



# NERRC ECONOMIC RESILIENCE LEARNING COLLABORATIVE

## Building Resilience in Economic Development: A Systems Approach for Sustainable Growth

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## Introduction

Economic development is a pivotal driver of growth, prosperity, and quality of life for regions and communities across the country. In the face of challenges that global uncertainties, natural disasters, climate change, socio-economic disparities, and technological disruptions pose, resilience strategies are essential tools to equitably and sustainably build prosperity over time. In the economic development context, resilience aims to better prepare regions to anticipate, withstand, and bounce back from any type of shock, disruption, or stress it may experience.<sup>1</sup> This Argonne National Laboratory National Economic Research and Resilience Center (NERRC) research brief is intended to provide guidance for economic development professionals to navigate resilience within their communities, identify their role in the resilience landscape, and gain insight into components of economic development that can build to a more resilient and sustainable economic future.

## Resilience in Economic Development

Resilience in the economic development context encompasses the ability of a local economy to withstand and recover from various shocks and stressors while also adapting to changes, ensuring long-term sustainability and growth. Shocks are acute events that disrupt a local economic system. Events such as the departure of major employers from an area or the disruption of critical economic channels such as roads, ports, and supply chains. Natural disasters are another type of shock, significantly impacting communities and their economies. Resilience also addresses chronic stressors within a community. Stressors are persistent conditions within an economic system that create strain. Stressors include challenges such as aging infrastructure, environmental degradation, and the persistent impacts of poverty and inequality. In many cases, chronic stressors magnify the impacts from an acute shock.

**Shocks:** Sudden, unexpected events that disrupt the normal functioning of a community.

**Stressors:** Long-term challenges or pressures that a community faces.

A consistent application of a resilience mindset, including addressing shocks, stressors, and the interaction between them, is necessary to ensure long-term community prosperity.

### Concepts Related to Resilience

Resilience shares commonalities with other related concepts. Understanding the commonalities can create multiple pathways for communities to initiate resilience efforts and achieve more holistic outcomes. Related concepts include the following:

- **Climate adaptation:** Climate adaptation refers to the process of adjusting or modifying systems, practices, or behaviors to effectively respond to and account for the impacts of climate change, reducing vulnerability and enhancing resilience in the face of changing climate conditions;<sup>2</sup>
- **Climate change mitigation:** Climate change mitigation refers to efforts to reduce or prevent the emission of greenhouse gases, aiming to minimize the potential impacts of global warming and

climate change. It includes strategies such as energy efficiency, the use of renewable energy, and carbon capture and storage technologies;<sup>3</sup>

- **Hazard mitigation:** Hazard mitigation involves the proactive measures taken to minimize or prevent the adverse effects of natural hazards or disasters on communities and the environment, aiming to reduce the potential damage and loss of life;<sup>4</sup> and
- **Sustainability:** Sustainability refers to the responsible and balanced use of natural resources and the protection of ecosystems to ensure their availability for future generations, focusing on meeting the needs of the present without compromising the ability of future generations to meet their own needs.<sup>5</sup>

Economic resilience differs from these concepts in that it has a broader scope, encompassing shocks, and stressors from various sources in the economy. Climate adaptation and hazard mitigation are more specific in terms of addressing climate change impacts and natural hazards, respectively, while environmental sustainability focuses on responsible resource use and ecosystem protection. However, economic resilience and these other concepts can be interconnected, particularly in the context of climate-related shocks and the need to build adaptive capacities to ensure sustainability and resilience in both economic and environmental aspects.

### Identifying Common Challenges and Disruptions to Economic Growth and Sustainability

Planning for resilience should take into account a component of the unknown. Factors such as timing, severity, and recurrence of both stressors and shocks can be hard to predict. These same factors can often lead to the difficulty of economic development planning in general. This dual complexity can cause dynamics of economic development, and effects caused by a myriad of disruptions, to ultimately be tied together. When planning for a more resilient economy, understanding the common challenges, and the impact of disruptions across the resilience landscape, is key.

