agreeing actions to mitigate potent vicious cycles.



Note: The group focused on evaluating a wide range of suggested options. In the extract (Figure 3) there are only three options shown (in light or dark blue). In the figure, evaluation results are shown at the end of each option, where R82 indicates the average rating (on a 0–100 relative scale) and the second number (9) indicates the degree of consensus (a smaller number shows higher consensus). Final agreed actions are in darker blue, and agreed strategies, that encompass many actions, in purple. Purple arrows indicate that the causality is part of a vicious cycle.

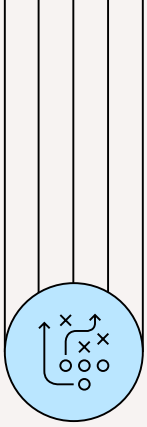


Lessons learned and critical success factors

With Strategyfinder, the members of the Agder Health Community now have an effective method for managing multi-organizational responses to crises. Based on this experience, these response capabilities now exist at scale and are improving preparedness for future crisis events.

The Agder Health Community experience provides several important lessons for other localities seeking to replicate this collaborative approach. These include:

- **Encourage participant engagement across multiple organizations.** Finding times when everyone can meet is difficult, especially when organizations are distanced from each other. Effective collaboration requires fast, but not perfect, outcomes. High meeting productivity made it easier to gain commitment to future collaboration.
- **Build risk models with inclusivity.** The exercise demonstrated the impact of co-creating a systemic risk model as the basis for creating a Community of Practice (CoP) where many organizations can share and access knowledge.
- **Tap the power of remote collaboration.** After the COVID-19 experience, participants became familiar and comfortable with Zoom, Teams, and Skype online working platforms. Jointly building a risk model/strategy map online was therefore easier than expected.
- **Focus on systemicity.** The work changed the way senior managers think about risk. This approach and group support software is now an embedded part of many multi-organizational team solution finding tasks.
- **Have committed leadership.** Successful implementation requires a committed leader to move things forward. In this case the work was promoted by Sigurd Paulsen, the Crisis Manager of the Kristiansand municipality.



What’s next

The Agder Health Community continues to evolve, with the formalization of its structure and expanded membership to include representatives from smaller communities. The emergency preparedness planning process, using the strategy mapping software and methods, is increasingly being adopted for use in other major crises beyond pandemics. Work is underway to use strategy mapping to better understand the systemicity of risks associated with a range of possible emergency scenarios, including large power outages, natural disasters, and future pandemics.

The Agder Health Community experience has led to a new European Union funding project proposal for using the same methods to enhance subnational public authority capacities for efficiently planning and implementing climate change adaptation (CCA) and disaster risk reduction (DRR) strategies. The application includes Estonia, Finland, Lithuania, Latvia, Norway, Poland, and Sweden. Norway is represented by the Kristiansand municipality, the Norwegian Association of Local and Regional Authorities, and the Center for Integrated Emergency Management at the University of Agder.

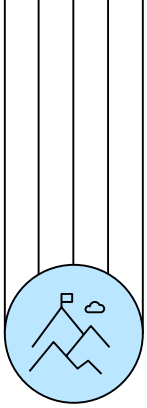
Strategy mapping has the potential to help governments better understand risk relationships associated with emergencies such as power outages, natural disasters, and future pandemics.

Case study

Simulating resilience

How Synthetic Nashville is redefining energy security in the face of climate threats

Myrna Bittner
CEO and Founder
RUNWITHIT Synthetics



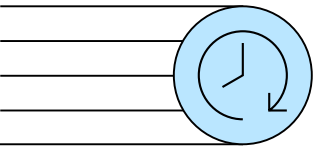
The challenge

Facilitating coordinated resilience and energy security

Nashville, the capital of Tennessee and one of the fastest growing cities in the US, is becoming increasingly vulnerable to power blackouts caused by cold snaps and ice storms.[3] To address this challenge, Nashville, the Tennessee Valley Authority (TVA), Nashville Electric Service (NES), and the Electric Power Research Institute (EPRI) identified ways to help ensure coordinated resilience and energy security during extremely cold weather conditions.

