

NIST Special Publication 1264

Respondent Summary Report

Business Survey: COVID-19 Impacts and Recovery in
the Context of Complex Events

Jennifer F. Helgeson¹, Juan F. Fung¹, Alfredo R. Roa Henriquez¹,
Ariela Zycherman², David T. Butry¹, Claudia Nierenberg²,
Yating Zhang¹, Donna H. Ramkissoon¹

¹ Applied Economics Office, National Institute of Standards and Technology

² Climate Program Office, National Oceanic and Atmospheric Administration

December 2020

Respondent Summary Report

Business Survey: COVID-19 Impacts and Recovery in the Context of Complex Events



This publication is available free of charge from:
<https://doi.org/10.6028/NIST.SP.1264>

December 2020

U.S. Department of Commerce
Wilbur L. Ross, Jr., Secretary
National Institute of Standards and Technology
Walter Copan, NIST Director and Undersecretary of Commerce for Standards and Technology

Certain commercial entities, equipment, or materials may be identified in this document in order to describe an experimental procedure or concept adequately. Such identification is not intended to imply recommendation or endorsement by the National Institute of Standards and Technology, nor is it intended to imply that the entities, materials, or equipment are necessarily the best available for the purpose.

This publication is available free of charge from: <https://doi.org/10.6028/NIST.SP.1264>



Table of Contents

Table of Figures	5
Table of Tables	7
Table of Appendix Figures	8
Glossary	10
Keywords.....	10
Acknowledgements.....	11
Executive Summary.....	13
1 Introduction and Background	15
1.1. Introduction	15
1.2. Importance of Small Businesses	15
1.3. Natural Disasters and Extreme Weather During a Pandemic	16
1.4. Audience and Partners.....	16
1.5. Objectives	17
2 Survey Overview	18
2.1. Survey Sections and Data Types	18
2.2. Survey Participants and Data Collection	19
3 Data Summary – Quantitative Data	22
3.1. Opening section	22
3.2. COVID-19 Impact and Adaptation Section	25
3.3. Natural Hazard Section	40
3.4. Attitudes Section.....	53
4. Discussion and Initial Findings.....	70
4.1. Current SME experience with COVID-19.....	70
4.2. SME experience with natural disasters during the COVID-19 Pandemic.	71
4.3. Current and future plans to address complex events: concurrent COVID-19 and natural disaster risks.	71
5. Future Efforts	72
References	73
Appendix	74

Table of Figures

Figure 1. Longitudinal study objectives.....	18
Figure 2. Census regions broken down with state outlines. Source: U.S. Census Bureau	20
Figure 3. Percent respondents by Census regions. n = 1357	21
Figure 4. The role of respondents in their organizations (n = 1363).....	23
Figure 5. The total number of employees in their organizations (n = 1354).....	24
Figure 6. Whether the organization is/was designated as essential (n = 1123).....	25
Figure 7. The impacts of the COVID-19 pandemic on the continuity of business operations (n = 1119).	27
Figure 8. Word cloud indicating themes across impacts of the COVID-19 pandemic on continuity of business operations indicated by respondents.	28
Answers by those respondents who indicated “other” are presented in Figure 10. In these free-form answers, highlighted issues were payments coming due and cancellations of orders—both	
Figure 9. Impacts of the COVID-19 pandemic on business operations since March 13th (n = 1090).	28
Figure 10. Word cloud indicating themes across impacts of the COVID-19 pandemic on their business’ operation indicated by respondents.	31
Figure 11. Major factors that influenced the choice to temporarily close, change hours or staffing changes (n = 1122).	32
Figure 12. Word cloud indicating themes across factors that influenced decisions to close businesses temporarily.	33
Figure 13. Most trusted sources of information for COVID-19 across all respondents (n = 1120).	34
Figure 14. Word cloud indicating themes across sources of information indicated by respondents indicating “other.”	35
Figure 15. Requested or planned use of financial assistances (n = 1103).....	36
Figure 16. Word cloud indicating themes across requested or planned use of financial assistance by respondents indicating “other.”	37
Figure 17. Adaptation measures employed (n = 1050).....	38
Figure 18. Word cloud indicating themes across changes and adaptation measures made by respondents indicating “other.”	40
Figure 19. Concerns for natural hazards (n = 1077).	42
Figure 20. Whether the event type(s) occurred at this location since March 13th, 2020 (n = 1083).	43
Figure 21. Response to the event(s) during the COVID-19 pandemic (n = 298).	44
Figure 22. Number of natural hazard events in the past 10 years (n= 837).....	45
Figure 23. Mitigation/preparedness actions taken in the past to prepare the organization against natural hazards (n= 898).....	47
Figure 24. Word cloud detailing mitigation/preparedness actions taken in the past to prepare the business against natural hazards indicated by respondents who selected “other.”	49
Figure 25. Responses to whether past actions have helped the business to cope with COVID-19 (n=1036).....	50

Figure 26. Word cloud presenting information about the types of actions that respondents have taken in the past towards natural disasters that have helped their business cope against COVID-19 impacts..... 51

Figure 27. Responses to whether planning for natural hazards would change in the future (n= 629). 52

Figure 28. Word cloud presentation of themes across how respondents’ planning for natural hazards in the future may change relative to COVID-19 coping and adaptation..... 53

Figure 29. Organization’s top concerns regarding the impact and recovery from COVID-19 (n= 1006). 55

Figure 30. Word cloud presentation of themes across top concerns regarding the period of impact and recovery from COVID-19. 57

Figure 31. Responses to whether the organization has implemented steps to reduce concerns (n= 1001). 58

Figure 32. Responses to whether the organization has the resources to reduce concerns (n= 1003). 59

Figure 33. Word cloud presentation of resources needed by businesses to reduce their concerns specific to other risks coming to fruition during the COVID-19 transmission period. 60

Figure 34. Time before returning to pre-COVID conditions (n= 992)..... 61

Figure 35. Word cloud presentation of themes across answers provided by respondents who selected “other” when asked about the estimated time before returning to pre-COVID business conditions..... 62

Figure 36. Business sector (n= 930)..... 63

Figure 37. Years in business (n= 915). 64

Figure 38. Ownership structure of sampled businesses (n= 853). 65

Figure 39. Demographics of sampled businesses (n= 853) 66

Figure 40. Relative importance of specific groups to organizational recovery from COVID-19... 67

Figure 41. Level of agreement with COVID-19 impact statements 69

Table of Tables

- Table 1. Roles by Census regions (n = 1346). 23
- Table 2. Business sizes by Census regions (n = 1337)..... 24
- Table 3. Designated essential and nonessential businesses by Census regions (n = 1112). 25
- Table 4. The impacts of the COVID-19 pandemic on the continuity of business operations by Census regions (n = 1108). 27
- Table 5. The impacts of the COVID-19 pandemic on business operations since March 13th by Census regions (n = 1079). 29
- Table 6. Major factors that influenced the choice to temporarily close, change hours, or staffing changes by Census regions (n = 1111). 32
- Table 7. Most trusted sources of information for COVID-19 by Census regions (n = 1109). 34
- Table 8. Requested or planned use of financial assistance by Census regions (n = 1092)..... 36
- Table 9. Adaptation measures by region (n = 1039). 39
- Table 10. Concerns for natural hazards by Census regions (n = 859)..... 42
- Table 11. Whether the event type(s) occurred at this location since March 13th, 2020 by Census regions (n = 1073). 43
- Table 12. Response to the event(s) during the COVID-19 pandemic by Census regions (n = 294). 44
- Table 13. Number of natural hazard events in the past 10 years by Census regions (n = 826). .. 45
- Table 14. Mitigation/preparedness actions taken in the past to prepare the business against natural hazards by Census regions (n = 888)..... 47
- Table 15. Responses to whether past actions have helped the business to cope with COVID-19 by Census regions (n=1025). 50
- Table 16. Responses to whether planning for natural hazards would change in the future by Census regions (n= 620). 52
- Table 17. Organization’s top concerns regarding the impact and recovery from COVID-19 by Census regions (n= 997). 55
- Table 18. Responses to whether the organization has implemented steps to reduce concerns by Census regions (n= 992). 58
- Table 19. Responses to whether the organization has the resources to reduce concerns by Census regions (n= 994). 59
- Table 20. Time before returning to pre-COVID conditions by Census regions (n= 984). 61
- Table 21. Business sector by Census regions (n= 922). 63
- Table 22. Years in business by Census regions (n= 907). 64
- Table 23. Description of business by Census regions (n= 845). 66
- Table 24. Relative importance of specific groups to organizational recovery from COVID-19 68
- Table 25. Level of agreement with COVID-19 impact statements 69

Table of Appendix Figures

Figure A-1. The role of respondents in each Census region. n = 1346 74

Figure A-2. Business sizes in each Census region. n = 1337 74

Figure A-3. Designated essential and nonessential businesses in each Census region. n = 1112 75

Figure A-4. The impacts of the COVID-19 pandemic on the continuity of business operations by Census regions. n = 1108 75

Figure A-5a. The impacts of the COVID-19 pandemic on business operations since March 13th in each Census region. n = 1079 (More than 4 weeks) 76

Figure A-5b. The impacts of the COVID-19 pandemic on business operations since March 13th in each Census region. n = 1079 (1-4 weeks) 76

Figure A-5c. The impacts of the COVID-19 pandemic on business operations since March 13th in each Census region. n = 1079 (Less than 1 week) 77

Figure A-6. Major factors that influenced the choice to temporarily close, change hours, or staffing changes by Census regions. n = 1111 77

Figure A-7. The most trusted sources of information for COVID-19 in each Census region. n = 1109 78

Figure A-8. Requested or planned use of financial assistances in each Census region. n = 1092 78

Figure A-9. Adaptation measures by region n = 1039 79

Figure A-10. Concerns for natural hazards by Census regions. n = 859 (Option ‘None’ is not included) 79

Figure A-11. Whether the event type(s) occurred at this location since March 13th, 2020 by Census regions. 80

n = 1073 80

Figure A-12. Response to the event(s) during the COVID-19 pandemic by Census regions. n = 294 80

Figure A-13. Number of natural hazard events in the past 10 years by Census regions. n = 826 81

Figure A-14. Mitigation/preparedness actions taken in the past to prepare the business against natural hazards by Census regions. n = 888 81

Figure A-15. Responses to whether past actions have helped the business to cope with COVID-19 by Census regions. n= 1025 82

Figure A-16. Responses to whether planning for natural hazards would change in the future by Census regions. n= 620 82

Figure A-17. Organization’s top concerns regarding the impact and recovery from COVID-19 by Census regions. n= 997 83

Figure A-18. Responses to whether the organization has implemented steps to reduce concerns by Census regions. n= 992..... 83

Figure A-19. Responses to whether the organization has the resources to reduce concerns by Census regions. n= 994 84

Figure A-20. Time before returning to pre-COVID conditions by Census regions. n= 984..... 84

Figure A-21. Business sector by Census regions. n= 922..... 85

Figure A-22. Years in business by Census regions. n= 907 85

Figure A-23. Description of business by Census regions. n= 845 86

Glossary

AEO	Applied Economics Office at NIST
CER	Complex Event Resilience
COVID-19	Coronavirus Disease 2019 (COVID-19)
EWE	Extreme Weather Event
MBDA	Minority Business Development Agency
NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
RISA	Regional Integrated Science and Assessment
SBA	Small Business Administration
SME	Small – and medium-sized enterprise

Keywords

Adaptation, climate, community resilience, complex event, coping, COVID-19, extreme weather events, natural disaster, hazard, mitigation, online survey, pandemic, resilience planning, recovery, risk mitigation, small- and medium-sized enterprise, small business, survey instrument.

Acknowledgements

First and foremost the authors wish to thank all those who responded to the survey. The information learned is of great value and will hopefully make a difference to SMEs in the future. Thank you to all those who contributed ideas and suggestions for this report and the survey upon which this report is based as well as all those who helped distribute the invitation to participate in the survey.

We are grateful to members of NIST's Office of the Associate Director for Laboratory Programs (ADLP) and NIST's Public Affairs Office (PAO). Thanks to David Webb (NIST) and Emily Walpole (NIST) for time spent reviewing this document.

Sincere thanks goes to Therese McAllister (NIST), Howard Harary (NIST), Jason Averill (NIST), Maria Dillard (NIST), Jamie Kruse (East Carolina University), Douglas Hilderbrand (NOAA), Elizabeth Rohring (NOAA), Joshua Barnes (SBA), Bridget Gonzales (MBDA), Efrain Gonzalez (MBDA), Frederico Mini (MBDA), Brooks Nelson (U.S. Chamber of Commerce Foundation), and members of the NYC Department of Small Business Services.

Author Information

Jennifer F. Helgeson, Ph.D.
Research Economist
Applied Economics Office
Engineering Laboratory
National Institute of Standards and Technology
100 Bureau Drive, Mailstop 8603
Gaithersburg, MD 20899-8603
Tel.: 301-975-6133 Email: jennifer.helgeson@nist.gov

Juan F. Fung, Ph.D.
Research Economist
Applied Economics Office
Engineering Laboratory
National Institute of Standards and Technology
100 Bureau Drive, Mailstop 8603
Gaithersburg, MD 20899-8603
Tel.: 301-975-0484 Email: juan.fung@nist.gov

Alfredo R. Roa-Henriquez, Ph.D.
PREP Postdoctoral Fellow
Applied Economics Office
Engineering Laboratory

National Institute of Standards and Technology
100 Bureau Drive, Gaithersburg, MD 20899-8603
Tel.: 301-975-6481 Email: alfredo.roahenriquez@nist.gov

Ariela Zycherman, Ph.D.
Social Scientist and Program Manager, Climate and Societal Interactions Division
Climate Program Office,
National Oceanic and Atmospheric Administration
1315 East-West Highway Suite 100 Silver Spring, MD 20910
Tel.: 301-734-1244 Email: ariela.zycherman@noaa.gov

David T. Butry, Ph.D.
Office Chief, Research Economist
Applied Economics Office
Engineering Laboratory
National Institute of Standards and Technology
100 Bureau Drive, Mailstop 8603
Gaithersburg, MD 20899-8603
Tel.: 301-975-6136 Email: david.butry@nist.gov

Claudia Nierenberg
Chief, Climate and Societal Interactions Division
Climate Program Office,
National Oceanic and Atmospheric Administration
1315 East-West Highway Suite 100
Silver Spring, MD 20910
Tel.: 301-734-1245 Email: claudia.nierenberg@noaa.gov

Yating Zhang, Ph.D.
PREP Postdoctoral Fellow
Applied Economics Office
Engineering Laboratory
National Institute of Standards and Technology
100 Bureau Drive, Gaithersburg, MD 20899-8603
Tel.: 301-975-0427 Email: yating.zhang@nist.gov

Donna Ramkissoon
Administrative Office Assistant
Applied Economics Office
Engineering Laboratory
National Institute of Standards and Technology
100 Bureau Drive, Mailstop 8603
Gaithersburg, MD 20899-8603
Tel.: 301-975-2126 Email: Donna.ramkissoon@nist.gov

Executive Summary

The goal of this report is to provide small- and medium-sized enterprise (SME) stakeholders (e.g., owners and managers) who took part in *the NIST Business Survey: COVID-19 Impact and Recovery* survey¹ between July 8 and August 8, 2020 with a summary of self-reported data. This survey was the initial phase of a longitudinal research effort on SME Complex Event Resilience (CER) undertaken by the Applied Economics Office (AEO) at the National Institute of Standards and Technology (NIST) and the National Oceanic and Atmospheric Administration (NOAA).

The longitudinal research study focuses on business resilience in the face of complex events that arise from COVID-19 impacts in addition to other stressors and shocks experienced by U.S. businesses. There is specific emphasis on learning from and application of planning and response-related actions used to address natural hazards and extreme weather events (EWEs). The goals addressed by the longitudinal effort, of which this survey is the first part, include documenting:

1. Novel resilience-based mitigation actions employed during the COVID-19 pandemic,
2. Challenges in implementing resilience-based mitigation actions,
3. Use of past strategies and approaches to provide assistance to the current situation, and
4. Planned resilience actions and strategies.

As overall findings, four major categories of resources and information were identified by survey respondents that could help them address complex event risks arising from natural disasters during the COVID-19 pandemic:

1. Assistance navigating deep uncertainty,
2. Clear, detailed information and training,
3. Assistance with personal protective equipment (PPE) and other equipment, and
4. Access to financial assistance and financial information.

For additional discussion on methods employed in this survey, see the publication *Eliciting Lessons from Small- and Medium-Sized Enterprises (SMEs) for Natural Disaster Resilience Planning and Recovery During the COVID-19 Pandemic: SME Complex Event Resilience*.² Additional discussion about initial findings is available in the publication *Complex Event Resilience of Small- and Medium-Sized Enterprises: Natural Disaster Planning During the COVID-19 Pandemic*.³

¹ Office of Management and Budget (OMB) CONTROL NO. 0693-0078, Expiration Date 07/31/2022.

² This publication is available free of charge from: <https://doi.org/10.6028/NIST.DCI.002>

³ This publication is available free of charge from:
<https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.1258.pdf>

The lessons learned are intended to be relevant to SME owners and managers; these lessons learned are also intended to assist entities in providing guidance to SMEs on:

1. Mitigation planning for natural disasters during a pandemic situation and
2. Disaster readiness strategies to cope with the disruptions from a pandemic situation.

To learn more or to contribute to this data collection effort, email: SMEResearch@nist.gov .

1 Introduction and Background

1.1. Introduction

Researchers at NIST and NOAA have launched a longitudinal effort to assess resilience to complex events by small- and medium sized enterprise (SME) stakeholders (e.g., owners and managers). As a first step, a national survey of SMEs was conducted to better understand how SME management is planning for and addressing natural disasters while dealing with the impacts of the COVID-19 pandemic. This effort addresses the gap in research on the experiences of SMEs dealing with complex events generally, and those that arise during a pandemic specifically. Of specific interest is SME resilience to natural disasters during a pandemic: complex situations arising from more than one disaster need be addressed simultaneously and test the abilities of SMEs to cope. Furthermore, SME stakeholders who have planned for and dealt with natural disasters in the past may be able to transfer some of these actions to the COVID-19 pandemic situation.

1.2. Importance of Small Businesses

Small- and medium-sized enterprises (SMEs) make up 44 % of U.S. economic activities and are the lifeline for many local economies. Data shows that small businesses employed 59 million people in 2018 (SBA, 2019). Data also indicates that small businesses employ 47.3 % of the U.S. population (based on the number of people in the workforce) (U.S. Census Bureau, 2018). In the wake of the COVID-19 pandemic, SMEs have been greatly impacted through supply and demand-side difficulties, such as limited customer interactions, employee availability, as well as larger supply chain issues. Furthermore, microbusiness employers (i.e., those with fewer than nine employees) made up almost 75 % of all private-sector employers in 2016 and provided 10.3 % of private-sector jobs (SBA, 2017). Thus, the survey effort described herein intentionally strives to capture data from micro-sized businesses, which is a subcategory of small-sized businesses in this Report. The general definition of SMEs herein cover micro-, small-, and medium-sized enterprises.

Small- and medium-sized enterprises benefit their local communities by providing local jobs, increasing the tax base, fostering community involvement, and providing diverse, locally sourced/made products and services. The COVID-19 pandemic has shone a spotlight on the economic importance of SMEs and their impact on communities across the U.S., from large cities to more remote areas. It has also highlighted their precariousness when faced with deep uncertainty from both the supply and demand sides.

1.3. Natural Disasters and Extreme Weather During a Pandemic

There have been a number of concurrent natural hazards during the COVID-19 transmission period at the time of this publication (December 2020) (NOAA, 2020). The chances are high that populations around the U.S. will experience continued natural disasters (e.g., heat waves, floods, hurricanes, fire, and drought) during the period of virus transmission and into the period of recovery (e.g., Phillips et al., 2020). Small businesses located in areas vulnerable to these natural disasters and other extreme weather events (EWEs) are particularly noteworthy in the context of COVID-19.

The research team is aware that different types of small businesses face different challenges due to factors such as, but not limited to, geographic location, sector, size, and owner demographics.⁴ Small businesses feature prominently across U.S. communities as sources of employment and foundational sources by which critical consumer needs are met. Understanding the experiences of the owners and managers of SMEs throughout the COVID-19 pandemic in the context of concurrent natural hazards is critical to understanding needs and learning from successful SME experiences.

1.4. Audience and Partners

The goal of this report is to provide data to SME stakeholders (e.g., owners and managers) about the self-reported data from those SME representatives who took part in *the NIST Business Survey: COVID-19 Impact and Recovery* survey⁵ between July 8 and August 8, 2020.

This survey is part of the initial phase of a longitudinal research effort on SME Complex Event Resilience (CER) undertaken by the Applied Economics Office (AEO) at the National Institute of Standards and Technology (NIST) and the National Oceanic and Atmospheric Administration (NOAA). These researchers have experience with survey efforts that address natural disasters planning, mitigation, and recovery for SMEs and other community stakeholder types, e.g., households.

The intended audience for the research findings arising from this effort includes government agencies and other institutions that work directly with SMEs. Different organizations assisted in

⁴ For a review of these factors, see Helgeson et al. (2020c).