#### Global Disruptions

Local economies are not isolated; they are deeply interconnected with the global marketplace through trade, investment, and information flow. This interdependence creates a complex web of relationships where actions and disruptions in one part of the world can have far-reaching effects on local communities and vice versa. Globalization has accelerated these connections, making local economies vulnerable to global shocks and fluctuations.<sup>6</sup> These disruptions include the following:

- **Global market shifts:** Changes in global market dynamics, such as fluctuations in commodity prices or shifts in international trade agreements, can significantly impact local economies. Communities that depend heavily on a specific industry or export may suffer when demand decreases or competition increases. Conversely, changes in global market trends could also present opportunities for growth and diversification for some communities.<sup>7</sup>
- **Technological automation:** Advances in technological automation, including robotics and artificial intelligence, can lead to job displacement and changes in labor markets. Industries rely heavily on manual labor, such as manufacturing and some service sectors, may face reduced demand for human workers. If automation is solely used to reduce labor costs, it can lead to unemployment and decreased income for local residents, impacting the overall economic activity.<sup>8</sup>

- **Supply chain disruption:** Supply chain disruptions, such as trade conflicts, transportation disruptions, or global crises (e.g., pandemics) can have severe consequences for local economies. Many communities rely on the smooth functioning of supply chains to receive essential goods and materials or to export their products. Any disruption in the flow of goods can lead to shortages, production delays, and increased costs for businesses, ultimately impacting local employment and consumer spending.<sup>9</sup>

An example of vulnerability due to globalization is apparent through experiences that local economies experienced due to the COVID-19 pandemic. Starting in 2020, a surge in demand for electronics and a simultaneous disruption in the supply chain for semiconductors and microchips created a global shortage for many electronics and high-tech products. This global shortage had a direct impact on various industries within the United States, most notably the automotive sector. Many car manufacturers in the United States had to cut back on production due to the lack of essential microchips, leading to layoffs and reduced working hours in factories across the country.<sup>10</sup>

At the same time, the global nature of the economy can strengthen local resilience. For example, globalization served as a source for increased resilience in relationship to medical supplies and trade during the COVID-19 pandemic. An unprecedented increase in need for personal protective equipment international trade proved a lifeline for many healthcare facilities. While world trade decreased by 7.6% in 2020, trade in medical goods increased by 16%.<sup>11</sup> International trade allowed much-needed medical supplies to be delivered worldwide even as countries worked to boost domestic production.

#### Climate and Natural Hazards Disruptions

Climate change and natural hazard disruptions can create significant uncertainties for local communities and economies. As a result of climate change, the frequency and severity of natural disasters is increasing. Factors such as extreme heat and drought can affect multiple industries and place constraints on available resources. These factors have also led to increased intentionality and climate awareness in all sectors. For the local economy, these environmental shocks can bring with them full transformation of industry composition, transitions away from extractive industries and toward more sustainable and restorative sectors for the future. Examples of climate and natural hazards disruptions include the following:

- **Natural disasters:** Natural disasters, including hurricanes, earthquakes, floods, and wildfires can have severe consequences for local communities and economies. Infrastructure damage, loss of homes and businesses, disruption of transportation networks, displacement of workers, and resulting supply-chain interruptions can lead to significant economic losses. Recovery efforts may take years, affecting businesses and livelihoods in the region.<sup>12</sup>
- **Climate change:** Climate change magnifies the intensity and severity of natural disasters, including hurricanes, floods, droughts, and wildfires.<sup>13</sup> At the same time, it can be a stressor, creating longer periods of extreme heat, and water scarcity, which can in turn affect quality of life and economic activity. Planning for climate change requires an understanding not only of the state of the natural environment now, but also how it may end up in the future.
- **Drought and its effect on agricultural economies:** Drought conditions can significantly impact agricultural communities, especially those that depend on farming and related industries. Water

scarcity can lead to reduced crop yields, livestock losses, and increased production costs. As agricultural output declines, local farmers may struggle financially, and agribusinesses may face challenges due to decreased demand. These impacts can create a ripple effect throughout the local economy, affecting businesses that rely on the agricultural sector and reducing overall economic activity in the community.<sup>14</sup>