Communities often lack localized historical data to predict or prepare for future weather events, which are increasingly frequent and severe due to climate change. In this context, infrastructure vulnerability and human preparedness are intertwined, leading to cascading impacts that can disrupt essential services and increase human risk.

Specifically, there was a pressing need to address the disparities in how different populations, especially the economically disadvantaged, experience these events. The business problem focused on creating a framework for proactive emergency preparedness that considered the physical, technological, and social infrastructure necessary to support the community during extreme weather events.



The response

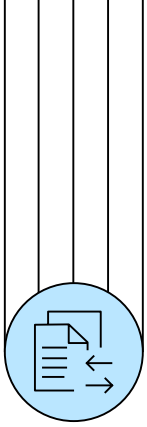
A digital twin to simulate extreme weather impacts on the power grid

The solution to this challenge was realized through the collaboration of the city of Nashville, TVA, NES, and EPRI, with RUNWITHIT Synthetics (RWI) providing the technical backbone. RWI deployed its Synthetic Environment Twin technology, which creates a virtual sandbox model of a city, as well as its infrastructure and population.[4] This “living” digital twin, named “Synthetic Nashville,” allowed stakeholders to model and visualize the impacts of simulated extreme cold weather conditions on Nashville’s power grid and its residents. Synthetic Environment Twins unlock five-dimensional (5D) geometry, represented by five coordinate values, for decision support and forecasting, as well as three-dimensional (3D) place-based intelligence with the additional dimensions of time and context.

This synthetic environment was generated by augmenting various datasets, including US Census data, local tax roll information, and energy consumption patterns, providing hyperlocalized insights into how a cold snap would affect individual homes and the wider community. Additionally, RWI's models integrated demographic data, including economic and health factors, to measure specific vulnerabilities of different populations.

A key feature of this solution was the simulation of grid failure, examining the demand-side electrical load and heating requirements down to individuals in households. The virtual model could project how long different areas of Nashville could endure power outages before human needs became critical. It also offered insights into how distributed energy resources (DER) could be deployed to mitigate these impacts.

Synthetic Nashville allowed stakeholders to run scenarios and assess potential investments in grid hardening and social infrastructure, such as resilience hubs. The project culminated in the RWI Holodeck, a live virtual reality environment where stakeholders could interact with these simulations in real time.

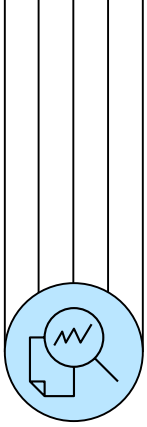


Outcomes and benefits realized

The project delivered measurable and actionable benefits including:

- **Enhanced energy resilience.** By simulating various cold weather scenarios, the project identified critical pressure points in Nashville's energy grid. It provided actionable data on how to prioritize load reduction and restoration efforts, enabling the most vulnerable populations to receive power first during an outage.
- **Informed investment in DER.** The insights generated by Synthetic Nashville helped decision-makers identify where DER could be most effectively deployed. This could significantly reduce the impact of outages and reduce grid strain during high-demand periods.
- **Human impact data.** The model provided a granular view of human needs during a cold weather event, including how economically disadvantaged and medically vulnerable populations were disproportionately affected. This allowed the creation of risk indices to guide emergency response efforts.
- **Community resilience planning.** The data-driven approach informed resilience planning efforts, helping ensure that infrastructure investments addressed both human and physical vulnerabilities. It identified locations where establishing community resilience hubs would have the greatest impact, especially in economically disadvantaged areas with poor access to these resources.

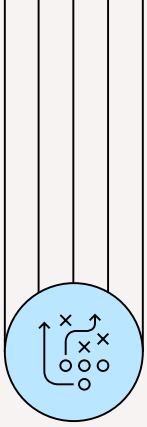
The data-driven approach informed resilience planning efforts, helping ensure that infrastructure investments addressed both human and physical vulnerabilities.