⁵ Office of Management and Budget (OMB) CONTROL NO. 0693-0078, Expiration Date 07/31/2022.

the initial review of survey questions and dissemination of the survey to potential respondents, including, but not limited to:

- Minority Business Development Agency (MBDA),
- NYC Department of Small Business Services,
- U.S. Small Business Administration (SBA),
- U.S. Chamber of Commerce Foundation,
- Weather Ready Nation, NOAA
- Regional Integrated Sciences and Assessments (RISA), NOAA
- Sea Grant, NOAA

The lessons learned from this work are intended to be relevant to SME owners and managers; these lessons learned are also intended to assist partners and other entities in providing guidance to SMEs on:

1. Mitigation planning for natural disasters during the pandemic and
2. Disaster readiness strategies to cope with the disruptions from the pandemic.

1.5. Objectives

Many SMEs face potential disruptions from sudden-onset, often unexpected shocks as well as persistent stressors. Natural hazard risks motivate many SMEs to develop emergency plans, some elements of which may be applicable to pandemic response. Furthermore, pandemic responses may assist SMEs in navigating responses to future natural disasters and EWEs, as well as other disruptions.

As presented in Figure 1, four objectives guided development of this survey:

1. Identify what novel resilience-based mitigation actions are being employed by SMEs during the COVID-19 pandemic,
2. Assess challenges in implementing resilience-based mitigation actions,
3. Identify which past coping strategies and approaches are being used to resolve the current situation and,
4. Assess planned resilience actions and strategies to reduce natural hazard impacts during the COVID-19 pandemic.

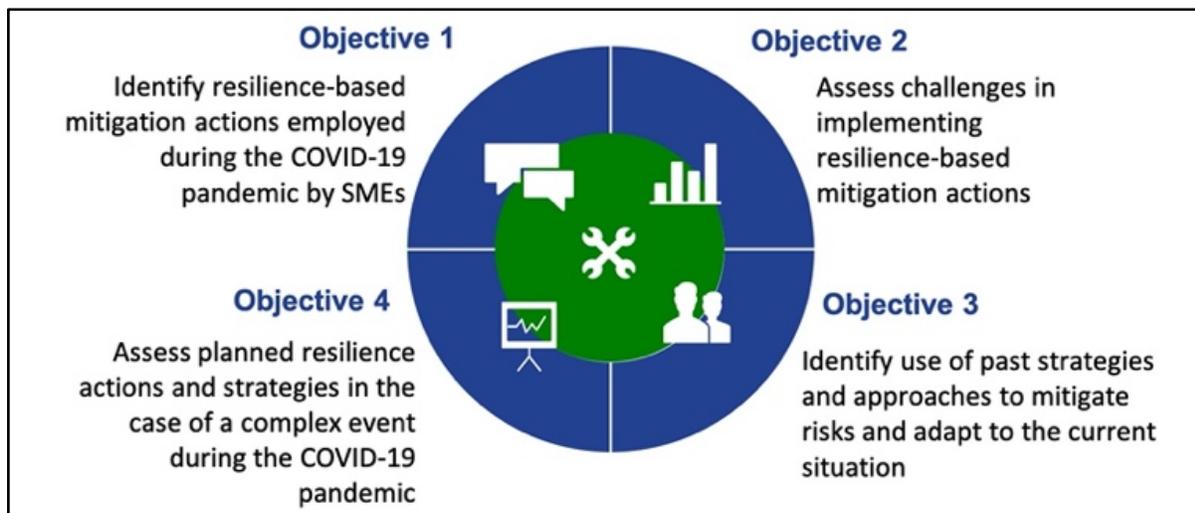


Figure 1. Longitudinal study objectives

2 Survey Overview

The *NIST Business Survey: COVID-19 Impact and Recovery* survey was conducted online for approximately a month during summer 2020 (from July 8-August 8, 2020). By June 2020, the majority of nonessential businesses across the country were able to start some level of typical business activities. The survey sought to obtain information from their experiences from the period during which nonessential businesses across the U.S. had halted some or all of their typical services due to mandatory requirements following the March 13, 2020 Federal National State of Emergency declaration.

Details on survey questions, survey methodology, and a detailed description of the underlying framework are provided in the publication *Eliciting Lessons from Small- and Medium-Sized Enterprises (SMEs) for Natural Disaster Resilience Planning and Recovery During the COVID-19 Pandemic: SME Complex Event Resilience*.⁶ A summary of our methods is provided in brief, below.

2.1. Survey Sections and Data Types

There are five main sections in the survey⁷:

1. Role of respondents and business size (*Opening Section*)

⁶ This publication is available free of charge from: <https://doi.org/10.6028/NIST.DCI.002>

⁷ Each of these sections will be reviewed in detail in Section 4 of this report.

2. Direct effects of COVID-19 on businesses (*COVID-19 Impact and Adaptation Section*),
3. Risks from natural hazards faced by businesses (*Natural Hazard Section*),
4. Businesses' future plans (*Attitudes Section*), and
5. Details about businesses and respondent information.

This report presents survey results arranged by question number, as they appeared in the online survey. Responses to both closed-ended questions and open-ended questions are presented in Section 4. In cases where a closed-ended question set included an “other” or “please explain” category, these responses are also presented.

2.2. Survey Participants and Data Collection

According to the SBA, to classify as a *small* business, the business has a maximum of anywhere between 250 and 1500 employees depending upon the specific industry in which the business is situated (SBA, 2019)⁸. Micro-sized businesses are covered under the SME definition by employee numbers. For purposes of this survey we take the lower-end of the range to cover the employee number maximum for an SME. In our discussion of responses, there is differentiation between the respondent to the survey (e.g., owner or manager) as an agent of the SME, opposed to the SME itself.

The survey was sent to SME contacts in natural hazard-prone counties of 28 states through direct e-mail invitations (Helgeson et al., 2020a). Since natural hazard types differ across the country, the focus states were selected based upon the division of the U.S. by U.S. Census regions: Northeast, Midwest, West, and South, as seen in Figure 2.

⁸ For a description of small business definitions by sector, see: https://www.ecfr.gov/cgi-bin/text-idx?rgn=div5;node=13%3A1.0.1.1.17#se13.1.121_1104

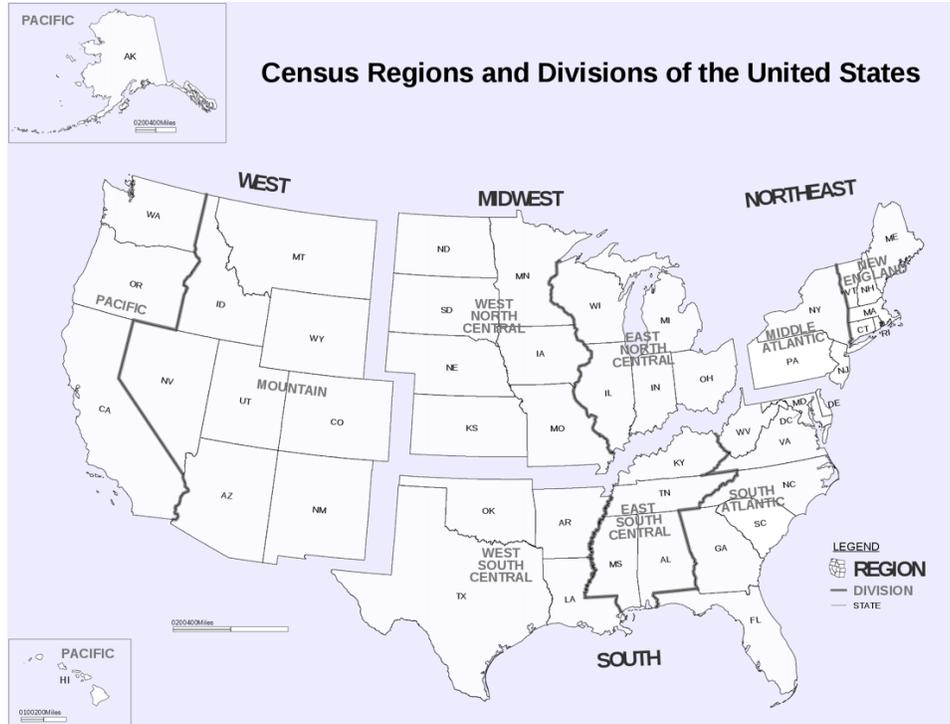


Figure 2. Census regions broken down with state outlines. Source: U.S. Census Bureau⁹

In total, 1374 SMEs were represented in the survey and these respondents provided insightful feedback, both through closed-ended and open-ended responses. Of these, 1357 firms indicated their business' location. According to Census regions, 52 % of respondents are located in the South region, and 15 % in the Midwest, 11 % in the Northeast, and 22 % in the West; see

Figure 3.

⁹ https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf

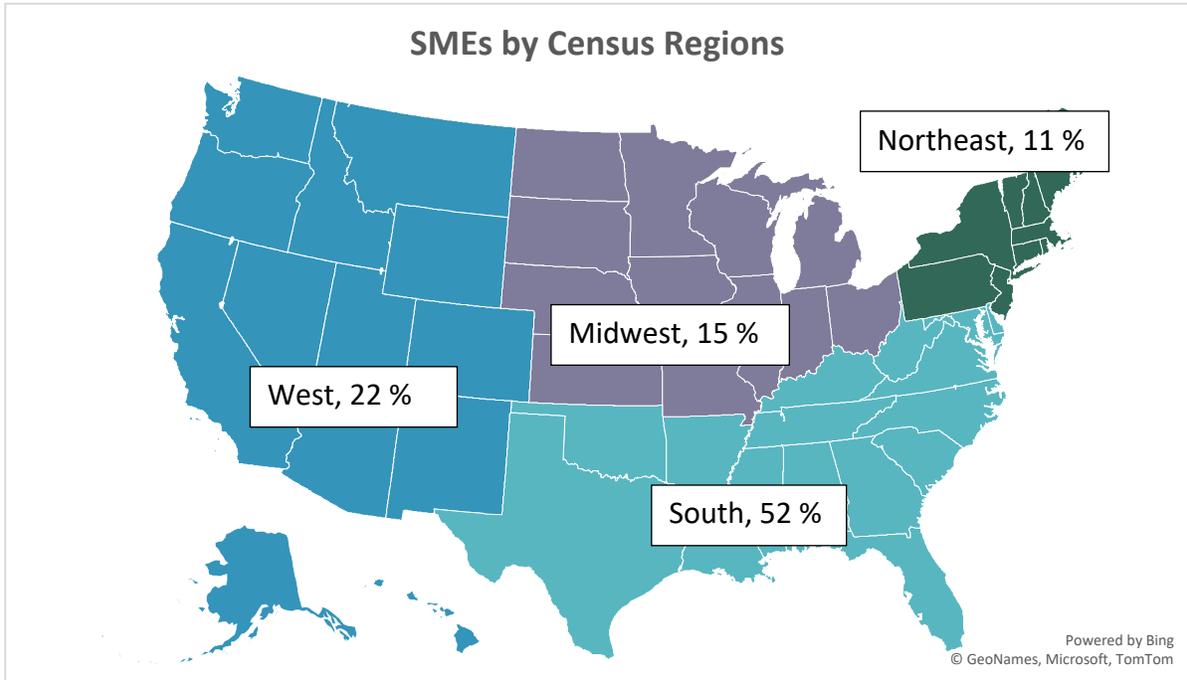


Figure 3. Percent respondents by Census regions. n = 1357

3 Data Summary – Quantitative Data

The quantitative responses from close-ended survey questions are tabulated and presented by Census region in this section. The decision to divide responses by Census region was motivated by the geographical clustering of different natural disaster and EWE types.

Additionally, qualitative responses to open-ended questions are provided. In some cases, there are follow-on questions from a close-ended question (e.g., *other* options) that are qualitative in nature. These are presented in order of appearance in the survey instrument.

We provide the question as it appeared in the survey followed by the basic descriptive analysis information. For each question, a table summarizing responses by Census region is presented. Some of the survey questions were presented with options that were mutually exclusive in nature (i.e., each respondent was allowed to select only one option). The survey also contained questions characterized by non-mutually exclusive responses, indicating that a business was allowed to select one or more options in response to the same question. If a question relies on non-mutually exclusive responses, this is reported in the respective analysis. Each table that provides percentages by Census region must be read horizontally; the sum of the cells in each row adds up to 100%. In this analysis, we compute the percentage for each cell by looking at the total number of respondents selecting a specific option in each question. Thus, the percentage values in all the tables are based on total number of respondents, opposed to being weighted by regional responses. Given that more than half of the total number of business responses came from the South, it is expected to have greater percent values reported in the table cells that identify businesses located in that region.

It should be noted that not all survey respondents answered every question in the survey. The number of responses for a given question is indicated in the discussion and presentation of each question reviewed. Out of the 1374 respondents who participated in this survey, 752 indicated their interest in receiving this report and participating in future waves of data collection. These respondents provided their first names and a valid email address.

3.1. Opening section

The following closed-ended questions appeared in the opening section of the survey. The question as it appears within the survey is presented followed by relevant graphics, tables, and a description of the data summary. Please note that table and figure sample sizes may not match due to missing location responses for a given question.

1. What is your role with the organization?

In total, representatives of 1363 SMEs provided responses to this question. Out of this number, 58 % and 19 % of respondents are owners and managers, respectively. An additional 7 % of respondents act in a joint capacity as owners and managers. The remainder (16 %) comprise other respondent types, including assistant managers, senior employees, other employees, or individuals with no formal role in the organization (Figure 4). Roles by Census region are shown in Table 1 and Figure A-1 in the Appendix.

For those who answered “other” to this question, many pointed to the title of Chief Executive Officer (CEO) or Director of the business.



Figure 4. The role of respondents in their organizations (n = 1363).

Table 1. Roles by Census regions (n = 1346).

Role by Region	Midwest	Northeast	South	West
Owner	13 %	12 %	53 %	22 %
Manager	17 %	10 %	51 %	22 %
Both	10 %	12 %	50 %	28 %
Other	21 %	11 %	51 %	17 %

2. How many full-time AND part-time individuals did your business employ at this location at this time last year?

In total, 1354 respondents answered this question. Out of this number, 55 % of respondents answered on behalf of a business with no more than 10 employees, 31 % responded on behalf of a business with 11-100 employees, and 14 % of them had more than 100 employees (Figure 5). Business sizes by Census regions are shown in Table 2 and Figure A-2 in the Appendix. In this analysis microbusinesses are defined as those that employ no more than 10 people, small businesses as those employing more than 10 and up to 100 people, and medium-sized businesses employing more than 100 people.

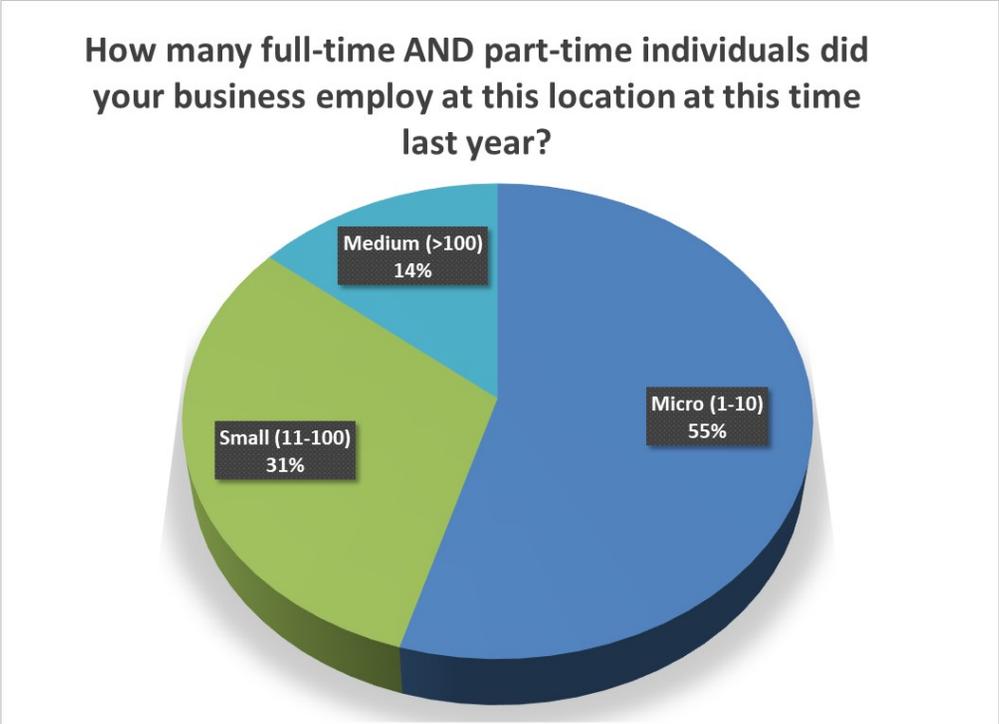


Figure 5. The total number of employees in their organizations (n = 1354).

Table 2. Business sizes by Census regions (n = 1337).

Size (employee number) by Region	Midwest	Northeast	South	West
Micro (1-10)	15 %	12 %	53 %	20 %
Small (11-100)	11 %	10 %	52 %	27 %
Medium (>100)	20 %	11 %	48 %	21 %

3.2. COVID-19 Impact and Adaptation Section

This survey section asks about direct effects of COVID-19 (coronavirus) on the business for which the respondent is answering.

3. If there were any public health restrictions (e.g., stay-at-home orders, movement limitations, limits on public gatherings, or requirements for social distancing), is/was your organization designated as essential?

In total, 1123 respondents answered this question. Out of this number, 50 % reported that their business was designated as *essential* by their states, 13 % of respondents characterized their businesses as partially essential, and 30 % indicated that their businesses was classified as nonessential. Additionally, 6 % of respondents were not sure about this (Figure 6). Essential and nonessential businesses, by percent, are presented by Census region in Table 3 and Figure A-3 in the Appendix.

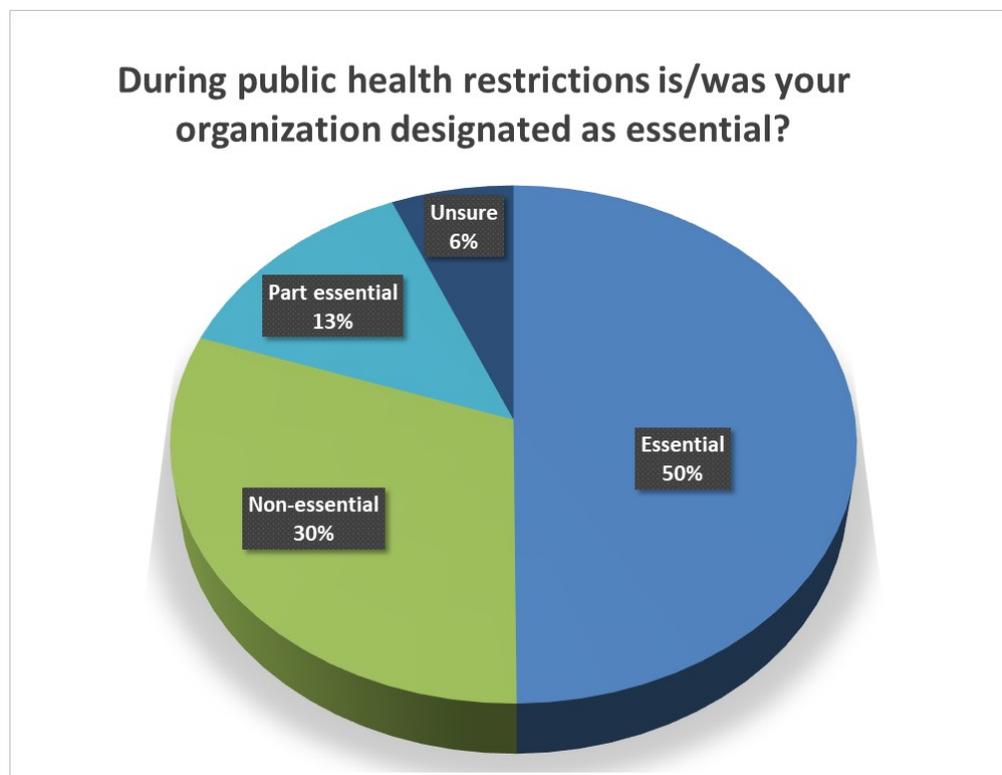


Figure 6. Whether the organization is/was designated as essential (n = 1123).

Table 3. Designated essential and nonessential businesses by Census regions (n = 1112).

Business designation (Essential/Non-essential) by region	Midwest	Northeast	South	West

Essential	15 %	10 %	52 %	23 %
Non-essential	13 %	13 %	52 %	22 %
Part essential	16 %	8 %	52 %	24 %
Unsure	14 %	16 %	51 %	19 %

4. How has the COVID-19 pandemic impacted the continuity/stability of your day-to-day operations?

In total, 1116 respondents answered this question. Respondents could select multiple responses, which implies responses are non-mutually exclusive. Their answers indicate that 37 % of businesses were closed for more than four weeks due to COVID-19, and 6 % of them were closed for less than four weeks. Responses also indicate that 14 % of SMEs were open as usual to the public (Figure 7). Moreover, 30 % of businesses reduced onsite operations and required staff to telework, and 20 % of them had all staff working from home. Although 26 % of businesses reduced operating hours, 11 % increased e-commerce and 13 % offered new services to customers such as contactless pick-up and delivery, respectively. The impacts by Census regions are shown in Table 4 and Figure A-4 in the Appendix.