Natural disasters and climate can have a years-long impact on communities and their economies. For example, in September 2013, a record-breaking rainstorm stalled over the Front Range mountains of Colorado, dumping 18 inches in a period of days of rain over an area that typically receives 14 inches annually.<sup>15</sup> The storm caused catastrophic floods that destroyed highway corridors, water, sewer, communication, electricity, homes, and businesses across 24 counties. Lyons, one of the hardest hit towns, brought together local government, regional partners, non-profits, economic development professionals, and members of the community to create a Recovery Action Plan that articulated a vision for a more resilient community into the future.<sup>16</sup> The plan included a series of actions to create an environment for local businesses to grow and prosper, as well as to leverage the town's unique environmental and cultural assets to increase tourism. Lyons recently gathered to commemorate the 10-year anniversary of the floods and to acknowledge and celebrate the completion of their recovery process.<sup>17</sup>

#### Local or Regional Disruptions

Although proximity of a disruption may increase the level of control from an economic development organization (EDO), local and regional disruptions are often the most common stressors within a community. Disruptions to the local economic base, or to major employers in the area, are a key point of focus for economic development planning and resilience planning alike. Examples of potential local and regional disruptions include the following:

- **Loss of an anchor employer or institution:** A community that depends heavily on a single major employer or institution is vulnerable to economic disruption if that entity faces financial troubles or closes down. When a major employer shuts down or relocates, it can lead to mass layoffs and steep declines in local economic activity. Furthermore, the loss of an anchor institution, such as a university or hospital, can impact the local economy as it contributes to jobs, research funding, and attracts businesses that rely on the institution's services or graduates.<sup>18</sup>
- **Over-reliance on a single industry:** A community that relies on a single industry becomes vulnerable to economic instability, job losses, and potential erosion of skills and infrastructure, if that industry faces a downturn, whether through technological changes or market shifts.
- **Demographic shifts:** Changes in the local population's size, age distribution, and composition can influence the economic vitality of a community. For example, an aging population might lead to increased demand for healthcare and senior services, while a declining population could result in reduced consumer spending and a shrinking labor force.<sup>19</sup>
- **Policy changes:** Government policy decisions, such as tax reforms, changes in regulations, or shifts in funding allocations, can have far-reaching effects. Positive policies can encourage investment and growth, while negative or restrictive policies can stifle business activity and development.



In Alaska, communities are taking action to become more resilient to local or regional disruptions. Salmon fishing has been a long-standing social and economic driver for many towns and villages across Alaska, but as climates change and the availability of fish becomes less reliable, state and local governments took action to identify and implement more resilient solutions. Many local areas have started to consult closely between corporate fishing operations and indigenous fisherpeople. In addition, combining fishing techniques led to more reliable and more resilient salmon populations in Babine Lake, the lower Columbia and Skeena Rivers, and the Salish Sea.<sup>20</sup>

Communities should prepare to address and adapt to all disruptions proactively. Developing resilience through diversification of industries, strengthening the workforce, fostering innovation, and investing in infrastructure can reduce the negative impact of these events and strengthen economic vitality.

### Shocks and Economic Resilience

Resilience and sustainable growth are interlinked concepts. By incorporating resilience measures into development strategies, communities can safeguard their progress against potential setbacks and enhance their ability to maintain consistent, long-term growth trajectories. The link between resilience, economic growth, and vitality lies in the recognition that it is essential to ensure the continuity and stability of economic development efforts.

Shocks, whether they are natural disasters, human-caused incidents, or another acute disruption, can have severe adverse effects on the short- and long-term economic well-being of a community.<sup>21</sup> In the short term, they can cause widespread destruction of physical infrastructure, disrupt supply chains, displace populations, and lead to a decline in economic activity. The immediate aftermath of a shock or disaster can result in a decrease in productivity, loss of livelihoods, increased unemployment, and heightened financial strain for both businesses and households.<sup>22</sup> The recovery process can be prolonged, draining resources and hindering economic activities.<sup>23</sup> In some instances, post-disaster recovery and reconstruction can have a measurable effect on economic growth, but those indicators of growth should be balanced within the broader context of what was lost, who is benefiting from new activities, and whether those new activities sustain employment and wages in the community.