Lessons learned and critical success factors

Several key lessons emerged from the implementation of Synthetic Nashville, which could guide other cities and regions in replicating the solution:

- **Human-centric data is critical.** Traditional grid resilience planning often focuses solely on physical infrastructure. The Synthetic Environment model demonstrated the importance of integrating human-centric data—such as health, mobility, and economic factors—into these plans. These attributes were critical in understanding community needs during a crisis.
- **Hyperlocalized modeling informs better decision-making.** Having detailed, hyperlocalized data was essential for making informed decisions. The granularity of Synthetic Nashville, down to individual households, allowed for precise planning in both energy management and human services.
- **Resilience hubs are lifelines.** The project highlighted the need for resilience hubs, such as schools and community centers, to serve as focal points for emergency response. By overlaying data on the most vulnerable populations with the availability of such hubs, stakeholders were able to plan for resource distribution in times of crisis.
- **Cross-sector collaboration is key.** The success of this project was driven by the collaboration among city planners, utility companies, and technology providers. The multi-stakeholder approach ensured that the solution addressed both technical and social challenges.



What’s next

The Synthetic Nashville project has laid the groundwork for continued innovation in resilience planning. Moving forward, several initiatives are being considered to build on the success of this project:

- **Expansion of synthetic models.** Synthetic Environment Twin technology is expanding to include other climate-related events, such as heat waves and floods, helping to prepare the city for a range of potential emergencies.
- **Wider adoption of DER.** The insights from this project can inform future investments in DER. The goal is to increase DER deployment in vulnerable communities, enhancing resilience during grid disruptions.
- **Community engagement.** Future phases will focus on using the data generated by Synthetic Nashville to engage with local communities and policymakers. This can help drive public awareness and support for resilience measures, creating effective, equitable solutions.
- **Integration into broader emergency preparedness programs.** Finally, the Synthetic Nashville model will be integrated into Nashville’s broader emergency preparedness framework. This can enable continuous updates and improvements as new data and technologies emerge, making the city more resilient to future climate challenges.

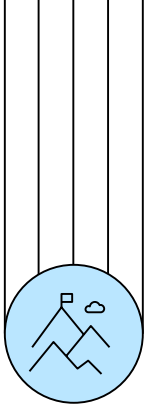
Synthetic Environment Twin technology is expanding to include other climate-related events, such as heat waves and floods, to prepare for a range of potential emergencies.

Case study

Crisis as catalyst

How Moldova's digital platform transformed refugee support in response to the Ukraine war

Luke Cavanaugh
Founder and Co-Author
interweave.gov

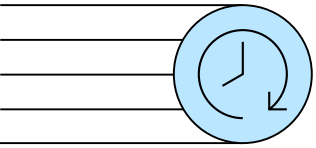


The challenge

A monumental war refugee crisis crosses borders

When Russia invaded Ukraine in February 2022, nearly one-third of Ukrainians were forced to flee their homes.[5] Many of them went to Moldova, a small neighboring country that experienced an overwhelming influx of war refugees—almost 100,000 people. One of the poorest countries in Europe, Moldova was unprepared to handle such a high volume of people in need of immediate support.

Many displaced Ukrainians lacked valid documents, were unfamiliar with border crossing points, and faced challenges such as broken-down vehicles and difficulties with bringing pets. There was a pressing need to provide timely information and essential services to help the refugees navigate a life-changing situation.



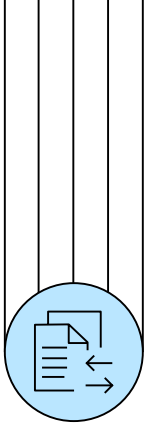
The response

A digital platform serving as a one-stop information hub for refugees

A group of volunteers quickly developed a website to coordinate support for Ukrainian refugees. Within a month after the start of the crisis, the platform had evolved into dopomoga.gov.md, an official resource of the Moldova government. The platform was designed to serve as a one-stop information hub for refugees, providing guidance on accommodation, food, healthcare, and legal assistance. The website operated through a series of rapid three-to-four-day development sprints to adapt quickly to user needs based on feedback from online chats and data collected at refugee centers.