Those respondents who indicated “other” largely highlighted impacts that were perceived to be extreme in nature and largely out of the ordinary that either allowed their business to continue to function or those that posed major limits to business functions. Figure 8 presents a word cloud highlighting the most commonly mentioned themes by respondents indicating “other” in response to this question. In some cases, the answers provided gave greater detail to a larger theme captured by the close-ended question answer options.

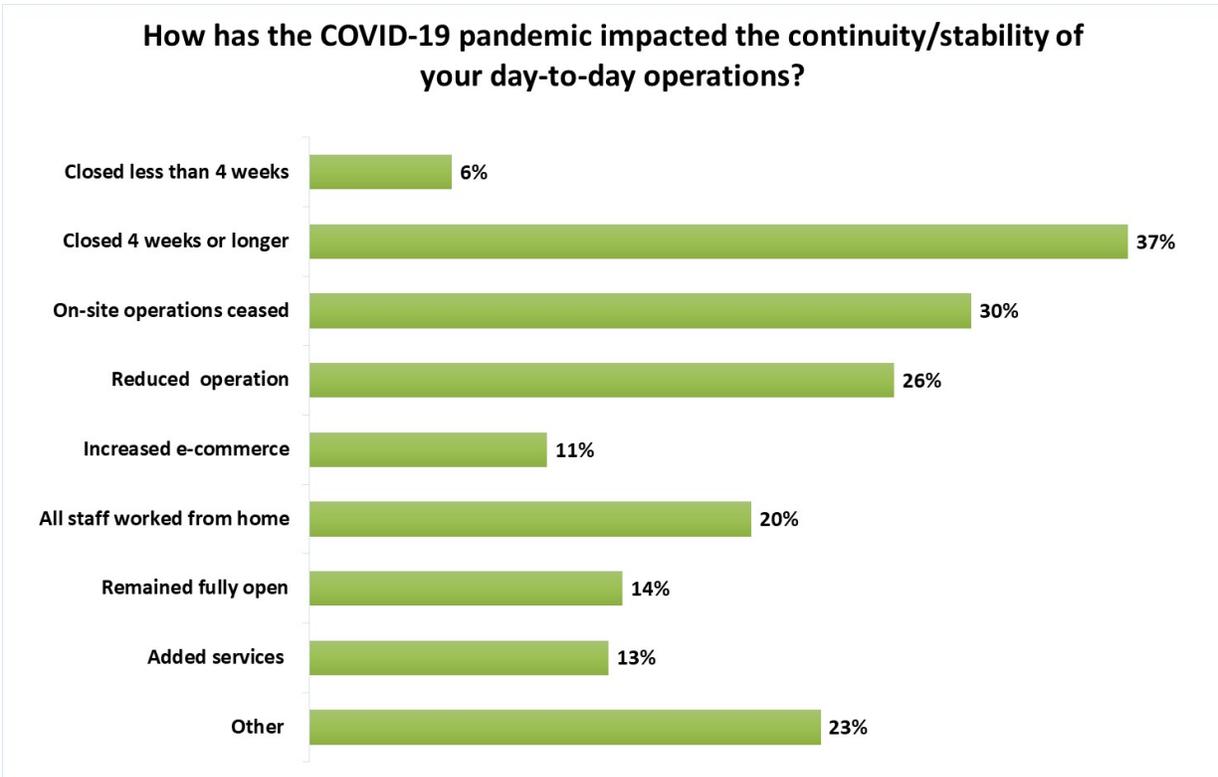


Figure 7. The impacts of the COVID-19 pandemic on the continuity of business operations (n = 1119).

Table 4. The impacts of the COVID-19 pandemic on the continuity of business operations by Census regions (n = 1108).

How has the COVID-19 pandemic impacted the continuity/stability of day-to-day operations, by region	Midwest	Northeast	South	West
Closed to the public: less than 4 weeks	11 %	6 %	56 %	27 %
Closed to the public: 4 weeks or longer	17 %	11 %	53 %	19 %
On-site operations ceased, but remaining staff teleworked	12 %	12 %	54 %	22 %
Reduced days/hours of operation	16 %	11 %	48 %	25 %
Increased e-commerce	9 %	12 %	51 %	28 %
All staff worked from home	11 %	10 %	56 %	23 %
Remained fully open to the public	16 %	7 %	50 %	27 %
Added services to business (e.g. contactless pick-up, delivery, etc.)	15 %	9 %	47 %	29 %
Other	12 %	17 %	48 %	23 %

from the supply (i.e., suppliers cancelling) and demand (i.e., customers cancelling) sides which impacted operations. In many cases, revenue was a limiting factor, and ability to operate (regardless of customer demand) was also an issue.

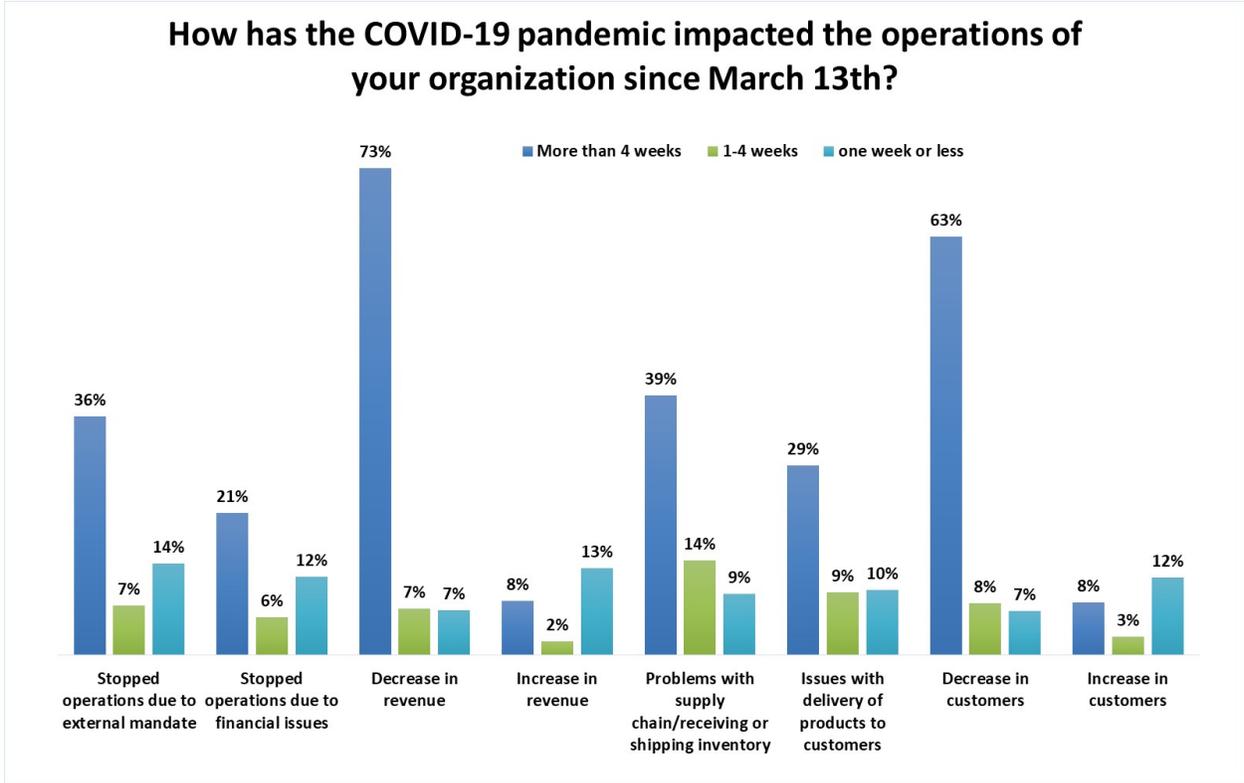


Table 5. The impacts of the COVID-19 pandemic on business operations since March 13th by Census regions (n = 1079).

Impact of COVID19 on operations since March 13 by region	Midwest	Northeast	South	West
More than 4 weeks				
Stopped operations due to external mandate	16 %	13 %	52 %	19 %
Stopped operations due to financial issues	16 %	13 %	55 %	16 %
Decrease in revenue	15 %	11 %	53 %	21 %
Increase in revenue	16 %	14 %	46 %	24 %
Problems with supply chain/receiving or shipping inventory	17 %	11 %	48 %	24 %
Issues with delivery of products to customers	15 %	13 %	50 %	22 %

Decrease in customers	14 %	11 %	52 %	23 %
Increase in customers	15 %	10 %	53 %	22 %
1-4 weeks				
Stopped operations due to external mandate	16 %	9 %	54 %	21 %
Stopped operations due to financial issues	10 %	8 %	49 %	33 %
Decrease in revenue	11 %	5 %	52 %	32 %
Increase in revenue	17 %	0 %	57 %	26 %
Problems with supply chain/receiving or shipping inventory	13 %	10 %	51 %	26 %
Issues with delivery of products to customers	15 %	9 %	53 %	23 %
Decrease in customers	9 %	6 %	54 %	31 %
Increase in customers	4 %	3 %	62 %	31 %
1 week or less				
Stopped operations due to external mandate	13 %	11 %	49 %	27 %
Stopped operations due to financial issues	16 %	9 %	48 %	26 %
Decrease in revenue	12 %	6 %	50 %	32 %
Increase in revenue	19 %	8 %	50 %	23 %
Problems with supply chain/receiving or shipping inventory	14 %	9 %	46 %	31 %
Issues with delivery of products to customers	16 %	8 %	47 %	29 %
Decrease in customers	17 %	7 %	51 %	25 %
Increase in customers	21 %	8 %	45 %	26 %



Figure 10. Word cloud indicating themes across impacts of the COVID-19 pandemic on their business’ operation indicated by respondents.

6. What are the most important factors that influenced the choice to temporarily close, change hours, or staffing changes?

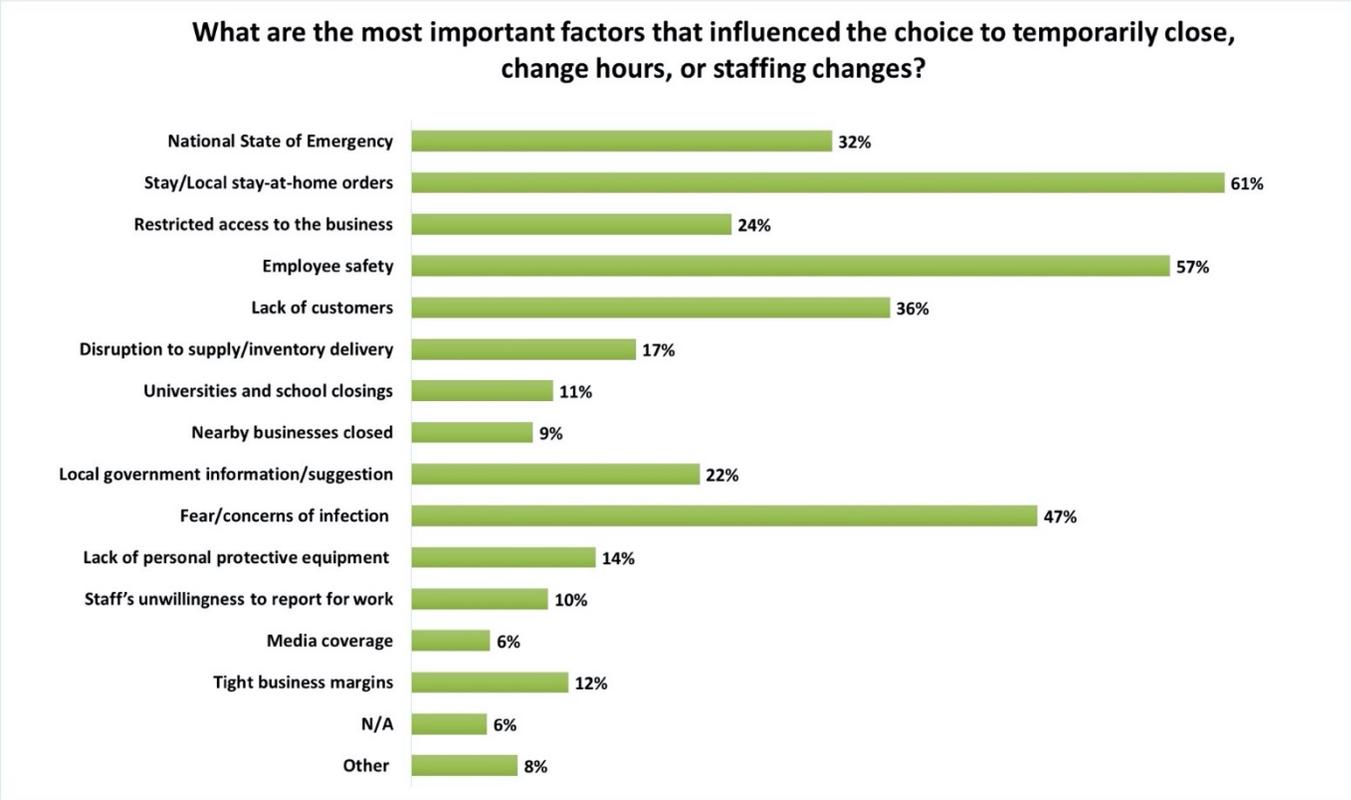
In total, 1122 respondents answered this question. Respondents could select multiple responses, which implies responses are non-mutually exclusive. The top three factors that lead to “temporarily close, change hours, or staffing changes” decisions are stay-at-home orders (reported by 61 % of respondents), employee safety considerations (reported by 57 % of respondents), and fear or concerns of COVID-19 infection (reported by 47 % of respondents). Other factors that influenced these decisions included local orders that restricted access to the business’ physical location (reported by 24 % of respondents) and information/suggestions from local government (reported by 22 % of respondents). Some SMEs had to change operating hours or temporarily shut down due to lack of customers (reported by 36 % of respondents), closure of nearby businesses (reported by 9 % of respondents), and universities and school closings (reported by 11 % of respondents).

Additionally, some SMEs faced operational issues that forced them to make changes, such as tight business margins (reported by 12 % of respondents), disruption to supply or delivery (reported by 17 % of respondents), and staff absence due to COVID-19 (reported by 10 % of respondents).

It is not surprising that shortages of personal protective equipment (PPE) and cleaning supplies lead to closure decisions or other business changes (reported by 14 % of respondents). Finally, the declaration of a National Emergency (reported by 32 % of respondents) and media coverage of COVID-19 (reported by 6 % of respondents) informed respondents of potential risks and further affected their choices to business adjustments. A summary of factors influencing the decisions to temporarily close, change hours or staff is presented in

Figure 11, similar results are presented by Census regions in Table 6 and Figure A-6 in the Appendix.

Figure 12 presents a word cloud detailing the details of respondents providing additional



information under the “other” answer category.

Figure 11. Major factors that influenced the choice to temporarily close, change hours or staffing changes (n = 1122).

Table 6. Major factors that influenced the choice to temporarily close, change hours, or staffing changes by Census regions (n = 1111).

Factors that influenced the decision to temporarily close, by region	Midwest	Northeast	South	West
National State of Emergency	15 %	12 %	53 %	20 %
Stay/Local stay-at-home orders	15 %	11 %	51 %	23 %

often considered trustworthy for information on COVID-19 (reported by 59 % of respondents), followed by local governments (56 %), national TV news (38 %), local TV news (35 %), internet-based news media (28 %), other federal government sources (25 %), internet sources (20 %), community leaders (16 %), social media (11 %), radio (11 %), friends or family (10 %), sectoral or trade news (6 %), and faith-based community (5 %). Trusted information sources indicated by Census regions are shown in Table 7 and Figure A-7 in the Appendix. Figure 14 provides a word cloud presentation of themes indicated across the 15 % of respondents who selected the “other” category in response to this question.

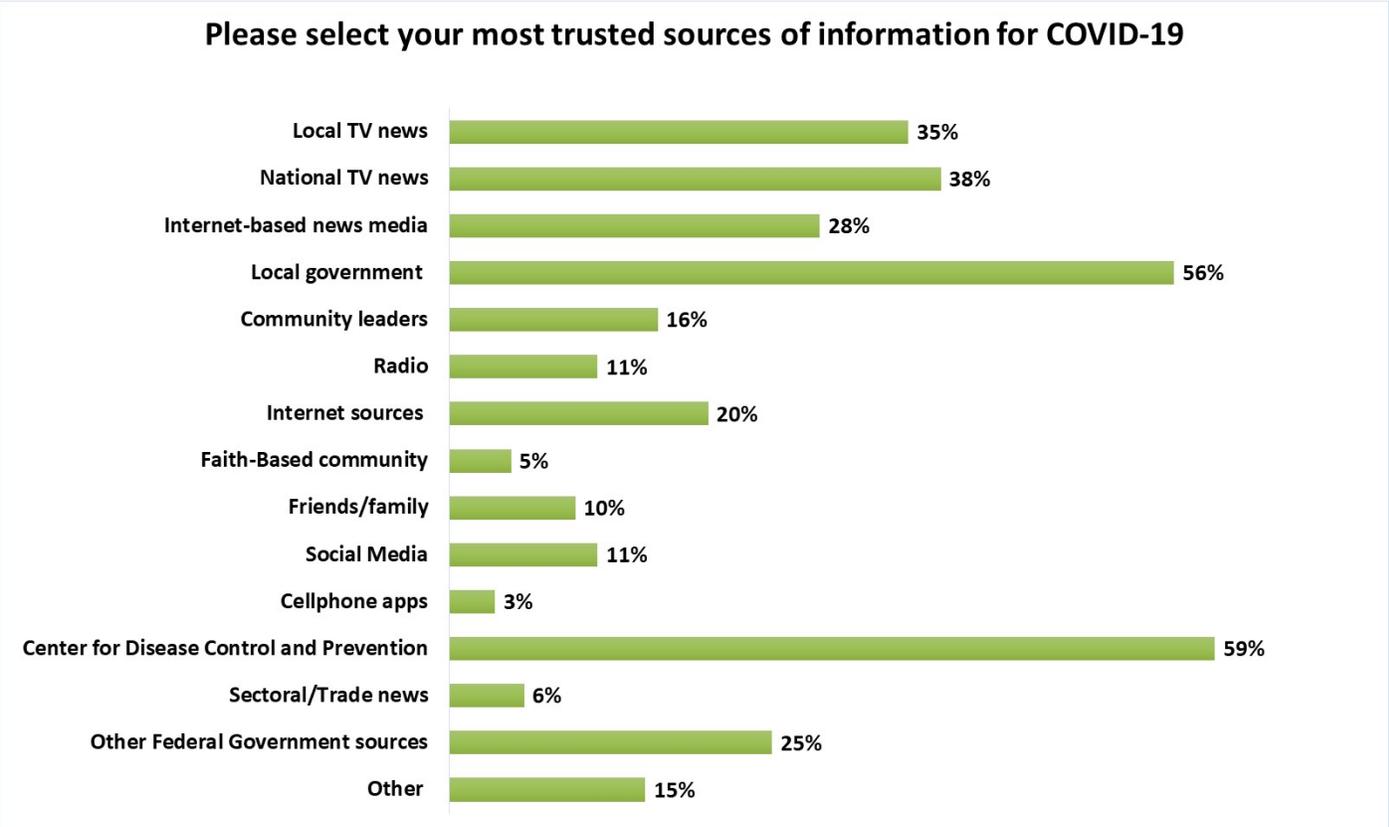


Figure 13. Most trusted sources of information for COVID-19 across all respondents (n = 1120).

Table 7. Most trusted sources of information for COVID-19 by Census regions (n = 1109).

Please select your most trusted sources of information for COVID-19	Midwest	Northeast	South	West
Local TV news	15 %	10 %	53 %	22 %
National TV news	12 %	12 %	55 %	21 %
Internet-based news media	12 %	11 %	51 %	26 %

respectively. Other financing methods employed include obtaining commercial loans from banks (reported by 7 % of respondents), acquiring state and local government grants/loans (12 %), enrolling in other federal programs (6 %), and gaining non-profit organizations’ support (3 %).

To close existing financing gaps, 21 % of respondents planned to use personal savings and 8 % of them had to ask family and friends for help. Moreover, 9 % of respondents requested a payment deferral from banks, 15 % of them postponed payments for rents and utilities, and 2 % of them planned to use business interruption insurance.