In the long term, shocks can leave lasting scars on an economy, hindering its potential for growth. These shocks can also exacerbate existing socio-economic disparities, as vulnerable and underserved populations face greater challenges in recovering and rebuilding their lives.<sup>24,25</sup> The long-term economic consequences of shocks can result in a decline in investor confidence, reduced economic competitiveness, and heightened risk perceptions, all of which can deter investment and hinder development.<sup>26</sup>

Incorporating resilience into development strategies mitigates the potential adverse effects of shocks. Resilience planning allows for the intentional consideration of shocks, diversification of economic activities, and the development of adaptive strategies. Communities that undertake resilience efforts are better equipped to absorb and respond to the impacts of crises, enabling them to bounce back more quickly and continue their development trajectory. Ultimately, the incorporation of resilience into development strategies ensures that the pursuit of sustainable growth is not derailed by unforeseen disruptions, safeguarding communities against the uncertainties of a dynamic and changing world.

## Key Institutions in Economic Resilience

### Engaging Beyond Traditional Economic Development Agencies and Organizations

The role of an EDO as a community partner with a broad reach of community connections often enables it to have conversations with individuals and organizations beyond the usual scope of a local government office. This gives an EDO special agency to create a more informed understanding of what resilience is and how it unfolds in the community.

When thinking about the network of an economic development organization, it is important to keep in mind that resilience looks different in different areas and at different layers of geography. Evaluating an EDO's network from the perspective of community members and organizations at each level can help to plan and tailor materials to ensure organizations and individuals have the best chance of recovery.

Individuals can increase their personal resilience in a variety of ways. From a physical perspective, they can take actions to protect homes and ensure ample access to key supplies such as medication.<sup>27</sup> From a social perspective, individuals can cultivate or strengthen relationships with family, friends, neighbors, and others, which creates support networks during and after shock events. While EDOs may not engage directly with individuals on matters related to personal resilience, they have a unique perspective into the network of individuals. An EDO may provide technical assistance to individual businesses or business owners to strengthen their organizational resilience through continuity planning, insurance, financing, and other strategies.

At the neighborhood level and the community level, resilience efforts require a more comprehensive understanding of the region's distinct assets, vulnerabilities, and needs. This starts with an understanding of the diverse characteristics of the population, which can help to enable effective and inclusive resilience strategies. Collaboration among various stakeholders, including local government, community organizations, and businesses, becomes essential in setting a resilience vision and coordinating efforts and resources towards building a resilient community. This coordination may take the shape of developing a resilience strategy, establishing a network that can be mobilized if a shock event occurs, or incorporating current and future risk into infrastructure development. By adopting a comprehensive approach and considering the interconnections and interdependencies within the community, it becomes feasible to foster sustainable and robust economic development capable of enduring shocks and flourishing amidst challenges.<sup>28</sup>

Leveraging the power of connection can create pathways for information before, during, and after a shock to improve community resilience and decrease the time that individuals and area businesses are affected.

- **Local governments:** Local governments are a centralized hub for providing services, information, planning, and allocation of resources. They also often act as the liaison to state and federal resources.
- **Academic institutions:** The academic community contributes through research, data analysis, and policy recommendations, providing evidence-based solutions for resilient economic development.



- **Non-profit organizations:** Non-profit community organizations bring expertise, resources, and specialized knowledge to complement governmental efforts, fostering more comprehensive and innovative resilience strategies. They also frequently provide services and resources to support community needs.
- **Business partners:** Private sector engagement is crucial for resilience implementation, as businesses possess the resources and agility to drive innovation and adaptability.
- **Individuals, families, and households:** Community members play a pivotal role in resilience initiatives, as their insights and active involvement are essential for crafting context-specific solutions.

Table 1: The Role of Key Institutions in Economic Resilience

	Chronic stressors	Pre shock	Post shock
<b>Local Governments</b>	Identify strengths, weaknesses, opportunities, and threats for a community. Seek and provide resources to address chronic stressors.	Integrate economic development into emergency management and community resilience plans. Incorporate risk assessments into economic development plans.	Rebuild critical infrastructure and networks to ensure stable growth and avoid future losses. Coordinate resources to support resilient economic recovery.
<b>Academic Institutions</b>	Research and analyze root causes and potential interventions. Devise evidence-based strategies for resilience.	Provide vital data and policy recommendations to support informed decision-making and effective risk reduction and response strategies.	Conduct research to understand changes to the natural, labor, and economic environment.
<b>Non-profit Organizations</b>	Provide specialized knowledge, resources, and expertise that enhance and broaden governmental resilience efforts and address root causes of chronic stressors.	Build partnerships designed to quickly mobilize when a shock event occurs.	Augment governmental efforts with relief and recovery services. Ensure resources continue to flow to the most vulnerable spaces in the community.
<b>Private Sector Partners</b>	Leverage resources and agility to foster innovation and adaptability.	Evaluate and supply chain vulnerabilities and strengthen business support networks.	Provide critical resources, services, and adaptive solutions to help communities recover and rebuild.
<b>Individuals, Families, and Households</b>	Actively participate in community resilience efforts and offer valuable insights into local contexts and needs.	Participate in or champion efforts to reduce risk from and vulnerability to shocks.	Check in on neighbors, creating a network of support for recovery and capturing lessons learned for the future.