The platform's core feature was a digital credential system that provided each refugee with a unique identification number to make their stay in Moldova legitimate. In cases where paper documents were lost or damaged during the refugees' flight, the platform helped ensure secure digital credentials, allowing refugees to access essential services without presenting physical documents.

Moldova's eGovernance Agency, led at the time by Olga Tumuruc, played a pivotal role in rapidly implementing and scaling this platform. The success of the solution was supported by Moldova's pre-existing digital infrastructure, including free Wi-Fi at the borders and distribution of free SIM cards to refugees, helping them to easily access the platform.

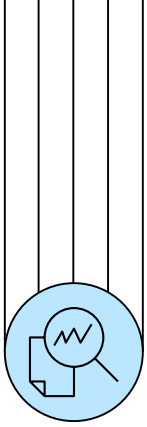


Outcomes and benefits realized

Over a short period of time, the dopomoga.gov.md platform achieved significant results, providing valuable assistance to over 500,000 unique visitors in its first year. To date, the platform has supported more than one million visitors, with 29,000 active users per month. This system not only provided timely and reliable information to Ukrainian refugees but also acted as a critical identity management tool for people crossing the border. The digital credentialing feature enabled refugees to streamline interactions with Moldovan government services and reduce bureaucratic hurdles.

Moreover, the platform fostered coordination among various government agencies and NGOs, creating an ecosystem for data sharing and collaboration that improved the overall efficiency of refugee support. Its success was attributed to Moldova's well-established digital culture, which facilitated quick decision-making and the ability to iterate and deploy necessary changes to the platform. As a result, dopomoga.gov.md has been recognized internationally, with Moldova's eGovernance Agency receiving accolades for its digital innovations.

The digital platform has supported more than one million visitors and served as a critical identity management tool for refugees crossing the border into Moldova.



Lessons learned and critical success factors

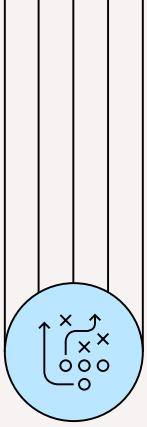
Several key lessons emerged from implementing dopomoga.gov.md. First, the importance of "humanizing government" became evident because the platform was built with a deep understanding of refugees' practical needs, such as simplifying legal requirements and making accommodations for refugees traveling with pets. Platform developers engaged with refugees at border crossings and asked about pain points and immediate needs to prioritize the most urgent services.

Additionally, the success of the platform was underpinned by Moldova's existing digital infrastructure and a culture of cross-governmental coordination. Years of investing in data-sharing capabilities among agencies allowed the government to respond swiftly and effectively during the crisis.

> The dopomoga.gov.md platform has been recognized internationally, with Moldova's eGovernance Agency receiving accolades for its digital innovations.

Another critical factor was the ability of the government to establish direct lines of communication with NGOs and international organizations, facilitating two-way information exchange to improve the accuracy and relevance of the platform's resources.

Other regions looking to replicate this success, must emphasize a "humanizing government" approach, leverage existing digital cultures within governments, and designate governments to play a clear coordinating role. Flexibility, speed in decision-making, and user-centered design are vital to responding effectively in crisis situations.



What’s next

While dopomoga.gov.md was developed as an emergency response, its future lies in its potential to continue providing long-term support for Ukrainian refugees. The platform is expected to evolve into a more comprehensive tool for managing refugee data and services during the prolonged crisis. Moldova’s eGovernance Agency has ambitious plans to further digitize government services, aiming to have 75% of government services digitized by the end of 2024. The infrastructure and lessons learned from dopomoga.gov.md can serve as a foundation for this transformation.

The long-term vision for dopomoga.gov.md is to maintain low operating costs while enhancing the platform’s functionality to accommodate the changing needs of refugees. As the platform shifts toward supporting more long-term planning rather than immediate crisis response, it can play a role in Moldova’s broader digital government strategy. The principles of data-sharing, direct communication, and rapid response that have made dopomoga.gov.md successful can continue to drive digital innovations across the Moldovan government.

