

**The State of Disaster Resilience of Small Businesses natural hazard' or
'disaster'**

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The role of small businesses within communities is vital and stimulating to the city overall. Businesses provide goods and services to residents and visitors, employ local neighbors, and contribute to the well-being of the greater neighborhood. For businesses, resilience is the ability to survive, adapt and grow regardless of the shocks or stresses experienced. This includes being prepared for disasters, knowing how to respond to disasters, and understanding how to be connected both before and after a disaster. Small businesses have been largely forgotten when it comes to preparation for, response to or recovery from disasters. There are resilience improvement initiatives for major Cities and multinational companies, however, small businesses are left behind even though they are the major source of employment, of new jobs created and often serve as critical supply links both to the community as well as to other companies.

Sponsor and Contributors

The United Nations Office for Project Services (UNOPS), in partnership with the United Nations Office for Disaster Risk Reduction (UNISDR) and with funding support from the Walmart Foundation, launched a study in 2016 to evaluate the disaster preparedness and resilience of small- to mid-size businesses (1). This study was initiated after the devastating Category 5 Hurricane Katrina (2005) in New Orleans, Louisiana, USA which caused the death of 1,833 people and caused infrastructure damages in excess of \$125B as a result of storm surge and levee failure. As a typical coastal city with many SMEs, this study focused on surveying over 200 SMEs in New Orleans to better understand the degree of preparedness to plan for, respond to and recover from a natural disaster.

Why New Orleans?

New Orleans celebrated its 300-year anniversary in 2018 and is no stranger to extreme weather events and has a large population of SMEs. The results of this project are documented in a 2016 UNOPS report entitled “Disaster Resilience of Small to Mid-Size Businesses on New Orleans Historic Corridors”. New Orleans also was an excellent candidate for this study given that in August 2015 New Orleans became the first city in the world to produce and release a comprehensive city resilience strategy (Resilient New Orleans: Strategic actions to shape our future city) and has a Chief Resilience Officer empowered to make the City disaster resilient.

Over 80% of the small businesses in New Orleans were destroyed by Hurricane Katrina, critical neighborhood supply chains were interrupted, and long-lasting impacts occurred to the Community and Region. Thirteen years later New Orleans population is 84 percent of its pre-Katrina size.

This study was conducted by AECOM with support from PriceWaterHouse Coopers(PWC), IBM, Resilient NOLA, Florida International University, New Orleans Redevelopment Authority and staff from the City of New Orleans. The author was the principal investigator for this study.

Small and Mid-sized Enterprises (SMEs)

Small and mid-sized enterprises (SMEs) are defined as businesses having less than 500 employees on-site and can be extremely important in making a city more resilient. These businesses are partners to the planning and response activities, and importantly act as a catalyst to the recovery following a disaster. SMEs represent a significant portion of employment and contribute a great deal to local economies. In the United States there are over 28 million small businesses. In many cities including New Orleans, SME's make up most businesses operating within the City. SMEs generate the lion's share of private sector revenue and include most employees. For example, in New Orleans over 90 percent of the SMEs have 25 or fewer employees. As important as SMEs are to any city, they are also extremely vulnerable to both acute shocks and chronic stresses from natural hazards including hurricanes, typhons, tornados, earthquakes, storms, droughts, wildfires, and high temperature events.