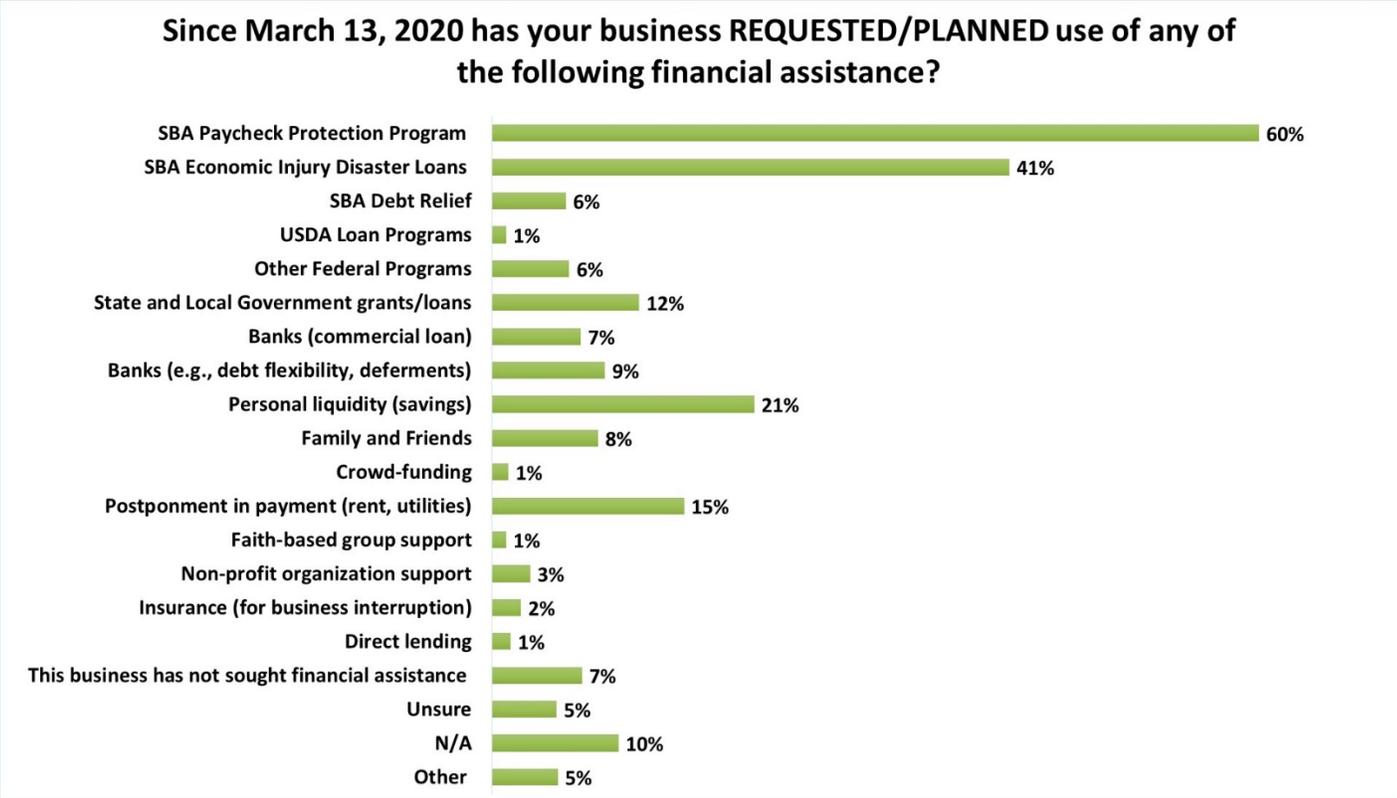


Figure 15. Requested or planned use of financial assistances (n = 1103).

Survey responses indicate that some financial strategies were less likely to be used by SMEs, including direct lending (1 %), crowdfunding (1 %), faith-based group support (1 %), and USDA loans (1 %). Finally, 7 % of respondents had not sought any financial assistance at the time of the survey. Planned financial assistance sources by Census regions are shown in Table 8 and Figure A-8 in the Appendix. Figure 16 indicates themes for this question indicated in responses by those who indicated other as part of their response.

Table 8. Requested or planned use of financial assistance by Census regions (n = 1092).

Since March 13, 2020 has your business requested/planned use of any of the following financial assistance?	Midwest	Northeast	South	West
SBA Paycheck Protection Program (PPP)	13 %	10 %	54 %	23 %
SBA Economic Injury Disaster Loans (EIDL)	12 %	12 %	57 %	19 %
SBA Debt Relief	16 %	5 %	58 %	21 %
USDA Loan Programs	42 %	0 %	42 %	16 %
Other Federal Programs	16 %	7 %	55 %	22 %
State and Local Government grants/loans	17 %	11 %	51 %	21 %
Banks (commercial loan)	11 %	8 %	61 %	20 %
Banks (e.g., existing debt flexibility – payment deferments)	11 %	9 %	63 %	17 %
Personal liquidity (savings)	14 %	12 %	53 %	21 %
Family and Friends	16 %	12 %	52 %	20 %
Crowdfunding	31 %	8 %	46 %	15 %
Postponement in payment (rent, utilities)	15 %	11 %	50 %	24 %
Faith-based group support	33 %	0 %	50 %	17 %
Non-profit organization support	33 %	6 %	45 %	16 %
Insurance (for business interruption)	28 %	12 %	52 %	8 %
Direct lending (e.g., Venture capital, angel investors, Fintech)	25 %	0 %	56 %	19 %
This business has not sought financial assistance from any source	22 %	8 %	44 %	26 %
Unsure	25 %	11 %	40 %	24 %
N/A	20 %	13 %	45 %	22 %
Other	19 %	9 %	54 %	18 %



Figure 16. Word cloud indicating themes across requested or planned use of financial assistance by respondents indicating “other.”

9. Please describe any changes your organization has made to adapt during the COVID-19 pandemic since March 13th. Please check all that apply.

In total, 1050 respondents answered this question. Respondents could select multiple responses, which implies responses are non-mutually exclusive. Out of the 1050 businesses, 28 % reported having changed products produced or offered to consumers and 9 % prioritized inventories to some customers and reallocated products based on inventory levels (Figure 17). Additionally, 20 % of respondents reported having shifted their businesses to e-commerce, and 22 % and 16 % of them offered delivery services and curbside pick-up, respectively. Other adaptation measures they took include encouraging employees to telework (52 %), negotiating longer payment terms (12 %), negotiating current and future prices (9 %) with suppliers, and collecting money owed from customers as early as possible (20 %). Moreover, 25 % of respondents opted to exchange resources or information with other organizations, and 8 % of them implemented short-term alliances with their suppliers and/or competitors. Finally, some businesses reduced staff to cut expenses (reported by 33 % of respondents), whereas some added new staff (5%). Changes made to adapt to COVID-19 circumstances are indicated by Census region in Table 9 (below) and Figure A-9 in the Appendix. Figure 18 provides a word cloud with themes across changes and adaptation measures made by respondents indicating “other” as part of their response.

Please describe any changes your organization has made to adapt during the COVID-19 pandemic since March 13th.

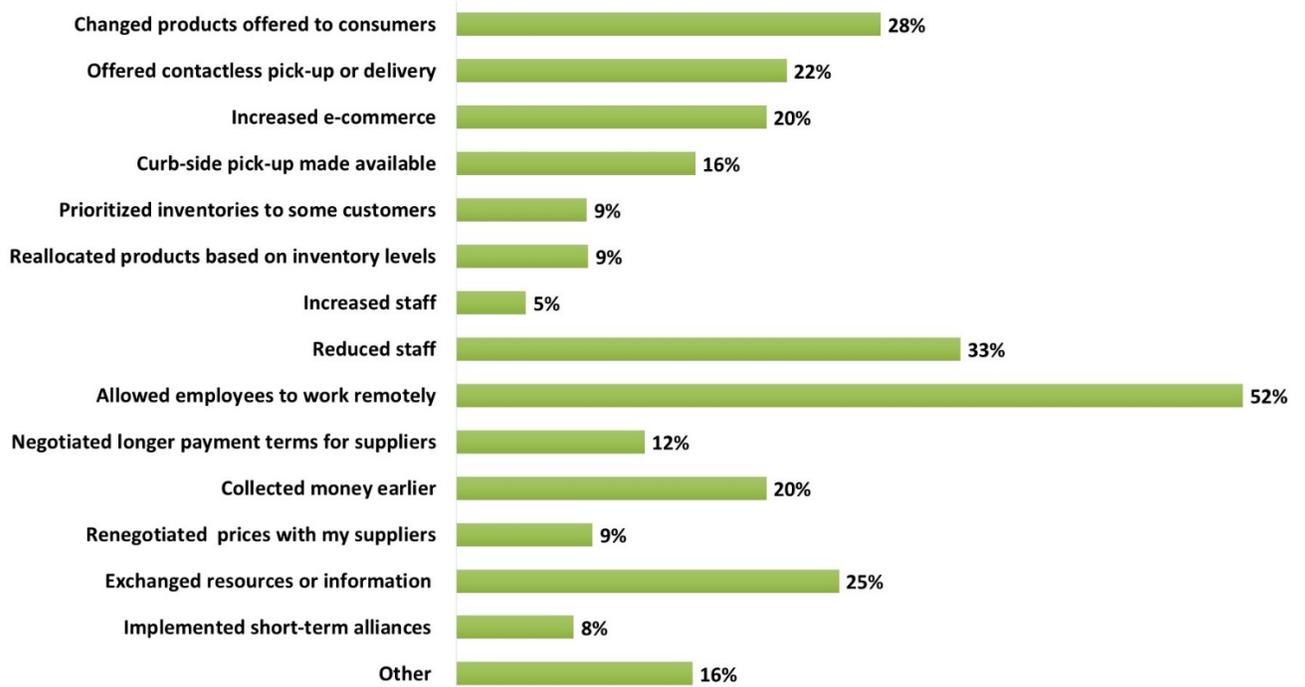


Figure 17. Adaptation measures employed (n = 1050).

Table 9. Adaptation measures by region (n = 1039).

Please describe any changes your organization has made to adapt during the COVID-19 pandemic since March 13th.	Midwest	Northeast	South	West
Changed products produced/offered to consumers	16 %	11 %	50 %	23 %
Offered contactless pick-up or delivery	22 %	11 %	44 %	23 %
Increased e-commerce	12 %	10 %	53 %	25 %
Curb-side pick-up made available	15 %	9 %	48 %	28 %
Prioritized inventories to some customers	12 %	11 %	53 %	24 %
Reallocated products based on inventory levels	13 %	9 %	54 %	24 %
Increased staff	19 %	2 %	65 %	14 %
Reduced staff	15 %	10 %	50 %	25 %
Allowed employees (some or all) to work remotely	14 %	10 %	53 %	23 %

Negotiated longer payment terms for suppliers so the company can keep its cash longer	6 %	16 %	53 %	25 %
Collected money owed from customers as early as possible	11 %	10 %	56 %	23 %
Renegotiated current and future prices with my suppliers	21 %	9 %	59 %	11 %
Exchanged resources or information with other organizations	18 %	10 %	51 %	21 %
Implemented short-term alliances with my suppliers and/or competition	14 %	9 %	61 %	16 %
Other	16 %	16 %	48 %	20 %



Figure 18. Word cloud indicating themes across changes and adaptation measures made by respondents indicating “other.”

3.3. Natural Hazard Section

This section asks the respondents about risks from natural hazards that their business face, both in the past and their expectation for the future.

10. What natural hazard(s) is/are of concern for your organization? (select all that apply)

In total, 1077 respondents answered this question. Respondents could select multiple responses, which implies responses are non-mutually exclusive. Risks presented in this question can be categorized as chronic and acute. A chronic risk is one that is recurring in nature and can often be expected; thus, an SME owner or manager may plan for chronic risks regularly. Chronic natural disaster risks include drought, extreme cold, heat waves, winter storms, flooding. Acute risks are associated with events that are less predictable and are typically defined by low-probability and high-impact. Acute natural disaster risks include hurricanes, storm surge, earthquakes, tsunamis, tornadoes, and wildfires

Regarding chronic risks, out of the 1077 SMEs, 15% of respondents indicated being concerned about drought/water scarcity. This percentage is the same for SMEs that reported being concerned about extreme cold (15%). Additionally, at the time of the survey, 34% of businesses reported being concerned about extreme heat/heat waves, 30% of respondents said being concerned about winter storms, and 31% of businesses said flooding was a concern.

Regarding acute risks, out of the 1077 SMEs, 30 % of respondents report that hurricanes were of concern to their organization at the time of the survey, 13% of SMEs said that storms surges was a concern, 16% of businesses reported being concerned about earthquakes, 2 % reported being concerned for the occurrence of tsunamis, 30% for the occurrence of tornadoes, and 13 % of SMEs reported concerns about the occurrence of wildfires. Additionally, 6% of respondents expressed other concerns, and 20 % of respondents were not concerned by natural hazards.

For additional discussion of chronic and acute risks, see Helgeson et al. (2020). Concerns about the occurrence of natural hazards are presented in Figure 19, and by Census regions in Table 10 and Figure A-10 in the Appendix. It is important to note that Table 10 presents three rows, one indicating the percentage of firms by region that reported being concerned for the occurrence of at least one type of chronic risk, the second row presents the percentage of businesses by region that reported being concerned for the occurrence of at least one type of acute risk, and the third column presents the percentage of firms that indicated being concerned for the occurrence of at least one type of chronic risk and one type of acute risk.

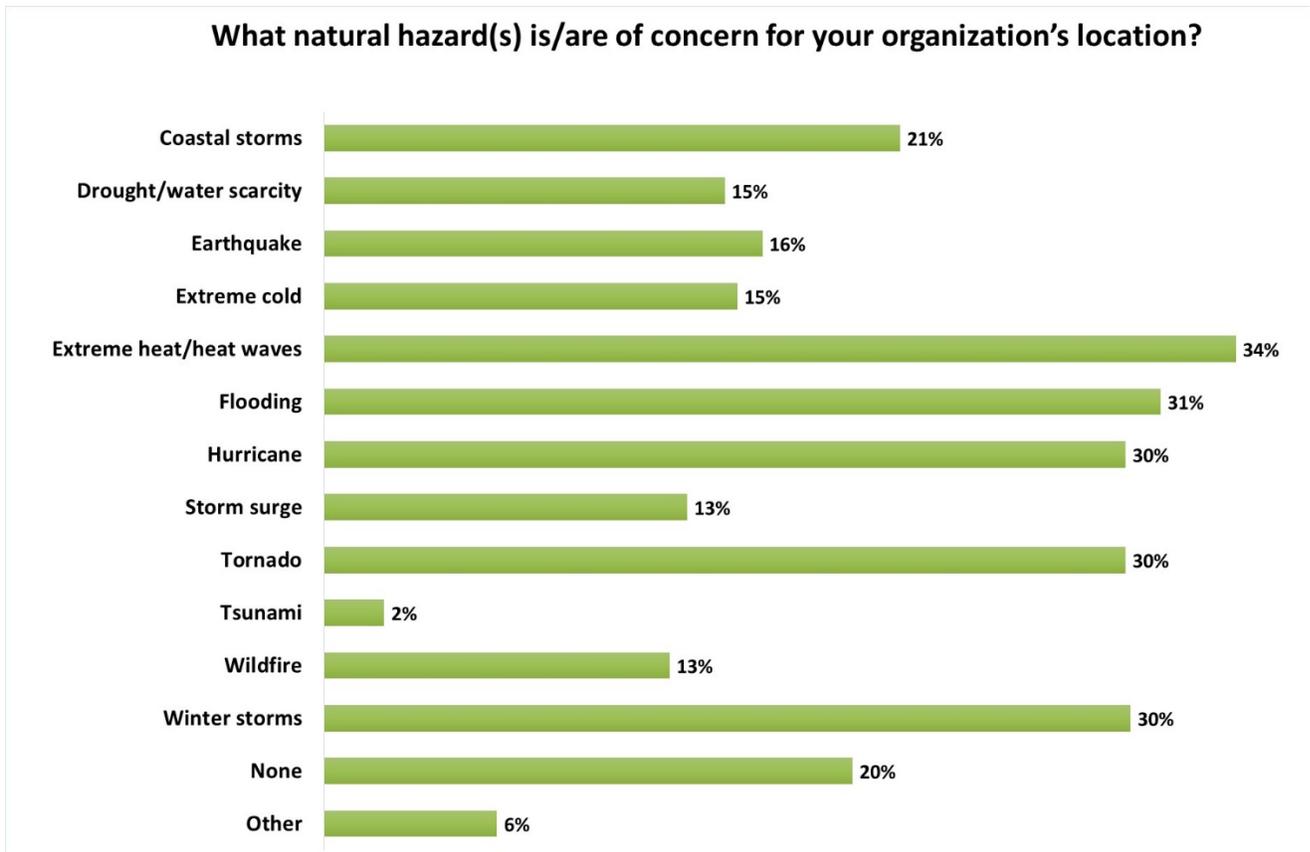


Figure 19. Concerns for natural hazards (n = 1077).

Table 10. Concerns for natural hazards by Census regions (n = 859).

Acute/Chronic Risk by Region	Midwest	Northeast	South	West
Chronic Risk	16 %	26 %	32 %	26 %
Acute Risk	5 %	6 %	63 %	26 %
Both	18 %	8 %	54 %	20 %

11. Since March 13th, 2020 has this/these event type(s) occurred at your location?

In total, 1083 respondents answered this question. As can be observed in Figure 20, 28 % of respondents had experienced at least one natural disaster event since March 13, 2020 and before August 8, 2020 (21% of SMEs reported having experienced a disaster with minor impacts and 7 % indicated having experienced a disaster with severe impacts). On the other hand, 66 % of respondents stated that their businesses were not subject to any event during this period, 2 % said they did not know, and 4 % did not provide an answer. Occurrences and impacts of natural hazard event(s) by Census regions are presented in Table 11 and Figure A-11 in Appendix.

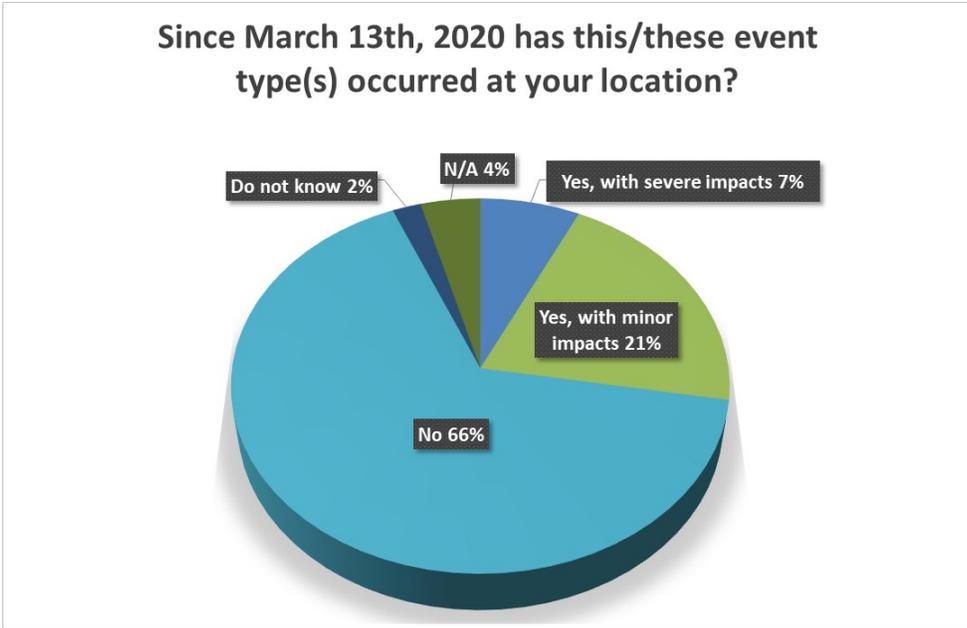


Figure 20. Whether the event type(s) occurred at this location since March 13th, 2020 (n = 1083).

Table 11. Whether the event type(s) occurred at this location since March 13th, 2020 by Census regions (n = 1073).

Since March 13th, 2020 has this/these event type(s) occurred at your location?	Midwest	Northeast	South	West
Yes, with severe impacts	15 %	13 %	57 %	15 %
Yes, with minor impacts	21 %	8 %	48 %	23 %
No	12 %	11 %	54 %	23 %
Do not know	5 %	14 %	55 %	26 %
N/A	24 %	15 %	35 %	26 %

12. Was your organization’s response to this event affected by COVID-19?

It should be noted that only respondents who indicated that they had experienced a natural disaster event at their location (i.e., answered yes in response to question 11) were eligible to answer this question. That said, 298 respondents answered this question. Whereas 46 % of respondents indicated their organizational response had been affected by COVID-19, other 46 % of SMEs reported that their organizational response to the disaster experienced had not been affected by COVID-19 (Figure 21). The remaining 8 % of businesses indicated that they were unsure. Post-event reactions by Census regions are shown in Table 12 and Figure A-12 in the Appendix.

Was your organization's response to this event affected by COVID-19?

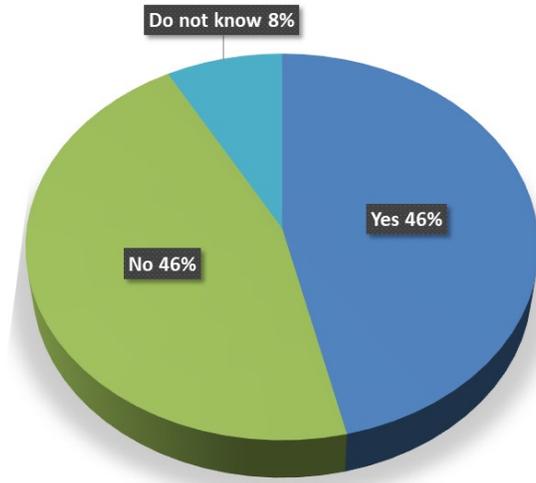


Figure 21. Response to the event(s) during the COVID-19 pandemic (n = 298).