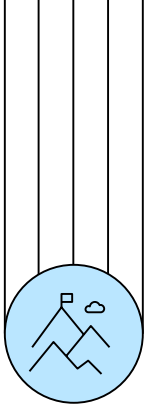
With its refugee emergency response website serving as a catalyst, Moldova’s eGovernance agency aims to have 75% of government services digitized by the end of 2024.

Case study

Speed, simplicity, survival

How a low-code solution transformed cross-border healthcare by European hospitals during a global pandemic

Vincent R. Hofbauer, M.D.
Director UKM
International—Medicine
Innovation, Digitalization
& International Affairs



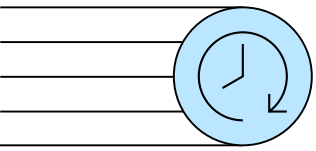
The challenge

An overwhelmed healthcare infrastructure

In early 2020, the COVID-19 pandemic presented an unprecedented challenge for healthcare systems worldwide. The Netherlands, with only seven ICU beds per 100,000 inhabitants, was particularly vulnerable when the rising number of infections overwhelmed its healthcare infrastructure. In contrast, Germany had a significantly higher patient capacity, with 34 ICU beds per 100,000 inhabitants. A growing stream of desperate Dutch patients traveled to Germany seeking care, overloading German hospitals near the border.

As the pandemic escalated, it became evident that the ad hoc transferring of COVID-19 patients was unsustainable. The Netherlands Ministry of Health formally requested assistance from the Ministry of Labor, Health, and Social Affairs of North Rhine-Westphalia (NRW) in Germany. The University Hospital Muenster (UKM), a leader in cross-border healthcare collaboration, was tasked with managing the coordination of ICU bed capacity across NRW.

The sheer scale of the crisis, combined with the logistical challenges of cross-border coordination, highlighted the need for an efficient and scalable solution to manage patient transfers. This situation set the stage for a rapid and innovative response to a complex, cross-border healthcare crisis.



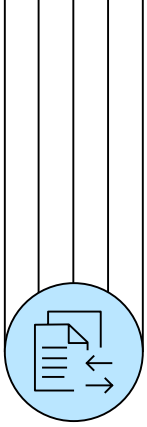
The response

A digital solution for rapid application development

Initially, UKM International managed ICU bed availability through a manual process. Hospitals across NRW responded to email requests, with data manually recorded in spreadsheets. This approach, while initially effective, quickly became unsustainable as the number of patients and the need for real-time updates grew exponentially. The team soon realized that a digital solution was essential to meet the increasing demands of the pandemic.

The solution came in the form of a web portal developed using Outsystems, a low-code development platform. Low-code technology, which allows for the rapid development of applications through modular components, was chosen for its speed and flexibility. Within a week, the web portal was operational, enabling hospitals across NRW and neighboring German states to update their ICU bed availability in real time. The system was designed to be user-friendly, allowing hospitals to easily indicate available capacity. This simplicity was crucial, as it decreased the time required for busy ICU staff members to update the system.

The portal was not only a technical solution but also a model of international collaboration. It seamlessly connected Dutch and German healthcare systems, enabling communication among hospitals and facilitating the efficient transfer of ICU patients. The system's ability to handle large volumes of data while maintaining patient confidentiality was vital in maintaining compliance with healthcare regulations. By integrating real-time capacity updates and automated coordination, the portal significantly reduced the administrative burden on healthcare providers, allowing them to focus on patient care.



Outcomes and benefits realized

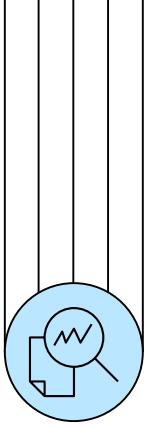
The implementation of the web portal had a profound impact on the ability of hospitals in NRW and beyond to manage ICU bed capacity during the pandemic. The system's real-time updates allowed for efficient coordination among hospitals, facilitating the transfer of patients to available beds as quickly as possible.