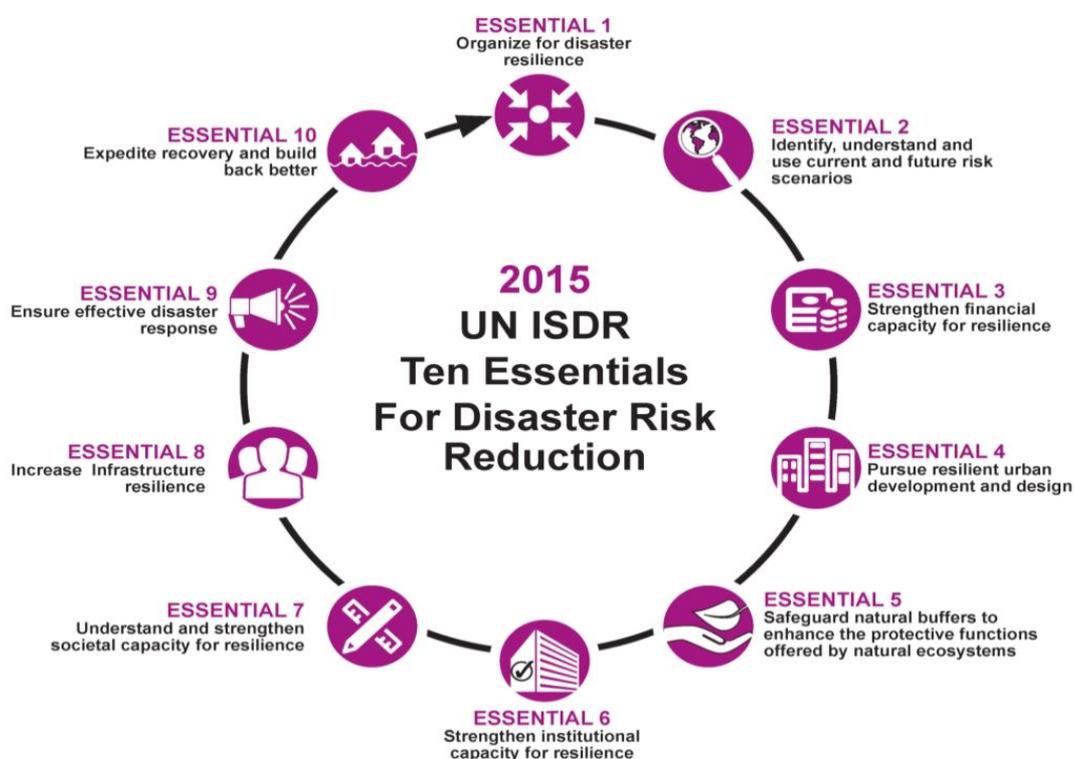
SMEs are often staffed with a handful of employees, independently owned and operated, and generally thinly capitalized with limited financial resources. With emphasis focused on building their business and satisfying customers, they have high dependency on suppliers such as public utilities (water, power, waste). Disaster planning is not at the forefront of investment, planning or in daily decision-making. When a disaster event occurs, such as an extreme storm, the capability of SMEs to persevere can be integral factor for the recovery of the neighborhood and the city. As such, it is important to enable SMEs — through education, training, and tools — to endure these events, respond appropriately after the event, and reopen their doors to resume business as soon as possible.

Purpose

To better understand disaster preparedness in the SME private sector segment, a face to face interview process was conducted of 208 businesses to identify how businesses and City government can collectively improve disaster resilience.

Survey Instrument Development

The first step in this study was to prepare a survey instrument that could be either personally administered via face to face interviews or filled out by the SMEs. This survey tool was developed following the UN's Ten Essentials for Disaster Risk Reduction:



and the Disaster Resilience Scorecard (jointly developed by AECOM and IBM). The Scorecard was issued to the public domain in 2014 (2). Containing aspects of each of the Ten Essentials, the Survey was divided into five sections: 1. Previous Disaster History 2. Awareness of Potential Disasters & Impacts 3. Status of Disaster Preparedness 4. Action Plan During a Disaster, and 5. Recovery and Building Back Better

The survey tool was developed, and beta tested on two different populations. As the survey focused on natural disasters, a unique aspect of the survey was the inclusion of a scenario typical for the region. The scenario defined conditions associated with a storm surge, flooding event with outage of utilities, supply chain disruption,