Table 12. Response to the event(s) during the COVID-19 pandemic by Census regions (n = 294).

Was your organization's response to this event affected by COVID-19?	Midwest	Northeast	South	West
Yes	13 %	14 %	53 %	20 %
No	24 %	5 %	48 %	23 %
Do not know	22 %	4 %	57 %	17 %

13. How many of these natural hazard events have affected your organization in the past 10 years?

In total, 837 respondents answered this question. Their answers indicate that 16 % of the businesses were not subject to any natural hazard events during the last ten years (Figure 22). However, 3 %, 6 %, and 10 % of respondents experienced 1, 2-5, and 6-10 events, respectively. Furthermore, 17 % of them were disturbed by 11-20 and 21-30 events. Additionally, 31 % of SMEs that responded this question suffered from as many as 31-100 events. The mean number of disasters is 25 and the median is 20. The maximum number of disasters experienced is 100, a number indicated by 19 businesses.¹⁰ Responses by Census regions are shown in Table 13 and

¹⁰ Those businesses indicated a high number of events, tended to report a mix of acute and chronic event types.

Figure A-13 in Appendix. It should be noted that experiencing more events makes sense when the SME location faces more persistent chronic extreme weather.

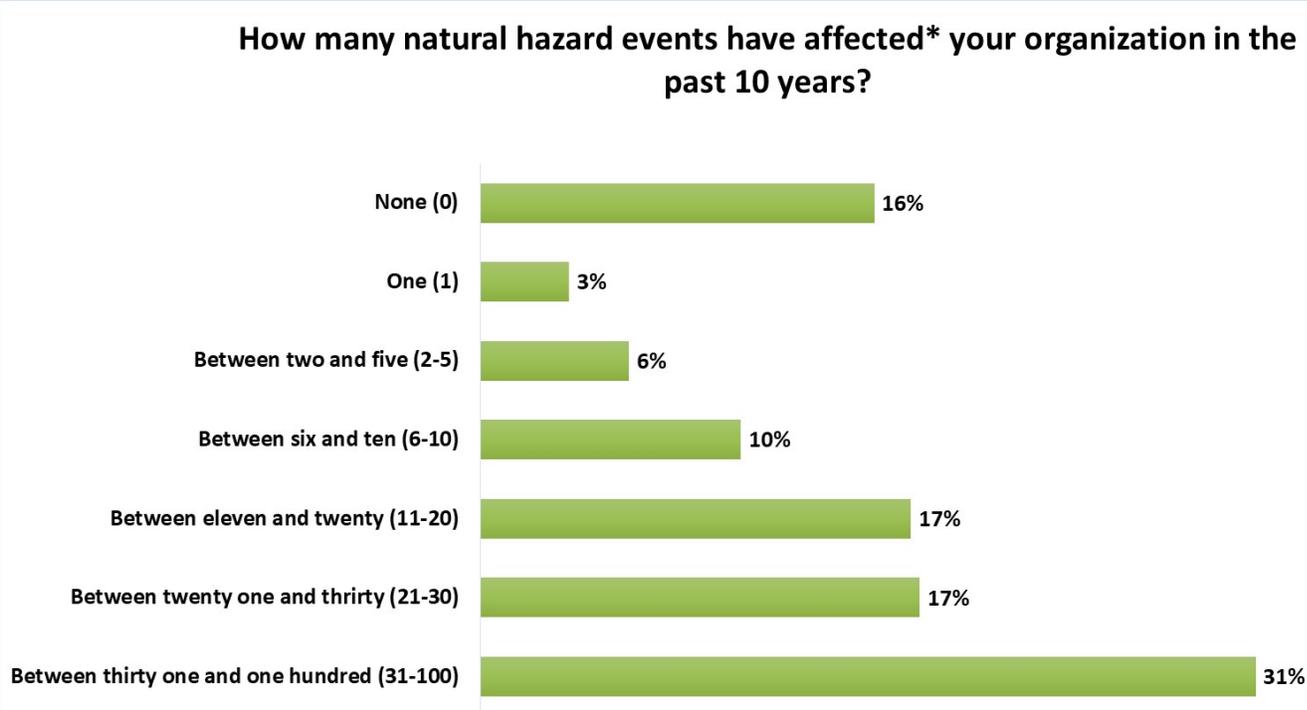


Figure 22. Number of natural hazard events in the past 10 years (n= 837).

Table 13. Number of natural hazard events in the past 10 years by Census regions (n = 826).

How many of these natural hazard events have affected* your organization in the past 10 years?	Midwest	Northeast	South	West
0	16 %	9 %	41 %	34 %
1	10 %	10 %	48 %	32 %
2-5	27 %	4 %	47 %	22 %
6-10	5 %	15 %	51 %	29 %
11-20	12 %	12 %	55 %	21 %
21-30	10 %	10 %	67 %	13 %
31-100	14 %	12 %	62 %	12 %

14. What type of mitigation/preparedness actions have you taken in the past (before COVID-19) to prepare your organization against natural hazards?

In total, 898 respondents answered this question. Respondents could select multiple responses to this question, which indicates non-mutually exclusive responses. The most common practice indicated is backing-up all important documents digitally or stored them at a secondary location (reported by 62% of respondents) before the next natural hazard event (Figure 23). Additionally, 57 % of respondents found it crucial to stay informed of weather watches and warnings (e.g., using NOAA Weather Radio or commercial apps). Only 6 % of respondents used permanent floodproofing methods such as installing flood gates, while 10 % of them employed temporary floodproofing methods such as building sandbag walls and boarding up doors. Furthermore, 24 % of them raise inventory and other supplies off the ground to prevent water exposure. For wildfires prevention, 18 % of respondents cleared debris or dry vegetation away from structures. Insurance is an important tool for risk mitigation, which is represented by 40 % of respondents who performed an insurance check-up to ensure adequate insurance coverage, and 18 % of them increased insurance coverage when there is a high probability that a natural hazard event will occur. Other risk mitigation efforts include performing risk assessment to identify business vulnerabilities to specific hazards (44 %), assessing building performance to ensure that they meet building code standards (23 %), securing a secondary storage location (17 %), and minimizing supply chain vulnerability through multiple source strategies (14 %).

For emergency preparedness, 41 % of respondents developed a written emergency action plan or checklist; 34 % of them assigned disaster responsibilities (i.e., emergency management function) to specific employees; 26 % of them performed safety drills regularly such as shelter-in-place, evacuations, and telephone trees; 21 % of them developed a connection to local emergency management officials; 29 % of them built an emergency fund (kept “rainy day” money on-hand) and; 23 % of them took advantage of social media to provide operation information to the public (e.g., closings). To maintain business operation during or after natural hazard events, 28 % of respondents backed up power generation, 26 % of them developed telework plans, 16% of them established or increased remote or online sales capacity, and 14% of them maintained or tuned up equipment for debris or snow removal in advance. Mitigation or preparation actions by Census regions are shown in Table 14 and Figure A-14 in the Appendix. It should that some mitigation or preparation actions relate to a specific hazard type. This is not accounted for in the present analysis.

Figure 24 presents a word cloud detailing mitigation/preparedness actions taken in the past to prepare the business against natural hazards indicated by respondents who selected “other” as part of their answer response. The details of these answers were typically specific to the type(s) of natural disaster(s) faced at the SME’s location.

What type of mitigation/preparedness actions have you taken in the past (before COVID-19) to prepare your organization against natural hazards?

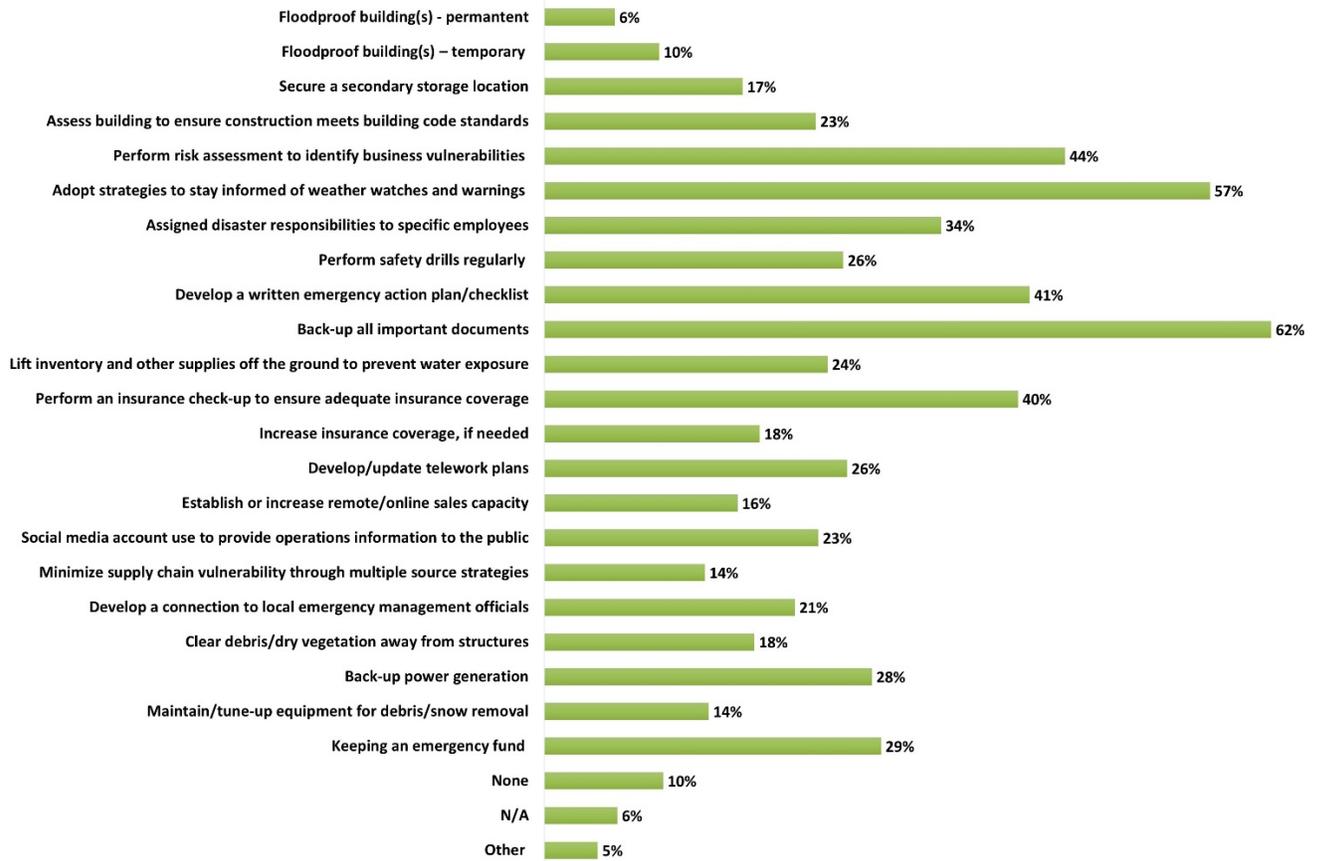


Figure 23. Mitigation/preparedness actions taken in the past to prepare the organization against natural hazards (n= 898).

Table 14. Mitigation/preparedness actions taken in the past to prepare the business against natural hazards by Census regions (n = 888).

Preparedness/mitigation by region	Midwest	Northeast	South	West
Floodproof building(s) - permanent	28 %	13 %	49 %	10 %
Floodproof building(s) – temporary	13 %	6 %	75 %	6 %
Secure a secondary storage location	20 %	9 %	53 %	18 %
Assess building to ensure construction meets building code standards	23 %	7 %	49 %	21 %

Perform risk assessment to identify business vulnerabilities	18 %	11 %	50 %	21 %
Adopt strategies to stay informed of weather watches and warnings	16 %	10 %	59 %	15 %
Assigned disaster responsibilities to specific employees	19 %	7 %	56 %	18 %
Perform safety drills regularly	22 %	7 %	53 %	18 %
Develop a written emergency action plan/checklist	18 %	10 %	51 %	21 %
Back-up all important documents	16 %	10 %	52 %	22 %
Lift inventory and other supplies off the ground to prevent water exposure	18 %	8 %	65 %	9 %
Perform an insurance check-up to ensure adequate insurance coverage	19 %	8 %	51 %	22 %
Increase insurance coverage, if needed	18 %	7 %	51 %	24 %
Develop/update telework plans	17 %	10 %	57 %	16 %
Establish or increase remote/online sales capacity	11 %	14 %	55 %	20 %
Social media account use to provide operations information to the public	22 %	11 %	50 %	17 %
Minimize supply chain vulnerability through multiple source strategies	16 %	17 %	45 %	22 %
Develop a connection to local emergency management officials	23 %	7 %	53 %	17 %

Clear debris/dry vegetation away from structures	11 %	8 %	61 %	20 %
Back-up power generation	16 %	13 %	54 %	17 %
Maintain/tune-up equipment for debris/snow removal	29 %	20 %	32 %	19 %
Keeping an emergency fund	18 %	10 %	48 %	24 %
None	6 %	12 %	48 %	34 %
Other (please specify)	22 %	5 %	41 %	32 %



Figure 24. Word cloud detailing mitigation/preparedness actions taken in the past to prepare the business against natural hazards indicated by respondents who selected “other.”

15. Have actions taken by your organization to prepare for natural disasters in the past helped prepare/cope with the impacts of COVID-19?

In total, 1036 respondents answered this question. Their answers indicate that 48 % of respondents believe that actions taken by the business in the past have not helped them to cope with COVID-19; see Figure 25. On the other hand, 17 % of respondents do not know if actions

taken in the past have helped their organizations and 15 % of respondents indicated that they did not know. About 20 % of respondents indicated that past actions have helped their business cope with COVID-19. Those respondents indicating that past experiences have helped were asked to provide details about the actions; themes from these answers are presented in Figure 26, below.

Responses by Census regions are shown in Table 15 and Figure A-15 in the Appendix.

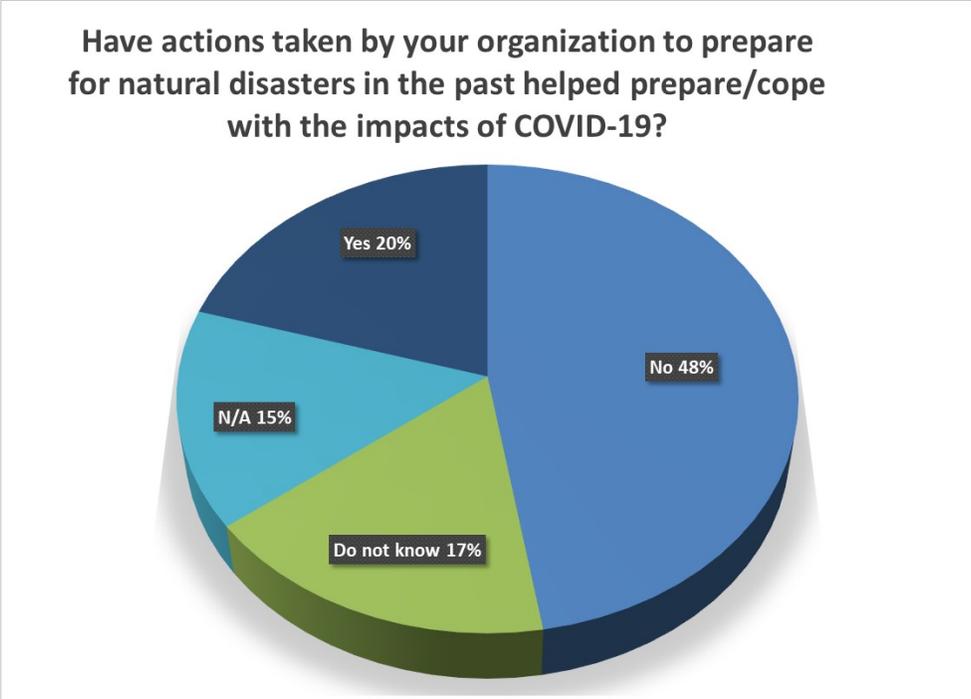


Figure 25. Responses to whether past actions have helped the business to cope with COVID-19 (n=1036).

Table 15. Responses to whether past actions have helped the business to cope with COVID-19 by Census regions (n=1025).

Have actions taken by your organization to prepare for natural disasters in the past helped prepare/cope with the impacts of COVID-19?	Midwest	Northeast	South	West
No	13 %	10 %	51 %	26 %
Do not know	16 %	7 %	59 %	18 %
N/A	15 %	16 %	44 %	25 %
Yes	15 %	11 %	56 %	18 %



Figure 26. Word cloud presenting information about the types of actions that respondents have taken in the past towards natural disasters that have helped their business cope against COVID-19 impacts.

16. Will your planning for natural hazards change in the future due to the COVID-19 pandemic?

Based on 629 respondents, 47 % of businesses indicated that their planning for natural hazards would not change in the future regardless the COVID-19 pandemic (Figure 27). On the other hand, 44 % of SMEs indicated they don't know or were unsure about whether their planning would change, and only 9 % of SMEs said their planning for natural hazards would change in the future due to the pandemic. Responses by Census region are shown in Table 16 and Figure A-16 in the Appendix. Figure 28 presents themes across how planning for natural hazards in the future would change.

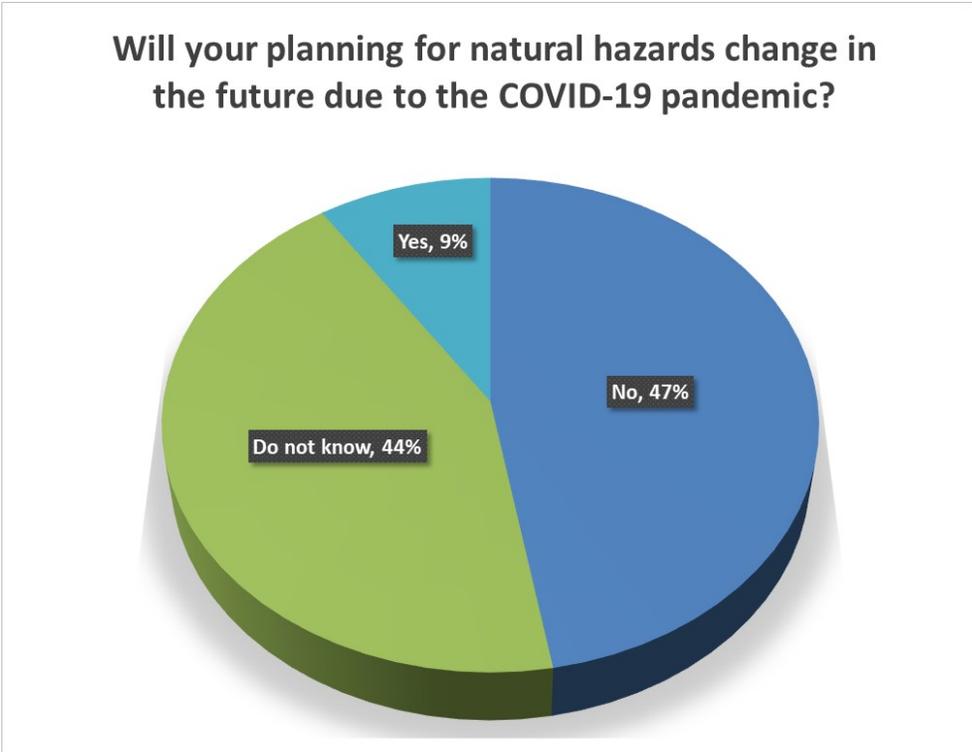


Figure 27. Responses to whether planning for natural hazards would change in the future (n= 629).

Table 16. Responses to whether planning for natural hazards would change in the future by Census regions (n= 620).

Will your planning for natural hazards change in the future due to the COVID-19 pandemic?	Midwest	Northeast	South	West
No	16 %	10 %	57 %	17 %
Do not know	15 %	9 %	48 %	28 %
Yes	17 %	16 %	43 %	24 %

half of the respondents (57 %) expressed their concern on the uncertainty of future COVID-19 outbreaks. Additionally, a substantial number of respondents worried that they may be unable to provide enough protection to their employees from the COVID-19 infection (43 %) or maintain a safe environment for working upon reopening (21 %). The third-level concerns are about the sustainability of their businesses. In this regard, 33 % of respondents said that they may go out of business as a result of COVID-19, while others worried that the pandemic would lower their productivity (27 %), disrupt their supply chains (19 % domestic, 11 % international), lead to loss of market share (18 %), or influence tariffs and trade (10 %). The fourth-level of concerns are focused on operations and re-opening of businesses, including reduction of workforce (17 %), operation issues associated with restarting (17 %), and rehiring, replacing, and retaining workforce upon opening (15 %). Finally, some respondents expressed concerns for natural disaster events at their location: hurricanes (14 %), floods (10 %), earthquakes (5 %), wildfires (5 %), tornados (10 %), and other natural hazards (9 %).

As previously mentioned, the breakdown of these actions across the sample is provided in Figure 29. Responses by Census regions are shown in Table 17 and Figure A-17 in the Appendix. Figure 30 provides themes across detailed responses of those who selected “other” as part of their responses to this question.