Within the first few weeks of operation, 126 hospitals across Germany had registered on the platform, offering a combined total of 200 ICU beds for COVID-19 patients. The addition of these additional ICU beds was a game-changer for Dutch patients, significantly increasing the proportion of ICU beds available to the affected patient population.

One of the most significant outcomes of this initiative was the ability to expand the scope of the project beyond Germany and the Netherlands. As the pandemic continued, other countries, such as Belgium, France, Italy, and Czechia, also sought assistance. This cross-border collaboration was made possible by the flexibility of the web portal, which could easily scale to include additional countries and hospitals.

By the end of 2021, 157 COVID-19 patients who urgently needed life-saving medical care were transferred to German hospitals through the system, with the majority coming from the Netherlands and Belgium. Due to the critical condition of these COVID-19 patients—many of them sedated and on life support systems—each transfer was essentially a military operation involving significant emergency response resources.

The success of the initiative enabled the scope of the project to expand beyond Germany and the Netherlands to other countries including Belgium, France, Italy, and Czechia.



Lessons learned and critical success factors

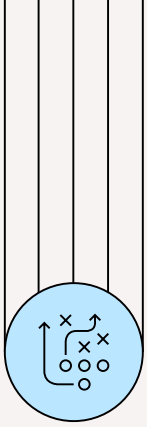
Several critical lessons emerged from the implementation of the web portal. First and foremost, the use of low-code development was transformational in terms of speed and flexibility. Traditional high-code development would have taken months to deploy, but the low-code approach allowed for a fully functional system to be up and running within a week. This speed was essential during a rapidly evolving crisis when every day counted. The modular nature of low-code development also allowed the system to be easily adapted for future use, including extending functionality to aid Ukraine war refugees by tracking availability of medical specialties to treat war casualties and rehabilitation services for continuing care.

Another key lesson was the importance of maintaining neutrality and independence in the system's operation. The success of the portal relied on the voluntary participation of hospitals, and it was crucial that the system remained free from political or bureaucratic interference. Existing government-managed systems had failed to provide accurate capacity data due to inconsistent reporting requirements, which often skewed the actual availability of ICU beds. By contrast, the web portal operated independently, with hospitals voluntarily updating capacity in real time, helping ensure that patients were directed to where care was genuinely available.

For other regions looking to replicate this solution, key considerations are speed, simplicity, neutrality, and human factors. The system's success was driven by its ease of use, which encouraged widespread adoption, and its ability to operate independently of political constraints. Additionally, using low-code technology created a system that could be rapidly deployed and adapted to meet the needs of the crisis.

The neutrality of the solution enables critical care and services to be provided to the people that need it, even as political crosscurrents and human factors add uncertainty. For example, at the onset of the COVID-19 pandemic, the Netherlands and Germany adopted two different approaches. Dutch communities imposed relatively few restrictions on public gatherings. However, just across the border, Germany was in a total lockdown mode. Despite pressures from some circles in Germany to close borders, the neutrality of the platform enabled German hospitals to continue accepting Dutch patients.

These considerations are critical for any region seeking to implement a similar solution in response to future healthcare crises. In addition, solution capabilities go beyond healthcare. They can be applied to other emergency situations where data-driven decision-making and collaboration are essential for allocating and managing scarce resources.



What’s next

Although the COVID-19 portal is currently dormant, the system is prepared for activation in the event of future pandemics or healthcare crises. The platform’s adaptability has already been demonstrated with its successful expansion to provide efficient matching of specialized medical care for Ukrainian war refugees. This new version of the portal includes additional functionality to coordinate care for trauma patients from initial treatment through rehabilitation services. By June 2024, it had already facilitated the transfer of 339 war casualties to medical facilities in NRW. The European Commission recognized this effort by awarding Germany the Union Civil Protection Mechanism Medal for its role in the Medevac operation for Ukraine.