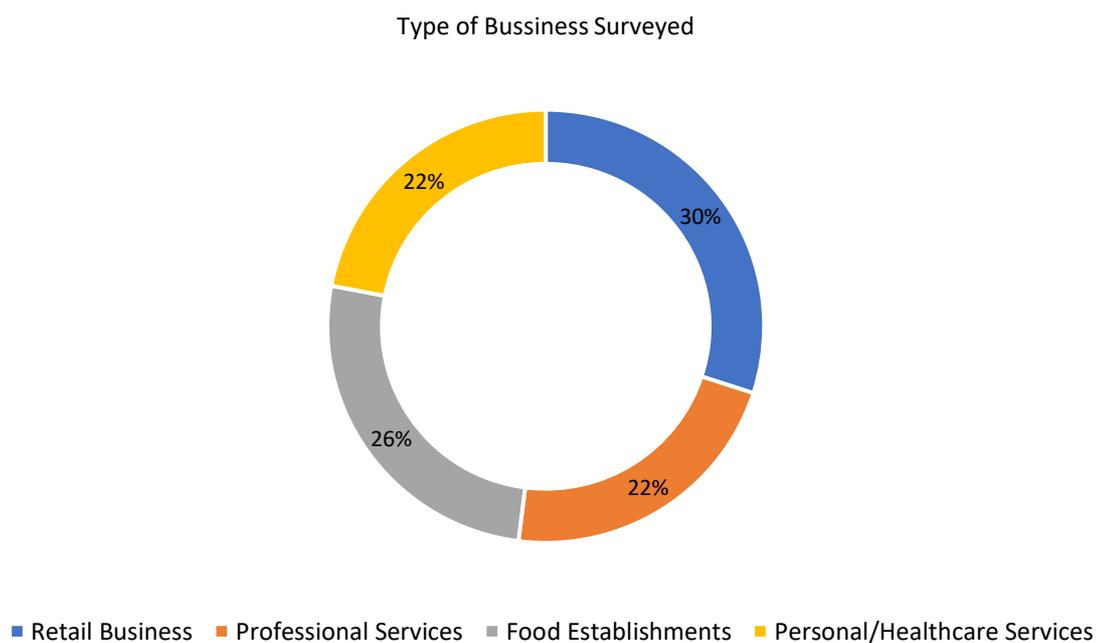
and damaged infrastructure. A series of questions that followed asked participating businesses to consider the scenario in their response.

Prior to the survey

Basic characteristics of each SME surveyed were collected before in-person interviews were conducted (e.g. through internet searches, available record review (elevation, FEMA floodplain data, etc.)). This included business characteristics such as the date the business was established, ownership type (i.e. Franchise, Corporation, Individual or Partnership), number of employees, neighborhood socio-economic features, and type of business). Given the disaster scenario, attention was focused on flood risk profiles based on elevation and location relevant to 100-year and 500-year floodplains (2014 Flood Insurance Rate Maps). SMEs surveyed were located above and below sea level.

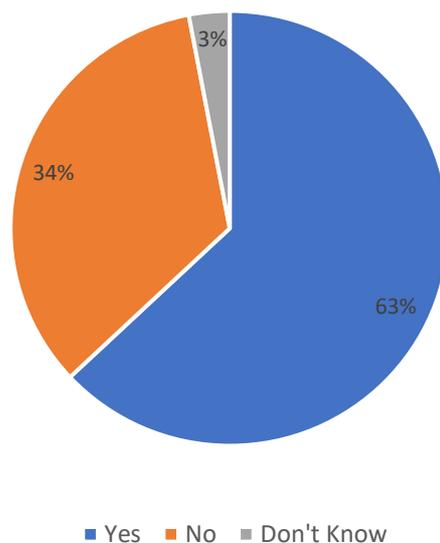
SME Characteristics

Survey participants were categorized by neighborhood, date established, business type, number of employees, and role of the person interviewed (owner, manager, employee). “Business Type” was defined as one of five categories: Retail, Food preparation, professional services, personal/healthcare services. The breakdown by business type is presented in figure2.



The date a business was established was another key characteristic with attention focused on SMEs established pre- or post-Hurricane Katrina (2005). Given that 80 percent of the SMEs were destroyed in 2005, nearly two thirds of SMEs interviewed were established after Katrina. Of the businesses surveyed, 63% reported prior experience with disasters as illustrated below:

Prior Experience with Natural Disasters

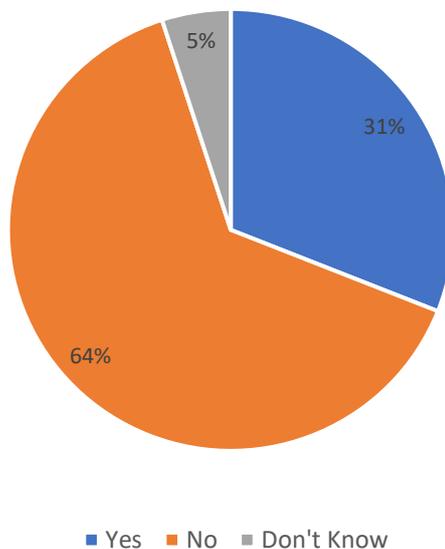


Most businesses interviewed were SMEs (73%) with Individual or Partnership ownership; nearly three fourths of business owners lived in the City. The remaining (27%) businesses surveyed were either franchise (17%) or corporate-owned (10%) stores. Nearly all the SMEs leased their business space with dependency on building owner to make resilient improvements. Interviews were largely held with actual owner or the manager of the business.

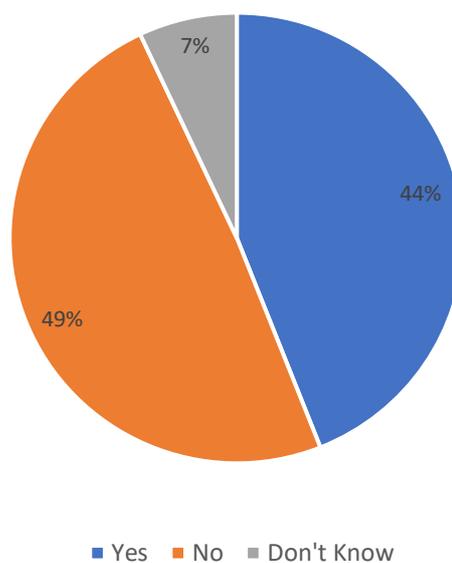
Overarching Themes from Interviews

The vulnerability of SMEs in New Orleans remains very high in part since a full third the businesses surveyed have not experienced a disaster, despite being in a high-risk location. Ironically, the majority of the businesses surveyed did not have a written evacuation plan or emergency plan in place due in part because many businesses were formed in 2015. Figure 4 illustrates the number of companies who have an evacuation or emergency plan in place:

Business with an Evacuation Plan



Businesses That Have an Emergency Plan

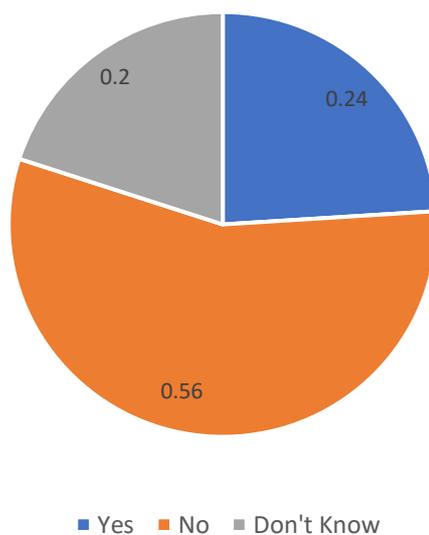


As expected the SMEs are highly dependent upon public utilities and their supply chain for operation. Interruption of either will greatly impact these businesses. A supply chain breakdown would close over half of the SMEs within two weeks. The supply chain is potentially just as important to a business' resilience as keeping one's own business intact. Almost every SME acknowledged their dependency on public utilities (96% on power; 86% on water), few businesses have backup power and/or water and only 5% reported having both backup water and power sources.

Risk Profile is very high for SMEs

The majority of SMEs in New Orleans are located below sea level within the 100-year and/or 500-year floodplain. There was little evidence of social cohesion: SMEs are often not connected with other businesses or community groups that addresses disaster risk reduction as illustrated in Figure 5