Please select your organization's top concerns regarding the impact of and recovery from COVID-19

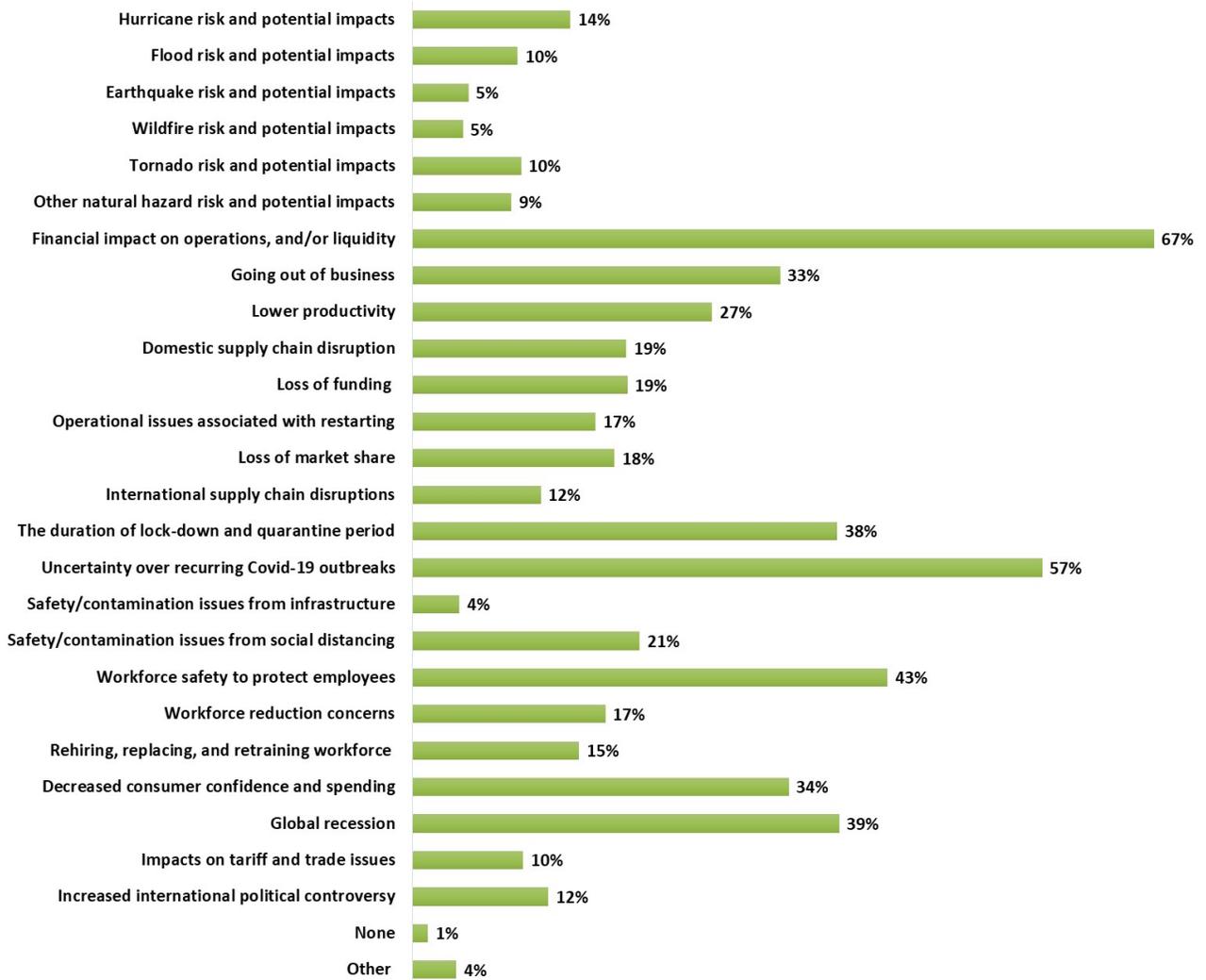


Figure 29. Organization's top concerns regarding the impact and recovery from COVID-19 (n= 1006).

Table 17. Organization's top concerns regarding the impact and recovery from COVID-19 by Census regions (n= 997).

Please select your organization's top concerns regarding the impact of and recovery from COVID-19	Midwest	Northeast	South	West
<i>Natural hazard concerns</i>				
Hurricane risk and potential impacts	1 %	6 %	89 %	4 %
Flood risk and potential impacts	12 %	3 %	78 %	7 %
Earthquake risk and potential impacts	8 %	2 %	16 %	74 %
Wildfire risk and potential impacts	7 %	0 %	23 %	70 %

Tornado risk and potential impacts	22 %	1 %	73 %	4 %
Other natural hazard risk and potential impacts	17 %	6 %	55 %	22 %
<i>Business financial, and market concerns</i>				
Financial impact on operations, and/or liquidity, capital	14 %	10 %	51 %	25 %
Going out of business	15 %	11 %	51 %	23 %
Lower productivity	16 %	8 %	49 %	27 %
Domestic supply chain disruption	15 %	9 %	47 %	29 %
Loss of funding (governmental and non-profit organizations)	16 %	10 %	52 %	22 %
Operational issues associated with restarting	19 %	12 %	48 %	21 %
Loss of market share	13 %	10 %	56 %	21 %
International supply chain disruptions	12 %	18 %	39 %	31 %
<i>COVID-19 specific concerns</i>				
The duration of lock-down and quarantine period	14 %	12 %	48 %	26 %
Uncertainty over recurring Covid-19 outbreaks in the future	14 %	12 %	51 %	23 %
Safety/contamination issues from shutdown infrastructure	20 %	12 %	46 %	22 %
Safety/contamination issues from working during social distancing	16 %	11 %	51 %	22 %
<i>Workforce concerns</i>				
Workforce safety to protect employees from infection	14 %	8 %	55 %	23 %
Workforce reduction concerns	15 %	8 %	49 %	28 %
Rehiring, replacing, and retraining workforce upon reopening	13 %	11 %	52 %	24 %
<i>Consumer concerns</i>				
Decreased consumer confidence and spending	14 %	10 %	51 %	25 %
<i>Global concerns</i>				
Global recession	11 %	11 %	49 %	29 %
Impacts on tariff and trade issues	17 %	15 %	44 %	24 %
Increased international political controversy	12 %	14 %	48 %	26 %
None	21 %	29 %	29 %	21 %
Other	5 %	20 %	45 %	30 %



Figure 30. Word cloud presentation of themes across top concerns regarding the period of impact and recovery from COVID-19.

18. Has the organization implemented steps to reduce risks to the concerns you indicated above?

In total, 1001 respondents answered this question; see Figure 31. Out of this number, 28 % of respondents have implemented steps to reduce the impact of COVID-19 on their business’ operations and recovery. An additional 28% of respondents are in the process of implementation. On the other hand, 17 % of respondents indicate that they were planning to implement adaptive strategies at the time of the survey. Fourteen percent of respondents would like to learn more about adaptive strategies before potential implementation, and only 5% of respondents did not have any plans or actions. Out of the 1001 respondents, 8 % were unsure as to whether or not any step(s) had been taken to reduce risks to the concerns indicated previously in question 17. Responses broken down by Census region are shown in Table 18 and Figure A-18 in the Appendix.



Figure 31. Responses to whether the organization has implemented steps to reduce concerns (n= 1001).

Table 18. Responses to whether the organization has implemented steps to reduce concerns by Census regions (n= 992).

Has the organization implemented steps to reduce risks to the concerns you indicated above?	Midwest	Northeast	South	West
Yes, already implemented	15 %	10 %	52 %	23 %
Yes, in the process of implementation	14 %	12 %	47 %	27 %
Yes, planning to implement	11 %	13 %	57 %	19 %
No, but would like to learn more	13 %	8 %	59 %	20 %
No, do not plan to do so	19 %	12 %	44 %	25 %
Unsure	18 %	8 %	46 %	28 %

19. Do you feel you have the resources you need to protect your business against the risks you identified above?

In total, 1003 SMEs provided responses to this question. Out of this number, 31 % SMEs said that their SME had the resources to protect their businesses against their top concerns (Figure 32), 37 % report that their SME did not have the needed resources, and 32 % of SMEs are unsure. Responses by Census regions are shown in Table 19 and Figure A-19 in the Appendix.

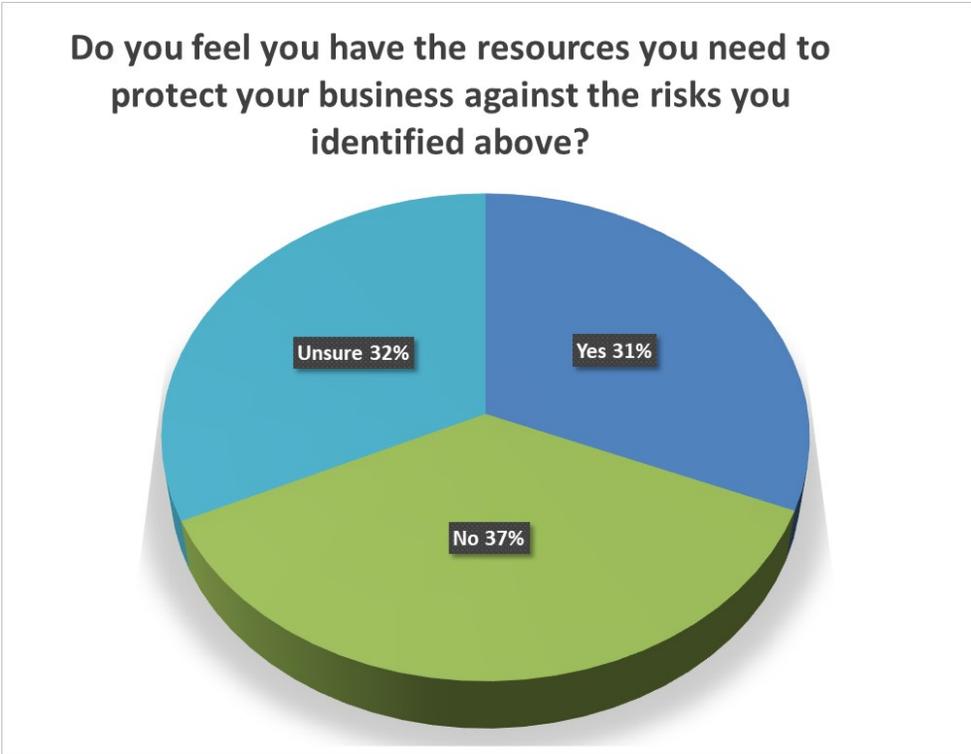


Figure 32. Responses to whether the organization has the resources to reduce concerns (n= 1003).

Table 19. Responses to whether the organization has the resources to reduce concerns by Census regions (n= 994).

Do you feel you have the resources you need to protect your business against the risks you identified above?	Midwest	Northeast	South	West
Yes	17 %	8 %	48 %	27 %
No	14 %	13 %	51 %	22 %
Unsure	12 %	12 %	54 %	22 %

20. What resources, knowledge, or support do you feel you need to be better protected against the risks you identified?

If respondents indicated that they do not feel that they have the resources they need in the previous question (i.e., 37 % out of 1003 SMEs, around 370 businesses), respondents were asked to indicate what they feel they need to better reduce their concerns, specific to other risks coming to fruition during the COVID-19 transmission period. This was an open-ended question and themes from respondents’ answers are presented in Figure 33, below. Responses largely fell into four major categories:

1. Assistance navigating deep uncertainty [about future circumstances],
2. Clear, detailed information and training
3. Access to financial assistance and financial information, and

4. Assistance with [procuring and understanding the use of] PPE and other relevant equipment.



Figure 33. Word cloud presentation of resources needed by businesses to reduce their concerns specific to other risks coming to fruition during the COVID-19 transmission period.

21. How much time do you think will pass before this business returns to its pre-COVID conditions (e.g., operations)?

In total, 992 respondents answered this question. Out of this number, 5 % of SMEs think that they will return to pre-COVID conditions within a month of responding to the survey (Figure 34), 3 % think that it will be between 2-3 months, 4 % need 4-6 months, 8 % between 6-12 months, 19 % between 12-18 months, 23 % consider they need more than 18 months, 19 % consider unlikely to resume operations, 6 % consider unlikely to reopen at all, 2 % do not know, and 11 % provided other responses. Responses by Census region are shown in Table 20 and Figure A-20 in the Appendix. Details of answers made by those who responded “other” to this question are available in Figure 35, below. The predominant theme across those responses was uncertainty around developing conditions over the course of the pandemic as well as complexities in planning for an unknown period of time, e.g., how best to allocate the business’ existing resources while facing an indeterminant amount of time with conditions that deviate from pre-COVID conditions.

How much time do you think will pass before this business returns to its pre-COVID conditions

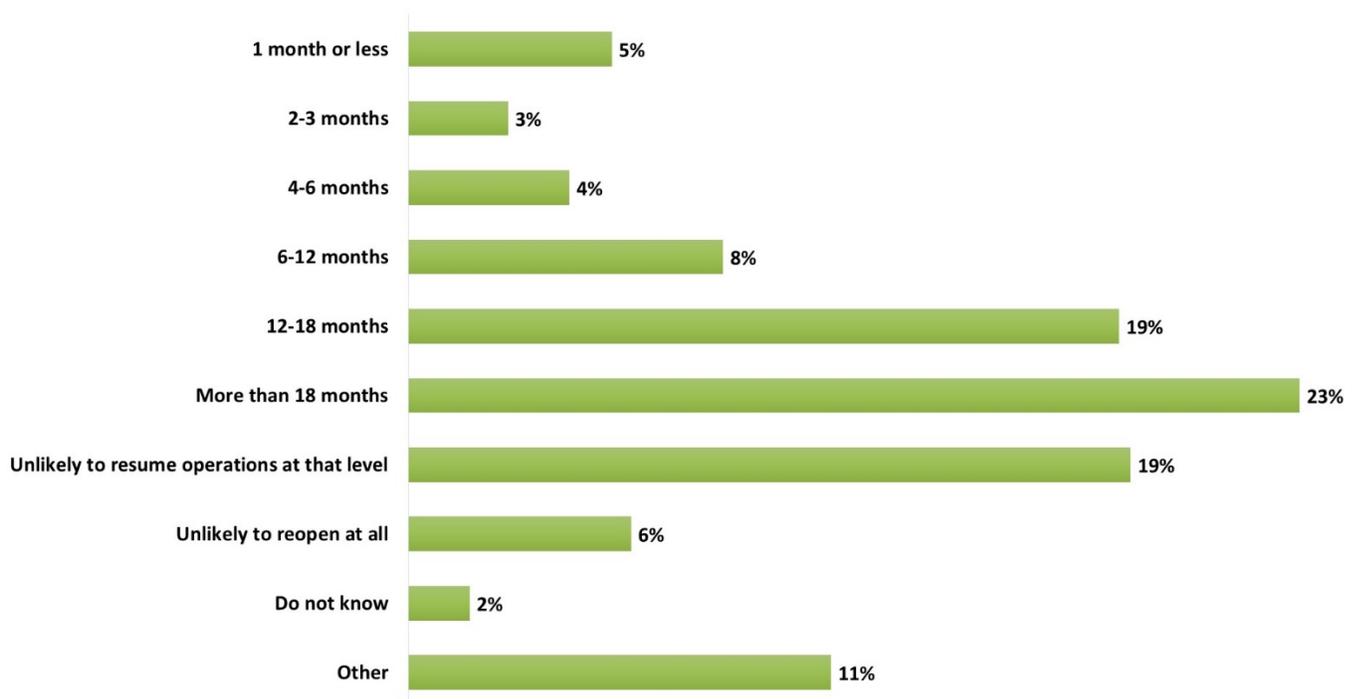


Figure 34. Time before returning to pre-COVID conditions (n= 992).

Table 20. Time before returning to pre-COVID conditions by Census regions (n= 984).

How much time do you think will pass before this business returns to its pre-COVID conditions	Midwest	Northeast	South	West
1 month or less	13 %	15 %	55 %	17 %
2-3 months	16 %	12 %	36 %	36 %
4-6 months	10 %	12 %	60 %	18 %
6-12 months	16 %	9 %	56 %	19 %
12-18 months	11 %	11 %	57 %	21 %
More than 18 months	16 %	9 %	47 %	28 %
Unlikely to resume operations at that level	16 %	13 %	46 %	25 %
Unlikely to reopen at all	16 %	5 %	61 %	18 %
Do not know	33 %	7 %	47 %	13 %
Other	16 %	12 %	47 %	25 %

Which sector best describes your business?

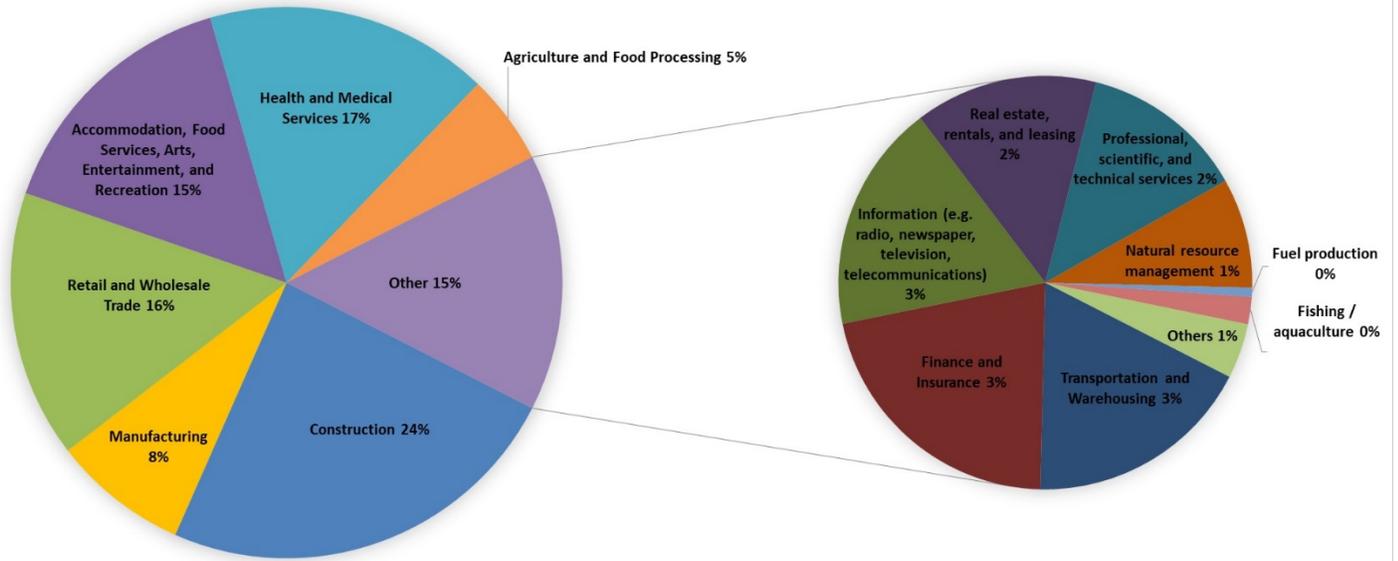


Figure 36. Business sector (n= 930).

Table 21. Business sector by Census regions (n= 922).

Which sector best describes your business?	Midwest	Northeast	South	West
Construction	14 %	14 %	53 %	19 %
Manufacturing	7 %	3 %	59 %	31 %
Retail trade	14 %	10 %	43 %	33 %
Accommodation and Food Services	17 %	8 %	43 %	32 %
Wholesale trade	14 %	10 %	55 %	21 %
Transportation and Warehousing	4 %	12 %	60 %	24 %
Finance and Insurance	23 %	0 %	60 %	17 %
Information (e.g. radio, newspaper, television, telecommunications)	16 %	12 %	56 %	16 %
Real estate, rentals, and leasing	21 %	11 %	26 %	42 %
Professional, scientific, and technical services	28 %	0 %	67 %	5 %
Health and medical services	8 %	8 %	61 %	23 %
Arts, Entertainment, and Recreation	20 %	15 %	46 %	19 %
Food processing, agriculture	27 %	15 %	35 %	23 %
Natural resource management	33 %	25 %	33 %	9 %
Fuel production	0 %	0 %	0 %	100 %
Fishing/aquaculture	33 %	0 %	33 %	34 %
Other	0 %	67 %	17 %	16 %

23. When was your organization founded at this location?

In total, 915 respondents answered this question. Out of this number, 8 % of respondents have been in business 1-2 years, 3 % for 3-12 years , 4 % for 13-22, 9 % of SMEs for 23-32 years, 12 % between 33-42 years, 16 % between 43-52 years, 22 % have been in business between 53-62 years, and 26 % of businesses in the survey have between 63-72 years of being in operations (Figure 37). The average number of years in business of sampled SMEs is 46, with median 51 years. The maximum number of years of sampled SMEs is 72 and the minimum is 1 year. Responses by Census regions are shown in Table 22 and Figure A-22 in the Appendix.