Looking ahead, the future value of the web portal lies in its ability to respond to new and emerging healthcare challenges. The system’s flexibility and ease of adaptation mean that it can be quickly repurposed for a wide range of crises, from future pandemics to natural disasters to humanitarian emergencies. Additionally, plans are in place to further expand the system’s capabilities, including integrating more advanced data analytics to predict patient needs and improve resource allocation. The continued collaboration between international healthcare systems and the ongoing development of the portal will help ensure that it remains a valuable tool or crisis management for years to come.

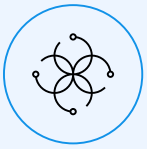
Beyond pandemics, the platform’s adaptability has been demonstrated with its successful expansion to provide efficient matching of specialized medical care for Ukrainian war refugees.

Action guide

Based on lessons learned from the preceding case studies, here are concrete actions government leaders need to take to create future readiness by focusing on resilience, collaboration, and adaptability in response to shock events. By embracing these behaviors, governments can better position themselves to safeguard constituents and provide continuity of services in an uncertain future.

Identify risks inclusively, with system-wide thinking. The greatest threat isn't the unknown crisis—it's failing to recognize that interlinked and compounded risks could destabilize the entire system.

- **Adopt holistic risk identification approaches.** These include diverse stakeholder inputs that capture a wide range of perspectives.
- **Embrace system-wide thinking and advanced modeling.** When combined with extensive human subject-matter expertise, this approach can optimize resources while mitigating risks that potentially could have the highest system-wide impact.
- **Encourage the use of collaborative tools.** These enable real-time, collaborative risk assessments to anticipate future crises before they happen.



Tap the power of cross-sector collaboration and technology. Future crises will not respect borders or bureaucratic boundaries and will test the agility of government partnerships and technology.

- **Invest in technology-driven platforms.** Develop solutions that enable remote collaboration across public and private sectors.
- **Promote seamless exchange of information and resources.** This is especially important during crises when speed and efficiency are paramount.
- **Leverage low-code software when appropriate.** This facilitates the rapid deployment of digital tools to streamline response efforts across borders and sectors.

Take a human-centric approach to resilience. Infrastructure may survive a disaster, but how will constituents fare? Resilience plans that don't accommodate human needs will fail.

- **Center crisis preparedness around people.** Don't lose sight of vulnerable populations that often experience disproportionate impacts.
- **Integrate human-centric data.** Include factors such as economic status, health, and mobility into resilience planning to provide equitable resource distribution during crises.
- **Invest in localized models.** Simulate the real-time impact of disasters on communities to inform targeted interventions.

Case study approach and methodology

In April 2024, the IBM Institute for Business Value, in collaboration with the IBM Center for The Business of Government and the National Academy of Public Administration, issued a call for proposals to learn about real-world examples of how government organizations implemented strategies and capabilities that improved their mission resilience to be "future ready" and prepared them to respond to disruptive events.

Five key domain areas were identified for case study development including emergency preparedness and response, cybersecurity, supply chain, climate sustainability, and workforce development. The case studies could be international, US, federal, state, or local. Examples should have been piloted or implemented between 2022 and 2024. Submissions were evaluated for suitability to the challenge theme and across evaluation criteria including recency, replicability, transferability, and innovation. Winners were selected based on the quality and impact of their solution.

Contributors

Sara Aboulhosn, Nathan Boudreaux, Ruth Gordon, Jillian McGuffey, Joseph P. Mitchell III, Kee Won Song, Tihomir Trifonov, and Michael Tucker.