Businesses That Participate in Disaster Preparedness Groups

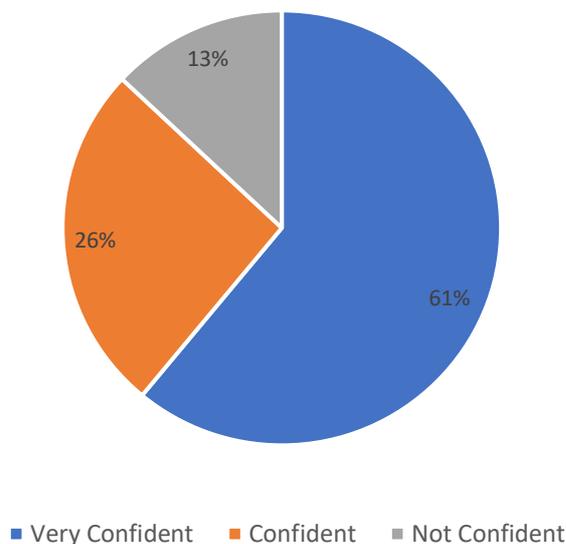


*Two thirds who responded "yes" were previously impacted by disaster event

The vulnerability of SMEs was not correlated with socioeconomic features of the neighborhood. SMEs within high socioeconomic neighborhoods in high risk floodplains did not have risk reduction actions in place.

Disaster Preparedness is low based on several indicators (i.e. emergency plans, having backup power system, storm/flood proofing measures). Preparedness is higher among those businesses that have weathered a disaster event. Interestingly, 87 percent of businesses reported to have confidence or high confidence in their insurance coverage, as illustrate in Figure 6.

Degree of Confidence in Insurance Coverage



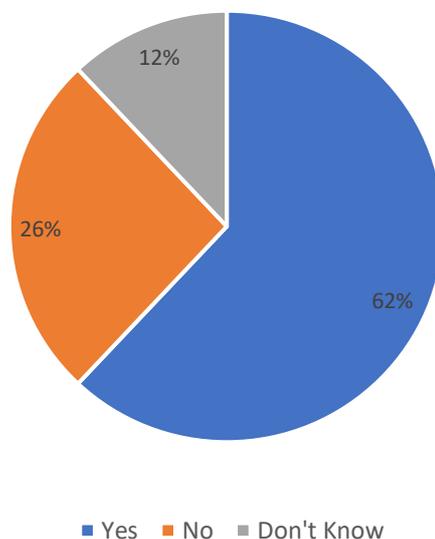
While some of this confidence may reflect known, capable insurance policies, this confidence may give businesses a false sense of security and lead to a lack of investment in disaster preparedness. This is ironic from the standpoint that North America incurred disaster losses that were insurance covered at 56 percent of overall losses in 2015; the amount of insurance coverage of losses in 2016 was slightly higher according to the MunichRE NatCatSERVICE (3). Does the presence of insurance serve as a reason not to prepare for disaster events?

As illustrated previously, Emergency Plans and Evacuation Plans are not common; fewer than half of the businesses surveyed have plans in place. Furthermore, less than one in four have a written emergency plan. Newer businesses, especially individually owned businesses in rented space, typically do not have either plans in place. If we consider those businesses established before 2005 the situation is better in that about half of the business did have a plan of some type in place. About 75% of the Corporate stores or franchise businesses have emergency plans in place.

Only 25 percent of all the businesses surveyed have established storm/flood proofing measures as illustrated in Figure 7 with a higher proportion of corporate owned stores or franchises taking actions to storm

proof their buildings.

Percentage of Businesses Who Have Taken Storm or Flood Proofin Measures



There is a Need and Desire for Increased Disaster Risk Reduction

There is a lack of awareness of disaster risk reduction procedures, however, many business representatives expressed an interest in learning more. Though many businesses have work to do in disaster preparedness, there are a few standout businesses that serve as good role models and could be good coaches for others. Disaster risk reduction and resilience improvement awareness is low. Consider that over half of businesses responding did not know the process to return to their business after a mandatory, City ordered evacuation. Almost all respondents are interested in learning more about local procedures for accessing and/or responding to a disaster event. There is high interest to get more communication and training from the City on improving resilience to achieve disaster risk reduction measures. When given the opportunity, many businesses requested additional information or said they would be interested in additional training on disaster preparedness and protocols.