## Situating Economic Development in Resilience Practice

The role of an economic development organization (EDO) is interwoven with the community around it. When economic resilience, interconnectivity can create issues of accountability, or knowing where an EDO sits in the broader resilience landscape. It is important to not only understand where the economic developer has agency in the context of building resilience but also to take into account the other offices and sectors that also play a large role.

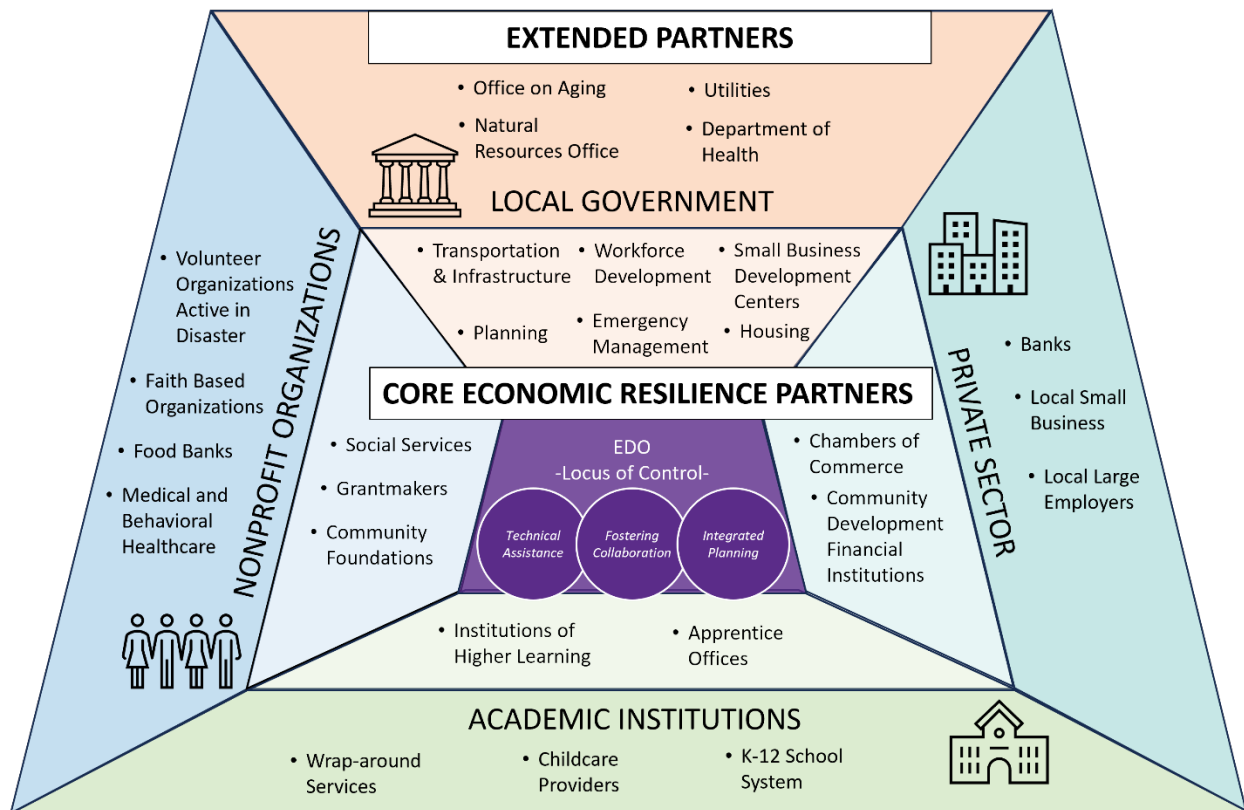


Figure 1: Economic Development Resilience Resource Network

Economic development as a profession connects the needs of the business community to larger funding, research, and policy networks. The partners in these networks include offices within local government, non-profit organizations, academic institutions, and the private sector. However, due to its focus, an EDO will not necessarily have direct connections to the full range of community organizations or larger resilience stakeholders. Figure 1 situates the economic development *Locus of Control*, or the range of activities that an EDO performs, into the broader network of resilience partners that should be engaged with for economic development planning, resilience planning, or in response to a shock or stressor. Figure 1 describes the most common offices within the resilience resource network, though every community will look a little different in terms of partner connections.