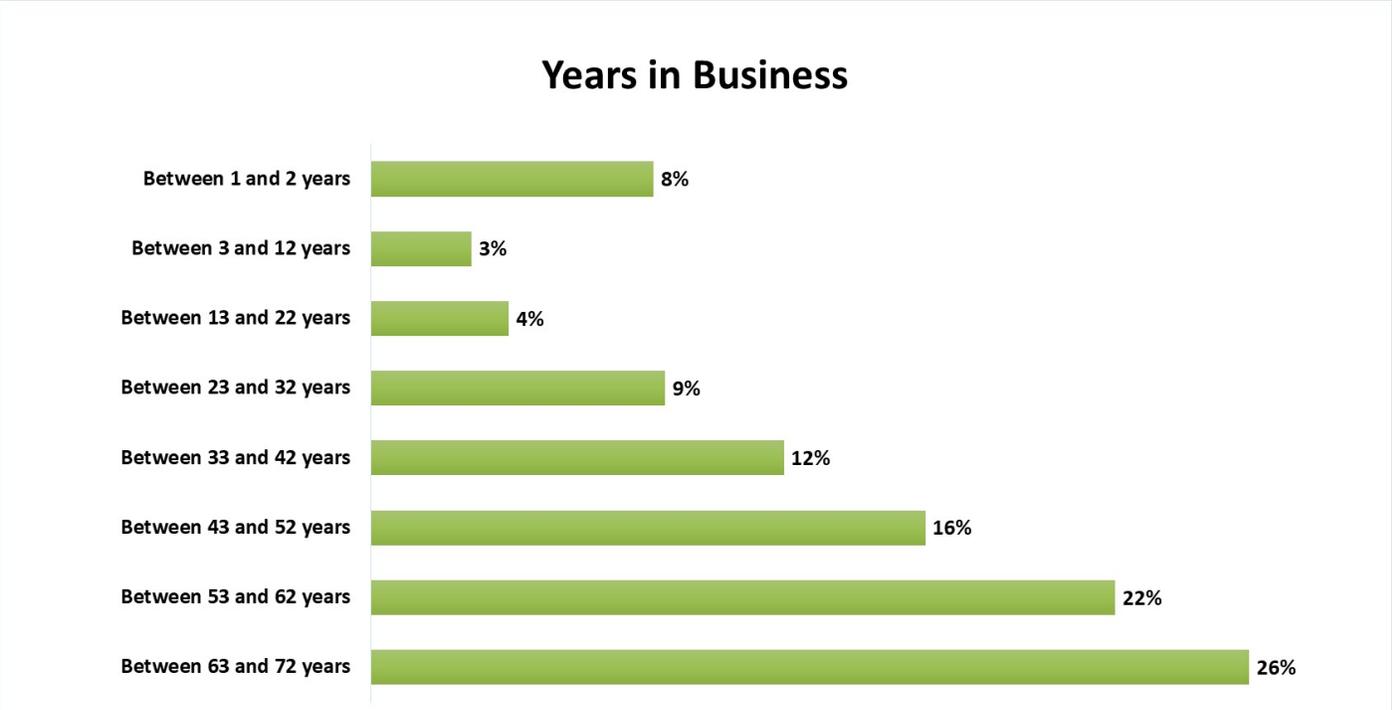


Figure 37. Years in business (n= 915).

Table 22. Years in business by Census regions (n= 907).

When was your organization founded at this location?	Midwest	Northeast	South	West
1-2	28 %	14 %	39 %	19 %
3-12	15 %	11 %	48 %	26 %
13-22	16 %	14 %	43 %	27 %
23-32	12 %	9 %	51 %	28 %
33-42	9 %	16 %	51 %	24 %
43-52	11 %	7 %	46 %	36 %
53-62	12 %	6 %	58 %	24 %
63-72	16 %	13 %	55 %	16 %

24. How would you describe this organization? Check ALL that apply

In total, 853 respondents answered this question. Please note that in this survey the respondent did not have to be federally categorized in these special categories to self-identify as such. This question had non-mutually exclusive response options; respondents could select multiple answer options. Out of the 853 SMEs that responded this question, 29 % self-described as woman-owned business, 19 % as minority-owned, 7 % veteran-owned, 24 % family-owned, 31 % single ownership. Furthermore, 11 % indicate that their ownership is structured as a partnership, 48 % as a corporation, 2 % franchise, 1 % cooperative, 7 % multi-location, 36 % for-profit, 12 % as non-profit, and 6 % as other. These results are presented in Figure 38 and Figure 39. Whereas Figure 38 provides information of the ownership structure of sampled businesses, Figure 39 summarizes some demographic results of sampled SMEs. Responses by Census regions are shown in Table 23 and Figure A-23 in the Appendix.

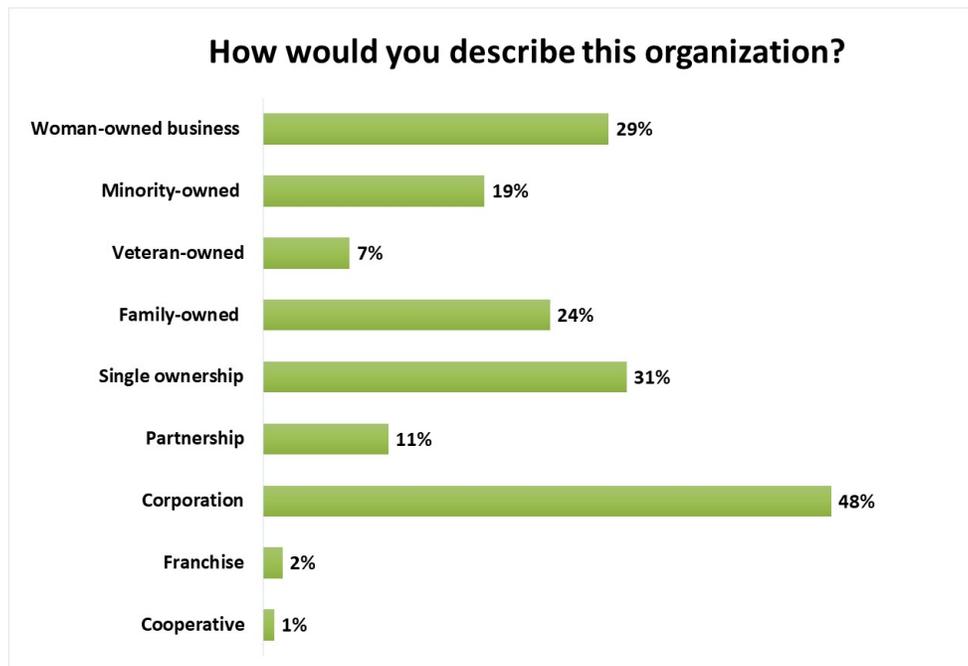


Figure 38. Ownership structure of sampled businesses (n= 853).

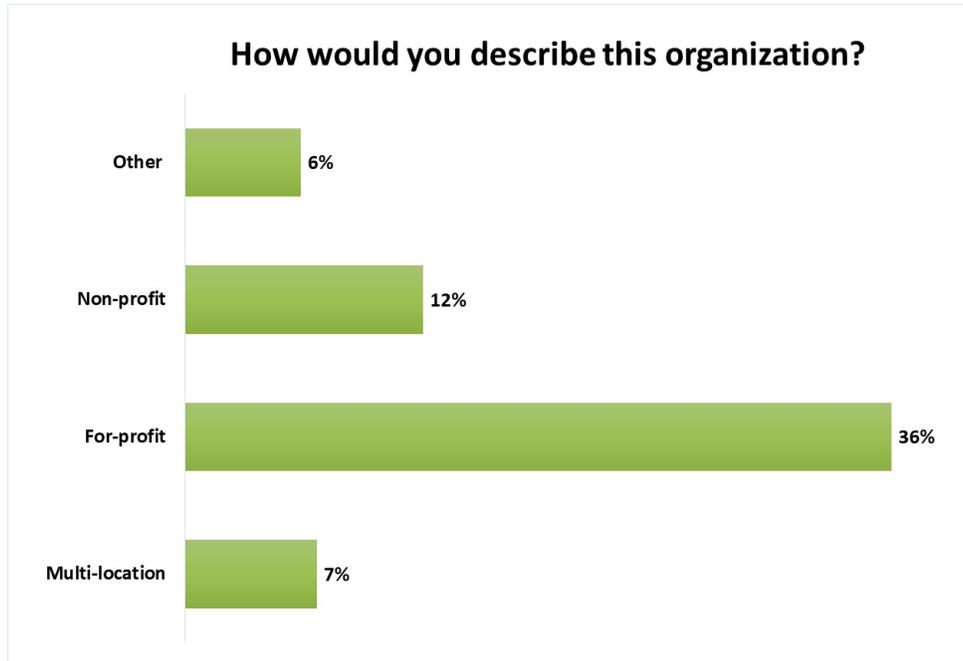


Figure 39. Demographics of sampled businesses (n= 853)

Table 23. Description of business by Census regions (n= 845).

How would you describe this organization?	Midwest	Northeast	South	West
Woman-owned business	14 %	11 %	56 %	19 %
Minority-owned	6 %	6 %	70 %	18 %
Veteran-owned	11 %	6 %	60 %	23 %
Family-owned	18 %	10 %	48 %	24 %
Single ownership	15 %	15 %	50 %	20 %
Partnership	8 %	7 %	59 %	26 %
Corporation	12 %	11 %	49 %	28 %
Franchise	7 %	14 %	64 %	15 %
Cooperative	25 %	25 %	50 %	0 %
Multi-location	9 %	16 %	49 %	26 %
For-profit	11 %	12 %	54 %	23 %
Non-profit	22 %	8 %	49 %	21 %
Other	8 %	6 %	59 %	27 %

25. How important is each group to your organization's recovery from COVID-19?

This question asked businesses to provide responses related to the importance of specific groups for the organization's recovery from COVID-19. The question identifies 12 different groups: Neighbors, Friends and family, Neighborhood, Suppliers, Customers, Business Groups, State Organizations, Federal Organizations, NOAA Sea Grant, NOAA Weather Ready Nation,

Manufacturing Extension Partnership Center, and Faith-Based Organizations. The importance of each of these groups to the SME is assessed on a 1 through 5 scale, being 1 'least important' and 5 'most important'. The results of this questions are presented in Figure 40 and Table 24. It is important to note the last column of the Table, which provides information about the sample used for each of the specific groups.

In general, 30 % of sampled businesses consider their neighbors as the least important in their recovery from COVID-19, 43 % indicate that friends and family are the most important. Additionally, about the same percentage of businesses (26 % and 27%) say that neighborhood organizations are the least and most important, respectively, in the recovery process from COVID-19. A high percentage of businesses (44 %) indicate that suppliers are important; however, a much higher (91 %) of SMEs consider their customers as the most important group in their recovery from COVID-19. Other groups with some importance for the organizational recovery include business groups (e.g., Chambers of Commerce) with 23 %, State organizations (28 %), and Federal organizations (32 %). Other groups such as NOAA Sea Grant, NOAA Weather Ready Nation, Manufacturing Extension Partnership, and Faith Based organizations are considered least important for organizational recovery with 60%, 43%, 51% and 43%, respectively. See Figure 40 and Table 24.

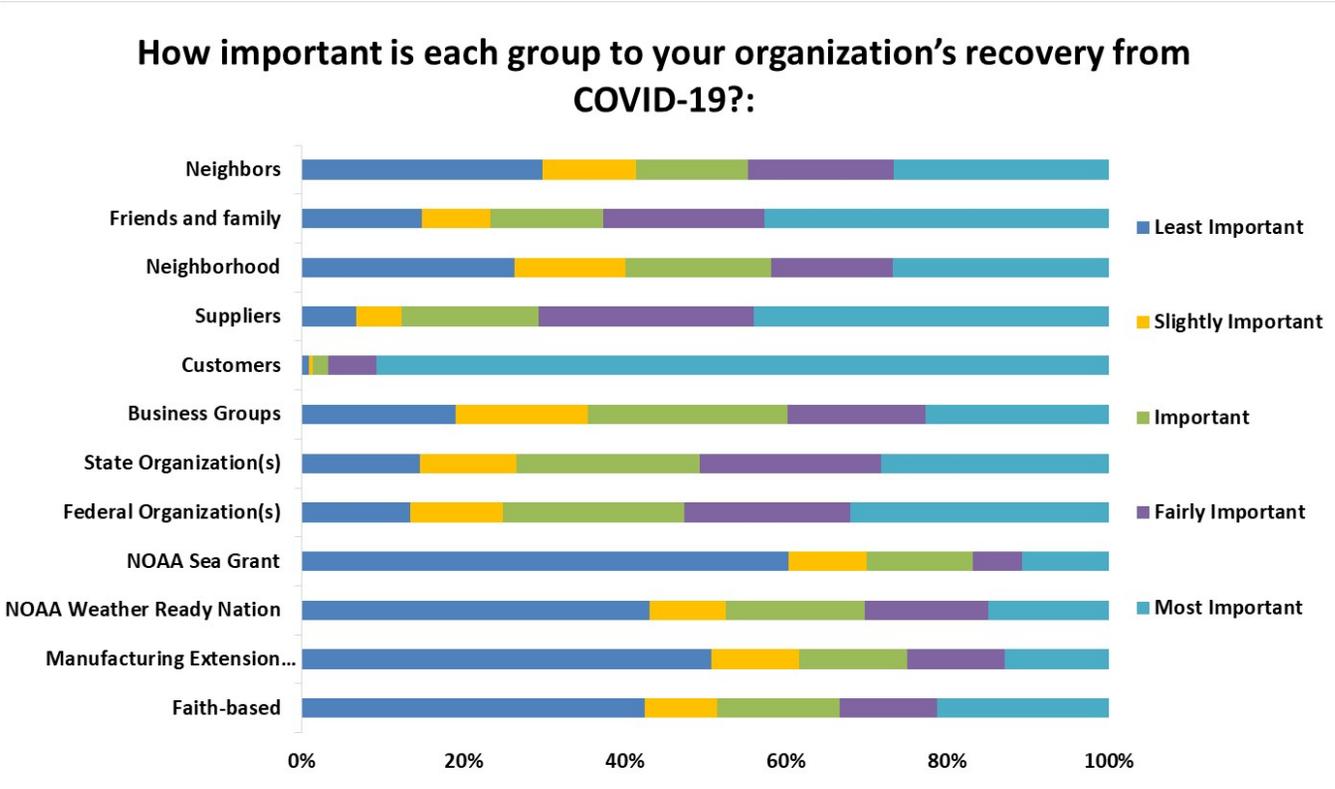


Figure 40. Relative importance of specific groups to organizational recovery from COVID-19

Table 24. Relative importance of specific groups to organizational recovery from COVID-19

How important is each group to your organization's recovery from COVID-19?	Least Important	Slightly Important	Important	Fairly Important	Most Important	Sample (n)
Neighbors	30 %	12 %	14 %	18 %	26 %	683
Friends and family	15 %	8 %	14 %	20 %	43 %	731
Neighborhood organizations	26 %	14 %	18 %	15 %	27 %	686
Suppliers	7 %	6 %	17 %	27 %	43 %	776
Customers	1 %	0 %	2 %	6 %	91 %	811
Business Groups	19 %	16 %	25 %	17 %	23 %	746
State Organization(s)	15 %	12 %	23 %	22 %	28 %	766
Federal Organization(s)	13 %	12 %	22 %	21 %	32 %	762
NOAA Sea Grant	60 %	10 %	13 %	6 %	11 %	456
NOAA Weather Ready Nation	43 %	9 %	17 %	15 %	16 %	522
Manufacturing Extension Partnership Center	51 %	11 %	13 %	12 %	13 %	496
Faith-based	43 %	9 %	15 %	12 %	21 %	588

26. Please indicate your level of agreement with the following statements:

This question asked businesses to indicate their level of agreement with the following statements: 1) COVID-19 did not impact my business in any significant manner, 2) COVID-19 posed the greatest risk yet to my organization's survival, 3) The impacts of COVID-19 will leave my organization unable to cope with a natural disaster, should one occur, in the next year, and 4) I am not concerned about a second wave of COVID-19 and the potential effects on my organization. Responses can be observed in Figure 41 and Table 25. Results indicate that most businesses (69 %) strongly disagree with the first statement (i.e., COVID-19 did not impact my business in any significant manner). Furthermore, at least 50 % of businesses responding this question strongly agree with the second statement (i.e., COVID-19 posed the greatest risk yet to my organization's survival). Nonetheless, more than a quarter of businesses (28 %) strongly disagree with the third statement (i.e., the impacts of COVID-19 will leave my organization unable

to cope with a natural disaster, should one occur, in the next year). The majority of businesses (66 %) are not concerned with a second wave of COVID-19 and the potential organizational effects. See Figure 41 and Table 25.

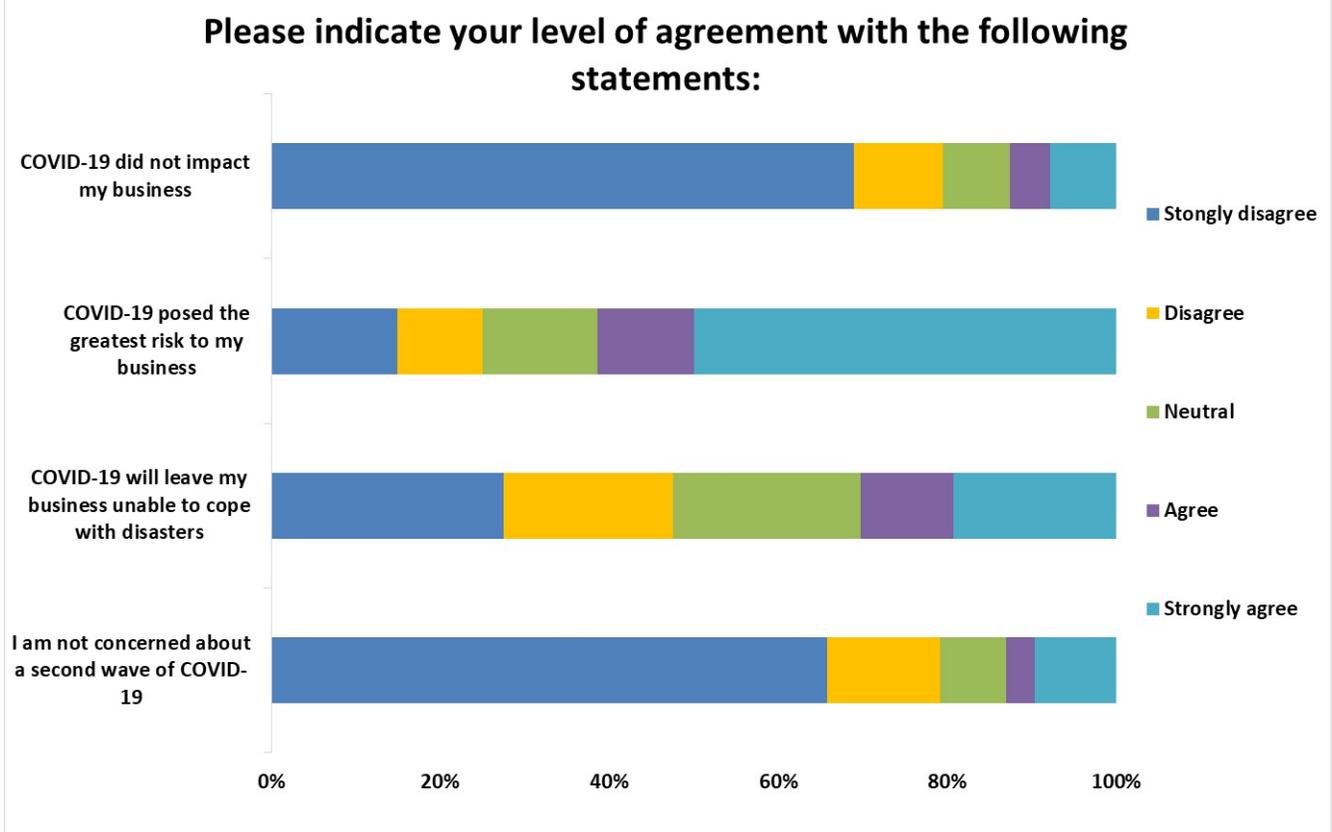


Figure 41. Level of agreement with COVID-19 impact statements

Table 25. Level of agreement with COVID-19 impact statements

Please indicate your level of agreement with the following statements:	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Sample (n)
COVID-19 did not impact my business in any significant manner	69 %	11 %	8 %	5 %	7 %	851
COVID-19 posed the greatest risk yet to my organization’s survival	15 %	10 %	14 %	11 %	50 %	839
The impacts of COVID-19 will leave my organization unable to cope with a natural disaster, should one occur, in the next year	28 %	20 %	22 %	11 %	19 %	809
I am not concerned about a second wave of COVID-19 and the potential effects on my organization	66 %	13 %	8 %	3 %	10 %	845

4. Discussion and Initial Findings

This discussion is based upon a synthesis of survey responses and does not indicate any specific policy recommendations arising from this research effort.

4.1. Current SME experience with COVID-19

Essential businesses do not necessarily appear to be better prepared for the impacts of COVID-19 than their non-essential counterparts. Many respondents report issues related to employees—from safety concerns to increases in leave requests and reduced productivity. Both essential and non-essential businesses across enterprise size report reductions in employee productivity whether they are onsite or remote. For example, one respondent noted that they *“closed [their] showroom to the public but continue to ship. [Salespeople] worked from home. Their effectiveness is diminished without in-person visits.”* However, the majority of COVID-19 responses made by businesses are largely related to demand-side signals from consumers.