Green Infrastructure Awareness Low

Only 29 percent of respondents stated they are familiar with green infrastructure to improve resilience. This is in line with the fact that most businesses lease their space rather than own. Green infrastructure is a resilient approach to managing weather impacts by working with nature to better manage stormwater, minimize

heat stress, improve air/water/soil. Examples such as rain gardens, bioswales, and tree planting were used by the City but not individual business owners.

Some Businesses Have Acted to Improve Resilience

In New Orleans, an area of frequent flooding, only 26 percent reported taking storm/flood proofing measures as illustrated previously. Measures most often cited were raising equipment/inventory, installing storm shutters, upgrade roofing, maintaining an inventory of sand bags & plywood (for windows), upgrading windows and in some cases actually raising the building foundation.

Recommendations for SME's Disaster Risk Reduction

15 Actions SMEs can take to improve the resilience of their businesses:

1. Prepare a written emergency plan, that is shared with all employees, that contains emergency phone numbers, addresses risk to natural hazards and helps to minimize flood and disaster impacts;
2. Have critical equipment and inventory (such as backup files, generators, electronic equipment, important supplies, etc.) located in an elevated position above a probable high-water mark;
3. Have an inventory of sand bags or other resources on site or nearby to minimize water intrusion;
4. Define the conditions when the evacuation of employees is to occur (i.e. when certain flood conditions are exceeded) and develop an evacuation plan that includes meeting points and a contact person to communicate with all employees;
5. Businesses should regularly back-up electronic data, including important business critical information and records, and keep a backup copy in a separate location not vulnerable to natural hazards;
6. For grocery stores and restaurants, consider stand-by emergency power supply, such as backup generator (with enough fuel on site) to operate refrigeration and other critical infrastructure in the event of a power failure;
7. For restaurants, consider both backup power and water supply enough to operate for up to seven days or until food inventory is depleted.

8. Connect with local neighborhood groups to establish a support system that can provide information and physical support in case of a disaster. Social cohesion is extremely important in disaster events. Businesses involved in neighborhood groups will often have more decision-making power and a better local understanding of vulnerabilities and history. These groups also serve as avenues to build disaster preparedness.
9. For businesses that own their operating space, purchase and/or review existing insurance policies, such as flood insurance, property insurance, and business interruption insurance. Be sure that these policies contain coverage enough to insure recovery after a disaster. If possible, establish rain garden or other green infrastructure within the business' footprint to minimize flood effects. Consider what specific physical vulnerabilities exist on property and take flood/storm proofing measures, such as elevating utilities, performing annual maintenance on drainage systems, sealing building, or having storm shutters in place, to reduce future risk of damage.
10. For businesses within floodplain, consider elevating entire building, if possible.
11. Research to determine what natural disaster grant programs are available, through State and Federal governmental agencies, for business owners. Some programs are applicable for pre-disaster planning and preparation while others are available for post-disaster, such as the U.S. Small Business Associations Disaster Loans through its Office of Disaster Assistance.
12. For businesses that lease or rent their property, be sure you understand what rights you have as a tenant. Some tenants may be able to make changes to the space you occupy if lease/landowner allows, such as elevating building controls, or adding a backup power supply. It is important to understand terms of the lease in the event of property damage from a disaster, including who is responsible for repairs and rebuilding and under what conditions; Communicate with property owner on disaster preparedness and resilience of existing building, determine what is building's history and its vulnerabilities (is building up to code for disaster safety, what storm-proofing actions have been taken; etc.);
13. For businesses that lease consider purchasing renter's insurance and business interruption insurance with enough coverage to insure business recovery following a disaster; and make sure critical inventory is mobile, that important data is backed up and in a specific location out of harm's way.

14. For business neighborhoods, develop social interactions to create cohesion among businesses. This cohesion provides pockets to implement resilience strategies unique to the neighborhood. Each neighborhood can become a “Resilient Corridor”, which can serve as the bridge between what the businesses and local organizations can or need to do, and what the City can provide.
15. For each neighborhood, establish a “Resilience Champion” to establish a communication process such that each business may assist each other in preparing for, responding to and recovering from a disaster. The “Resilience Champion” can maintain day-to-day resiliency initiatives, meet with the city to coordinate efforts with other neighborhoods and coordinate training and practice drills.