Core economic resilience partners include organizations that directly connect to the actions within an EDO's locus of control to the local economy. These organizations may or may not be aware that they too have a key role to play in the economic resilience conversation, but with other planning organizations,

offices of transportation, infrastructure, financing, and the workforce development pipeline, an EDO can start to have centered conversations around planning for and recovering from stressors and shocks in the community.

Extended resilience partners also perform vital functions to prepare for, mitigate, respond to, or recover from a shock. However, they sit outside of the usual connected network for economic development work. These extended partners can provide tailored services to individuals, businesses, and community partners, though may need to be integrated into planning or recovery through communications with core resilience partners. The stronger the overall network of recovery organizations, the easier resilience planning and recovery becomes.

## Developing Resilience Solutions through Systems Thinking

Systems thinking in economic development generates new solutions to common problems by promoting integrated planning, fostering collaboration, and leveraging data and technology. By considering the interconnections between economic, social, physical, and environmental factors, communities can design comprehensive strategies that foster resilience and sustainable growth. Engaging diverse stakeholders encourages a variety of perspectives, leading to more innovative and inclusive approaches. Furthermore, data-driven decision-making empowers communities to identify vulnerabilities and anticipate challenges, enabling them to respond proactively and adapt to changing circumstances.<sup>29</sup> Through the application of systems thinking, communities can build more robust and adaptive economic systems that navigate challenges and achieve long-term prosperity.

### Integrated Planning and Development Strategies

Systems thinking allows economic development planners to go beyond narrow sector-based approaches and embrace integrated planning that considers the interconnections between economic, social, and environmental aspects. By understanding how various factors influence and interact with one another, communities can devise comprehensive strategies that promote resilience. For instance, integrating economic development plans with social welfare initiatives can address socio-economic disparities and foster inclusive growth.<sup>30</sup> Simultaneously, factoring in environmental considerations ensures that economic activities are sustainable and do not compromise the well-being of future generations. This holistic approach to planning enables communities to identify synergies and trade-offs among different goals, leading to more effective and balanced development strategies.

Integrated planning especially applies to the Comprehensive Economic Development Strategy (CEDS). Under the current Economic Development Administration CEDS Content Guidelines resilience is a required topic.<sup>31</sup> Many existing community plans such as hazard mitigation plans, housing plans, transportation plans, infrastructure and critical improvements plans, and environmental or watershed plans provide ideas on whom to engage in planning efforts, and provide information about the community's past, present, and future. They also provide opportunities to align goals and objectives and provide a coordinated path forward for the community. The plans can also shed light on existing and proposed policies, projects, and programs.

Incorporating resilience into CEDS or grant proposals does not have to start from scratch. Instead, it can be a collaborative effort between planning offices and EDOs to bring value add to planning across the

resilience landscape. Integrating plans across domains both brings in new information and can ensure that planning efforts do not conflict and ideally build on one another.

### Fostering Collaboration Between Diverse Stakeholders

Collaboration among stakeholders promotes information exchange, cultivates innovation, and ensures that resilience strategies are inclusive and effective. Inclusive and sustainable economic development requires the active engagement of diverse stakeholders, including government agencies, local community organizations, academia, and the private sector. Systems thinking encourages collaboration among these stakeholders to pool resources, share knowledge, and generate innovative solutions. By involving all relevant parties in the decision-making process, communities can leverage a broader range of expertise and perspectives, leading to more robust and context-specific resilience strategies. For example, collaborative efforts between academic institutions and local governments can result in evidence-based policies that address unique community challenges.<sup>32</sup> By fostering an environment of open communication and mutual understanding, systems thinking fosters collective ownership of resilience initiatives and empowers stakeholders to work together towards shared goals.