Case study authors

Breaking the cycle in Norway

How the Agder Health Community rewrote the crisis preparedness playbook after a global pandemic

Colin Eden

Professor
University of Strathclyde
Business School
colin.eden@strath.ac.uk
linkedin.com/in/colin-eden-35789422b/

Jose Julio Gonzalez

Professor
Center for Integrated Emergency Management
University of Agder
jsjlgn@gmail.com
linkedin.com/in/jose-julio-gonzalez-0a33a36/

Sigurd Paulsen

Crisis Manager
Kristiansand Municipality
sigurd.paulsen@kristiansand.kommune.no
linkedin.com/in/sigurd-paulsen-43068a2a/

Simulating resilience

How synthetic Nashville is redefining energy security in the face of climate threats

Myrna Bittner

CEO and Founder
RUNWITHIT Synthetics
myrna@runwithitsynthetics.com
linkedin.com/in/myrna-bittner/

Crisis as catalyst

How Moldova's digital platform transformed refugee support in response to the Ukraine war

Luke Cavanaugh

Founder and Co-Author
interweave.gov
luke@cavanaugh.org.uk
linkedin.com/in/luke-cavanaugh-208806181/

Speed, simplicity, survival

How a low-code solution transformed cross-border healthcare during a global pandemic

Vincent R. Hofbauer, M.D.

Director UKM International—Medicine, Innovation, Digitalization & International Affairs
vincent.hofbauer@ukmuenster.de
linkedin.com/in/dr-med-vincent-r-h-7a78ab257/

IBM Center for The Business of Government

The IBM Center for The Business of Government connects research to practice, applying scholarship to real-world issues and decisions for government. The Center stimulates research and facilitates discussion of new approaches to improving the effectiveness of government at the federal, state, local, and international levels. Our intent is to spark creativity in addressing pressing public sector challenges—crafting new ways of improving government by identifying trends, ideas, and best practices in public management that can help government leaders respond more effectively to mission and management priorities. Visit us at https://www.businessofgovernment.org

IBM Institute for Business Value

For two decades, the IBM Institute for Business Value has served as the thought leadership think tank for IBM. What inspires us is producing research-backed, technology-informed strategic insights that help leaders make smarter business decisions. From our unique position at the intersection of business, technology, and society, we survey, interview, and engage with thousands of executives, consumers, and experts each year, synthesizing their perspectives into credible, inspiring, and actionable insights.

To stay connected and informed, sign up to receive IBM IBV's email newsletter at ibm.com/ibv. You can also follow us on LinkedIn at https://ibm.co/ibv-linkedin.

The right partner for a changing world

At IBM, we collaborate with our clients, bringing together business insight, advanced research, and technology to give them a distinct advantage in today's rapidly changing environment.

About Research Insights

Research Insights are fact-based strategic insights for business executives on critical public-and private-sector issues. They are based on findings from analysis of our own primary research studies. For more information, contact the IBM Institute for Business Value at ibv@us.ibm.com.

Related reports

Preparing governments for future shocks
Roadmap to resilience
https://ibm.co/government-future-shocks-resilience

Building future ready governments
https://ibm.co/future-ready-governments

Partnering for resilience
https://ibm.co/government-emergency-preparedness

Notes and sources

1 Bryson, John M. and contributors. Addressing Complex and Cross-Boundary Challenges in Government: The Value of Strategy Mapping. IBM Center for The Business of Government. January 5, 2023. https://www.businessofgovernment.org/report/addressing-complex-and-cross-boundary-challenges-government-value-strategy-mapping

2 Eden C. Strategyfinder Systemic Risk Management Detailed Manual. 2024. Strategyfinder Software GmbH ISBN 978-3-903556-07-2. www.strategyfinder.com

3 McGee, Nicki. “Report: Tennessee could see more blackouts this winter.” WKRN.COM. November 25, 2023. https://www.wkrn.com/news/tennessee-news/report-tennessee-could-see-more-blackouts-this-winter/

4 Synthetic Resiliency Modeling on Extended Power Outages. Tennessee Valley Authority. Accessed on October 31, 2024. https://www.tva.com/energy/technology-innovation/connected-communities/connected-communities-pilots/synthetic-resiliency-modeling-on-extended-power-outages

5 “Ukraine situation.” UNHCR The UN Refugee Agency Global Report 2022. https://reporting.unhcr.org/ukraine-situation-global-report-2022

IBM Corporation
New Orchard Road
Armonk, NY 10504

Produced in the United States of America | November 2024