Actions the City May Take to Strengthen SME Disaster Preparedness

The City has an important role to expand communications to the businesses regarding resilience improvement and disaster preparedness. This responsibility should include dissemination of materials, training and disaster risk reduction preparation. It is especially important to build awareness of new businesses in the City that have not endured a disaster event. Businesses may be a catalyst for accelerating recovery after a disaster; as such it is in the City’s best interest to support SMEs to be prepared for and resilient to disasters.

14 Actions the City may take to strengthen SME disaster preparedness:

1. Develop and distribute Emergency Resource Materials on a quarterly basis. Materials should be informative regarding natural disasters typical of the season, be brief (1-2 pages maximum) and provide a clear definition of who to call in the City for further information.
2. The City should work with and through neighborhood associations to communicate for disaster risk reduction.
3. Establish, publicize and conduct training and disaster awareness building programs that are offered on a periodic basis. These training programs should be brief (1 hour), instructive, and conducted regularly. Businesses should be strongly encouraged to attend.
4. Provide resilience improvement information to the newly established businesses in the City, citing the perils they may face, the mitigating measures they may take, who the local Resilience Champion is and a list of who to contact for additional information on disaster preparedness and recovery.

5. The City should develop a template for a Resilience Plan that includes Emergency Evacuation details. This Resilience Plan must be submitted with each business license application annually. The template should be brief, clear, and specific to the business type.
6. Establish an ongoing training program so that new businesses may participate as they are formed., The City could identify and direct citizens who volunteer to help businesses with basic preparedness activities such as lifting utilities or developing corridor green infrastructure projects such as rain gardens.
7. Establish a no-interest loan or grant program for which businesses could apply to fund projects to improve their resilience. Small loans or grants can be distributed for approved resilience projects such as purchasing stand-by generators or to perform storm/flood proofing upgrades.
8. The City should maintain a supply of back-up power systems that could be deployed for short periods of time to critical businesses (pharmacy, grocery store, critical care facilities, etc.) when power failures occur.
9. Evaluate the feasibility of establishing a distributive energy network with local micro grid renewable energy stations at critical infrastructure points in the city. While main power sources may be down, the renewable energy supply may maintain businesses deemed “critical” for recovery operations, such as healthcare facilities, grocery stores, and gas stations.
10. Establish LED solar street lighting program so that street lights function even when power is out of service.
11. Conduct periodic business surveys to define needs and improve communications between businesses in the community and the City.
12. Specific to New Orleans, conduct a pilot Radial Groundwater Pumping System on a low-lying neighborhood to better manage flooding. Thus subsurface water storage could be increased in advance of storm events if groundwater pumping is correlated to anticipated weather conditions.
13. Establish incentives for business and property owners to retrofit their facilities to become flood proof and disaster resilient. The incentives may be in the form of tax credits, grants

or no-interest loans. Examples of retrofitting priorities include elevating buildings above base flood elevation, building flood openings to allow entry and exit of floodwaters to prevent collapse, and floodproofing the building's utilities. Green infrastructure solutions that provide multiple benefits, including disaster risk reduction, could be included in this incentive program.

14. Commission a third-party review of City building codes and ordinances to determine their applicability, completeness and appropriateness for the climate conditions anticipated for at least the next ten years. Institute a process to review these codes every five years to ensure that codes address changing weather patterns, environmental changes, and conditions within the city. Climate projections are re-evaluated regularly, so having codes reviewed every 10 years would take any updates into account. In addition, the City should work more proactively with insurers on topics related to building codes regarding changing climate and environmental conditions.

Concluding Remarks

In conclusion, older businesses that 'survived' extreme weather disasters are generally better prepared than the businesses which do not have that institutional memory. It is important that the lessons learned be actively shared to build the institutional memory so others know what to expect, how to react and the steps to take to re-open after a disaster. In this study nearly two thirds of the businesses surveyed were established since 2005, and do not demonstrate appropriate preparedness characteristics to withstand a major disaster. Awareness of what to do is low. Resources to fortify their business are not present. Because most SMEs lease their space, the options to improve the facility's resilience are limited, however, best practices and resilience know how should be readily made available.

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