### Strengthening Capacity through Technical Assistance

Technical assistance can take many forms for an EDO. From a systems thinking perspective, technical assistance should be viewed not from the perspective of what services an EDO can provide, but instead from the lasting impact of the knowledge built and the connections made. Technical assistance can include actively providing services to organizations, hosting workshops around continuity or recovery plans, providing grants assistance, and convening economic development strategy meetings. It can also include technical assistance in a broader sense, taking a larger view of the economic development landscape and local demographics, assessing stressors and economic vulnerability, and holding listening sessions with economic actors in the area.

EDOs can use data to take a step back to provide communities and regions with better resilience information and technical assistance. Data-driven approaches empower decision-makers with valuable insights, enabling informed choices and proactive responses to emerging challenges. Data-driven approaches enable decision-makers to analyze complex economic systems, identify patterns, and forecast potential outcomes. By using data analytics and modeling, communities can anticipate the impacts of different interventions and make informed choices about resource allocation.<sup>33</sup> This data-driven decision-making helps identify gaps and areas of vulnerability, enabling proactive responses to emerging challenges. Moreover, technology facilitates real-time information sharing, enhancing coordination during crises and improving the effectiveness of response efforts. By harnessing data and technology, communities can adapt quickly to changing circumstances, strengthen resilience, and enhance the efficiency and efficacy of their economic development initiatives.

## Economic Developers' Role in Building Resilience

Contextualizing the role of the economic developer within the resilience landscape to build both direction and accountability is crucial. Because shocks affect everyone within an ecosystem, everyone plays a role in building resilience. This shared responsibility can be empowering but may also dilute accountability.

Seasoned economic development strategists, especially those active since 2020, have likely contended with significant economic challenges in their communities due to COVID-19. During this time, there have been many examples of innovative efforts across the country to gather resources, chart a path to recovery, and enable local and regional economies to become more resilient and thrive long-term. This report is intended to shed light on some strategies that economic development offices can enact today to learn from the recent global disasters that may help to inform better resilience practices for the future with longer lasting and more equitable outcomes.<sup>34</sup>

Economic developers can take specific actions to bolster the resilience efforts in their communities, such as the following:

- Ensuring sufficient economic diversification both for industry diversity and diversity by size and ownership of local business;
- Explicitly incorporating resilience into economic development plans;
- Evaluating local workforce needs and creating strategic workforce development;
- Creating lines of communication between businesses of varying sizes to ensure a network of support; and,
- Delivering technical assistance in navigating insurance and assistance programs.

### Evaluating the Economic Base

Two integral components create a more resilient base for a local economy through economic diversity. Firstly, sector diversification—which implies maintaining a variety of industries performing diverse functions—provides alternatives if a particular sector starts struggling or is especially vulnerable to the impacts from shocks. For instance, while hurricanes or fires wreak havoc on local retail, tourism, and agriculture, the construction industry capitalizes on rebuilding infrastructure across the community.<sup>35</sup>

Secondly, diversity in industry size plays a crucial role. Across the United States, approximately 54.4% of U.S. firms have five employees or fewer. However, larger firms account for a greater share of employment across all industries, and generally show greater resilience to shocks and offer above-average pay.<sup>36</sup> A healthy mix of small, medium, and large businesses, along with a connecting network, ensures the local economy can withstand shocks.

### Optimizing Workforce Development Initiatives

Workforce needs often pose chronic stressors to an economy. Along with workforce preparedness comes conversations about low-, medium-, and high-wage jobs in the area, upward mobility in the job market, and the availability of new workers. These components are central to equity conversations, ensuring all workers, regardless of their backgrounds or location, have equal opportunities to earn a stable income that shields them from disaster impacts.

According to a 2021 Manufacturers Alliance Foundation report, “more than half of department leaders (and two-thirds in human resources) report that workforce/talent availability will be among the most influential factors shaping the future of work in their department over the next 1-3 years.”<sup>37</sup> Planning for shifts in the workforce can be challenging and can require future planning as well as collaborating with local educational institutions, internship, and apprenticeship programs. These challenges can have spectacular returns in the long run. When a community has sufficient worker distribution, and when all

members of a community make a sufficient income to save in preparation for a shock, the resilience of an economic ecosystem improves.

### Preparing for New Technologies

The impact of technology has been a constant factor facing local and regional economies since the dawn of the industrial age. Contemporary discussions often center around machine learning, artificial intelligence, and advanced manufacturing potentially displacing jobs. Developing resilience solutions at a local level to address these potential disruptions requires a multifaceted approach that includes the following:

1. **Infrastructure development:** To ensure a community can participate in new technology backed work, it is critical to ensure the right infrastructure is in place. This includes not only electricity and broadband, but also access to water for cooling systems and space to construct high powered computing resources.
2. **Educational pathways:** Due to the ever-evolving nature of technology, it is crucial to equip the populace with both formal (university, community college) and informal (online accreditation, mentoring programs, coding academies) learning opportunities to help them adapt to technology changes.

### Addressing Equity

Resilient economic development cannot be achieved without addressing equity. Chronic stressors to the community are often deeply rooted in inequities of the community, including pockets of persistent poverty, blighted areas, barriers to upward employment and income, and the availability of wraparound and recovery services.<sup>38</sup>

Throughout history, various economic development strategies, policies, and interventions have inadvertently or intentionally magnified disparities and inequalities, underscoring the need to prioritize equity and diversity. The absence of a conscious emphasis on these principles can result in economic development policies that neglect certain demographics, perpetuating imbalances in income, living standards, education, and employment prospects. Such exclusion, whether intentional or otherwise, restricts access to well-compensated employment and overall labor force participation for particular groups, creating a chasm between potential economic vitality and actual economic performance.

The ramifications of economic development policies that marginalize specific groups extend beyond mere economic considerations, encompassing significant social costs. These may manifest in diminished economic output and productivity and increased poverty levels. Conversely, the development of equity and diversity within economic development strategies can catalyze positive transformations, fostering heightened innovation, entrepreneurial activity, and an inclusive economy.

Equity encompasses several core elements, including equitable access to services and benefits, inclusivity in decision-making processes, and fair distribution of outcomes.<sup>39</sup> These facets epitomize the essence of fair assistance extended to all, with an emphasis on bolstering communities that have been historically deprived of such opportunities.

The Federal Reserve Bank of New York found that 63% of small businesses that reported natural disaster losses were forced to close temporarily. The length of closure time differed across ethnic lines as



Hispanic and African American owned small businesses had to stay closed longer as compared to white-owned or Asian-owned businesses.<sup>40</sup> Time is of the essence for small businesses, as extended closure periods equate to prolonged revenue loss. Ensuring resources availability for all businesses—particularly those owned by people of color, the younger generation, or less affluent owners—is key to a robust recovery from a shock, leading to a more resilient future economy.

## A Holistic Approach

Resilience is no longer a peripheral concept but an essential ingredient of sustainable growth. As global complexities continue to rise, our ability to preemptively address and adapt to disruptions will shape the trajectory of our progress. By situating economic development within the resilience landscape, we not only buffer against potential adversities but also open avenues for innovation, collaboration, and long-term prosperity. More than a set of isolated initiatives, resilience must be deeply woven into the socio-economic fabric of our communities. Key to this endeavor is understanding and harnessing the interconnected nature of local and global economies and developing solutions using systems-based approaches.<sup>41</sup>

The broad range of potential disruptions underline the inherent complexity of this task.<sup>42</sup> However, such challenges also point towards opportunities for proactive intervention. Strategies such as industrial diversification, fostering innovation, and investing in infrastructure and disaster preparedness serve as invaluable tools to buffer against shocks and safeguard economic vitality.<sup>43</sup>

Furthermore, this perspective highlights the central role of key institutions and stakeholders in the resilience building process. Economic development organizations, governments, emergency management, and nonprofits, among others, all constitute essential components of this resilience network.<sup>44</sup> Their coordinated efforts, coupled with a keen understanding of the distinct needs and vulnerabilities of communities at various geographical levels, provide the foundation for resilience initiatives.

At an individual level, this implies preparedness measures such as strengthening homes, securing essential supplies, and building relationships with others in the community.<sup>45</sup> At a neighborhood and community level, it requires understanding unique community needs and vulnerabilities, along with strategic resource allocation to address these.<sup>46</sup> Through these multilayered efforts, a truly resilient community can emerge, capable of navigating shocks and thriving amidst uncertainties.

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