Even though supply chain issues are significant barriers, those respondents in or closely aligned with the manufacturing sector largely indicated little or no impact from COVID-19. These same SMEs reported severe effects from natural disasters historically, especially those disaster types with impacts that potentially affect capital equipment and machinery, such as flooding. Furthermore, the fact that many of these SMEs do not directly interact with the public has helped them maintain flexibility in addressing shifting deliveries from suppliers and empowered them to split production shifts (number of employees per shift) and alter products produced.

Those reporting the greatest negative effects on their business from COVID-19 tend to be in the services sector and either are seasonal in their functions and/or coordinate large gatherings. Compared to natural disaster-related delays in the past, COVID-19 delays from the consumer-side are longer due to deep uncertainty with major contracts postponed until 2021 and few new contracts. To mitigate financial losses, some in this sector have offered to arrange large remote virtual events;¹¹ however, this event mode is noted by respondents to be harder to sell (even at a discounted price). In turn, this leaves these respondents with a largely reduced financial safety net.

In sectors that are essential, but report significant disruptions, decrease in demand is reported as cascading from lowered demand and/or operation in other sectors. For example, limitations to nursing home visitors and lowered demand from employers has reduced demand for health screening in some cases. Additionally, those in the construction sector have seen large reductions in contacts for work that takes place inside homes or businesses due to owners’ health concerns in an indoor setting. Others, such as driving services (i.e., taxi services) can open their main premises, but have a fraction of their typical demand because of the nature of the service. Finally,

¹¹ Such as corporate conferences.

those SMEs with a primary line of business that is not essential but offer some essential services opted to *split* the business temporarily and keep the essential services open.

Respondents mentioned concerns surrounding health and wellbeing of themselves, their employees, and their customers. For example, one respondent mentioned that their “biggest concern is if an employee contracts the disease and we then must close or self-isolate.” Some respondents indicated that they are weighing whether or not to go into early retirement and many micro-sized enterprises expressed concerns over continuing to fund employee health insurance as financial margins continue to tighten.

4.2. SME experience with natural disasters during the COVID-19 Pandemic.

Unsurprisingly, SMEs’ capacity to respond to natural disasters is limited by current COVID-19 associated changes. It should be noted that many respondents who answered that their response to the natural disaster was not directly affected by COVID-19, actually were indirectly affected by decisions the business had already made to address COVID-19. For example, in sectors where there has been a significant shift towards teleworking to address COVID-19 already, there were relatively fewer issues addressing the natural disaster. On the other hand, some businesses that report minimal negative effects from COVID-19 indicate that experiencing the complex event of a natural disaster during the pandemic has disturbed what had become new normal operating procedures at their worksite. Across sectors and designation of SMEs as essential (or not), liquidity was another major issue. For example, there is concern around ability to meet the criteria for SBA Paycheck Protection Program (PPP) loans if money earmarked for employee retention was used to address natural disaster recovery during this period.

4.3. Current and future plans to address complex events: concurrent COVID-19 and natural disaster risks.

Respondents who have prepared for natural disasters in the past tend to report greater concern for a complex event related to natural disasters during the COVID-19 pandemic. Furthermore, the more generalized disaster preparedness and response plans are the more the respondent perceives that they have been applicable to the current pandemic and are flexible enough to address a complex event should one occur in the near future. As one respondent put it: *“We have dealt with many weather emergencies in the past as well a bad flu pandemic, all of which prepared us for something like COVID-19, especially as it relates to teleworking. Our employees have been used to teleworking during emergencies.”*

There appear to be lessons from COVID-19 responses that will permeate planning for future natural disaster preparedness. For example, multi-location SMEs would typically travel between locations or shift employees in the case of a natural disaster; however, during COVID-19 they report not transferring items or employees between locations, which impacts typical natural disaster responses. Planning for complex events is also trending towards use of capital to provide

maximum flexibility. For example, many respondents indicate that they have preemptively set-up credit lines. A number of micro-sized enterprises reported taking out personal loans and discuss letting their employees “*know that they care,*” but report that they do not have what they need to survive during a COVID-19 continued slowdown much less during a complex event during that period. Lastly, across the board, there are reported increases in cooperative actions with counterparts in the same industry and general location who would typically be competitors reported.

5. Future Efforts

Given that the COVID-19 pandemic was declared to be a National Emergency March 13, 2020¹² and has continued for well over nine months (as of this writing), SME stakeholders have had to address a number of issues, ranging from temporary closure, changes in supply chain flows, employee needs, and changes to customer demand. In some cases, respondents have realized a “new normal” that has addressed these challenges somewhat. However, there is continued uncertainty and inherent stress as the pandemic continues to affect the majority of SMEs, directly or indirectly. Most are faced with deep uncertainty for their SME as well as their households.

The need for complex event research stems from the high number of natural disasters concurrent with the COVID-19 pandemic. There are a number of other events that have coincided and will continue to coincide with the COVID-19 pandemic.

Future efforts include continued data collection from SME stakeholders who participated in this first survey effort. Data collection from additional SME stakeholders through future surveys and potential interviews is also under consideration. To participate or provide feedback, please contact: SMEResearch@nist.gov .

¹² Date of the Federal Emergency Declaration. See: “Proclamation on Declaring a National Emergency Concerning the Novel Coronavirus Disease (COVID-19) Outbreak.” <https://www.whitehouse.gov/presidential-actions/proclamation-declaring-national-emergency-concerning-novelcoronavirus-disease-covid-19-outbreak/>

References

- Helgeson, J.F., J.F. Fung, Y. Zhang, A.R. Roa Henriquez, A. Zycherman, C. Nierenberg, D.T. Butry, D. Ramkissoon. (2020a). Complex Event Resilience of Small- and Medium-Sized Enterprises: Natural Disaster Planning During the COVID-19 Pandemic, NIST SP 1258, Gaithersburg, MD. <https://doi.org/106028/NIST.SP1258>.
- Helgeson, J.F., J.F. Fung, Y. Zhang, A.R. Roa Henriquez, A. Zycherman, C. Nierenberg, D.T. Butry, D. Ramkissoon. (2020b). *Eliciting lessons from small- and medium-sized enterprises (SMEs) for natural disaster resilience planning and recovery during the COVID-19 pandemic: SME Complex Event Resilience*, NIST DCI 002. <https://doi.org/106028/NIST.DCI002>.
- Helgeson, J., E. D. Pierel, and K. Dow. (2020c). NIST-NOAA Survey Instrument for Business Disruption and Recovery Associated With Extreme Events: General Instrument Applied to the Greater Charleston, SC Small- and Medium-sized business community post-Hurricane Irma, NIST DCI 001, Gaithersburg, MD. <https://doi.org/106028/NIST.DCI001>.
- Phillips, C.A., A. Caldas, R. Cleetus, K. A. Dahl, J. Deplet-Barreto, R. Licker, L.D. Merner, J. P. Ortiz-Partida, A.L. Phelan, E. Spanger-Siegfried, S. Talati, C.H. Trisos and C.J. Carlson. (2020). "Compound climate risks in the COVID-19 pandemic." *Nat. Clim. Chang.* 10, 586–588 <https://doi.org/10.1038/s41558-020-0804-2>.
- Small Business Administration. (2017). *SMALL BUSINESS FACTS THE ROLE OF MICROBUSINESS EMPLOYERS IN THE ECONOMY*. <https://cdn.advocacy.sba.gov/wp-content/uploads/2019/06/06120136/508FINALAug17Microbusiness.pdf>. Accessed November 23, 2020.
- Small Business Administration (SBA). (2019). *Table of size standards*. <https://www.sba.gov/document/support--table-size-standards> Accessed November 11, 2020.
- Small Business Administration. (2019). *2019 small business profile*. Office of Advocacy. <https://cdn.advocacy.sba.gov/wp-content/uploads/2019/04/23142719/2019-Small-Business-Profiles-US.pdf> Accessed November 11, 2020.

Appendix

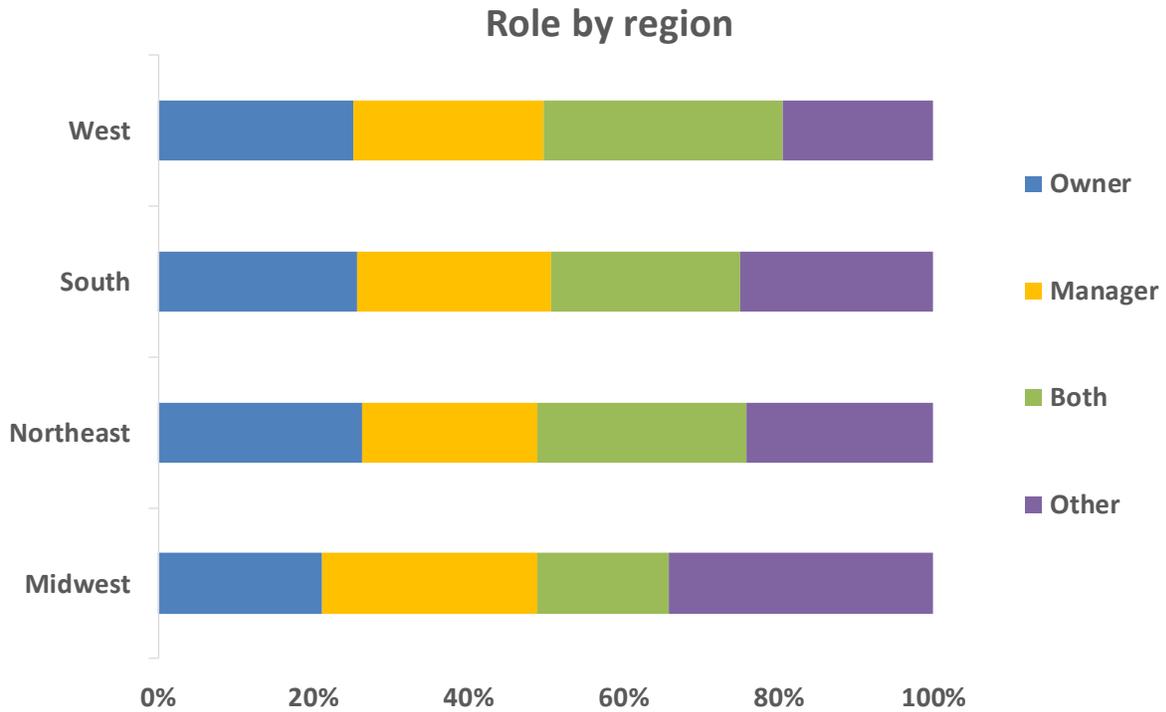


Figure A-1. The role of respondents in each Census region. n = 1346

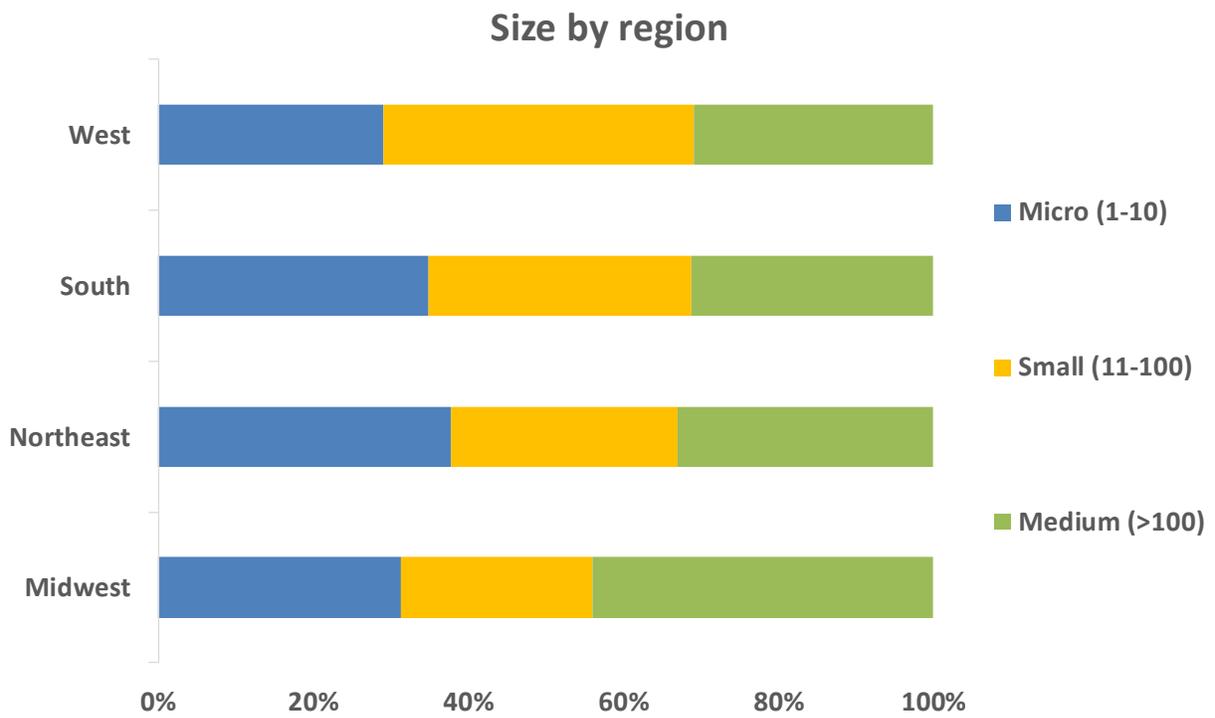


Figure A-2. Business sizes in each Census region. n = 1337

Business designation (essential/non-essential) by region

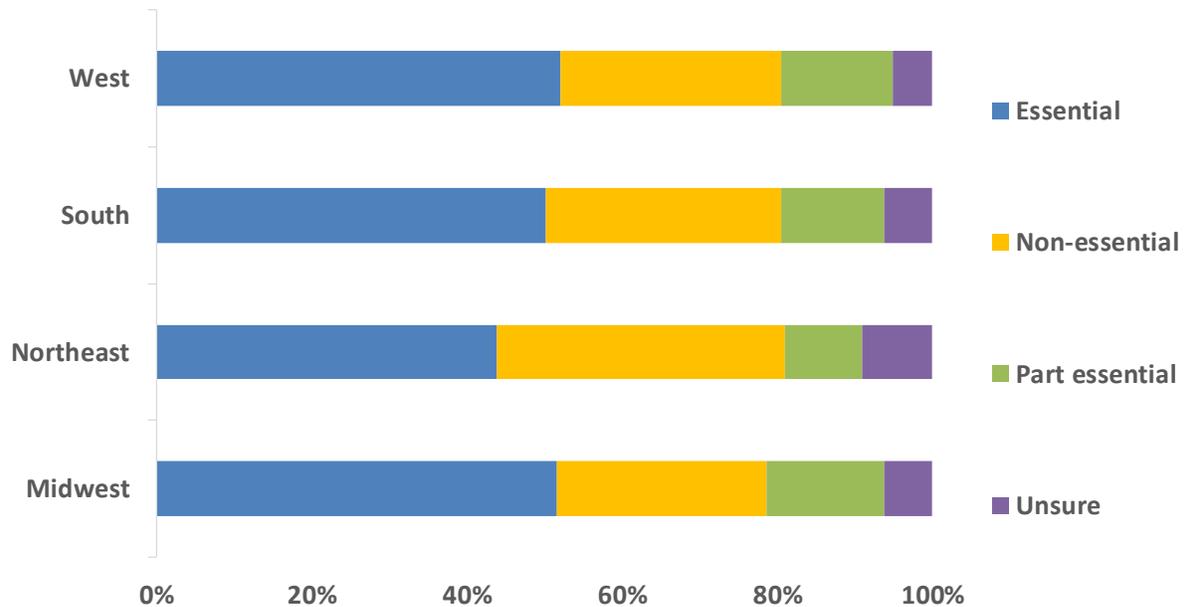


Figure A-3. Designated essential and nonessential businesses in each Census region. n = 1112

Continuity/stability to operations, by region

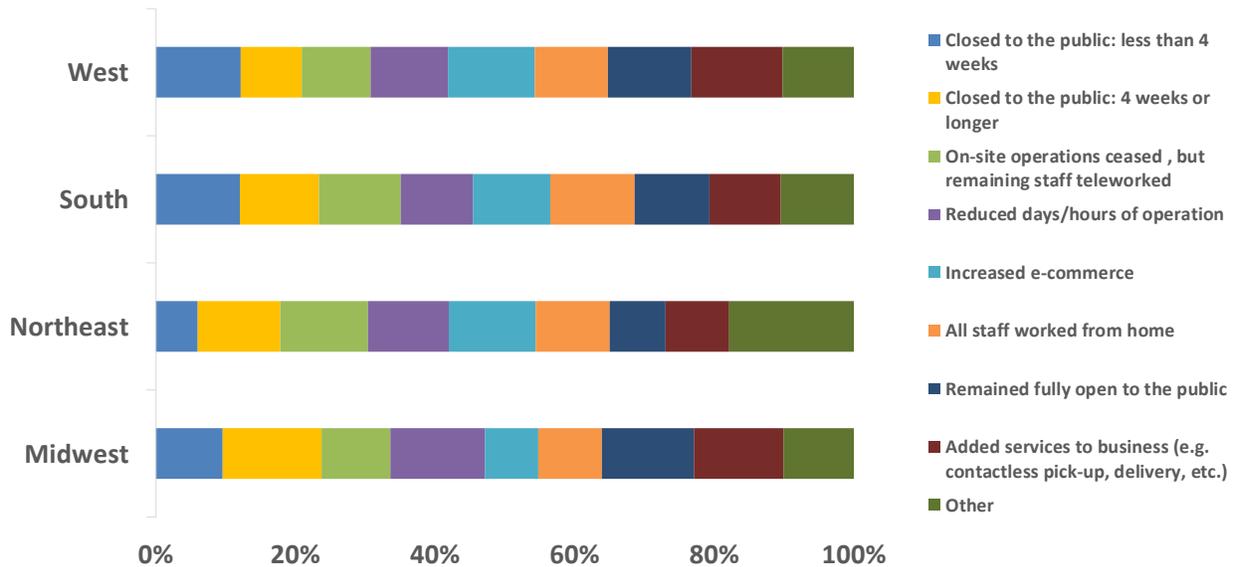


Figure A-4. The impacts of the COVID-19 pandemic on the continuity of business operations by Census regions. n = 1108

Impact of COVID19 on operations since March 13, for more than 4 weeks, by region

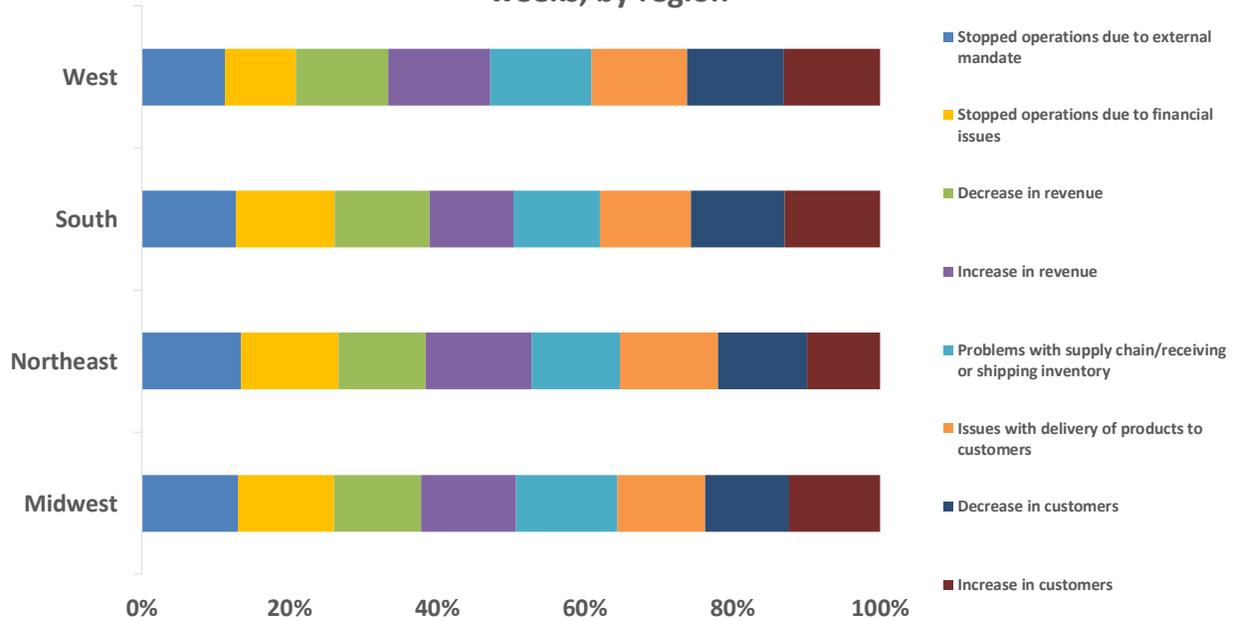


Figure A-5a. The impacts of the COVID-19 pandemic on business operations since March 13th in each Census region. n = 1079 (More than 4 weeks)

Impact of COVID19 on operations since March 13, for 1-4 weeks, by region

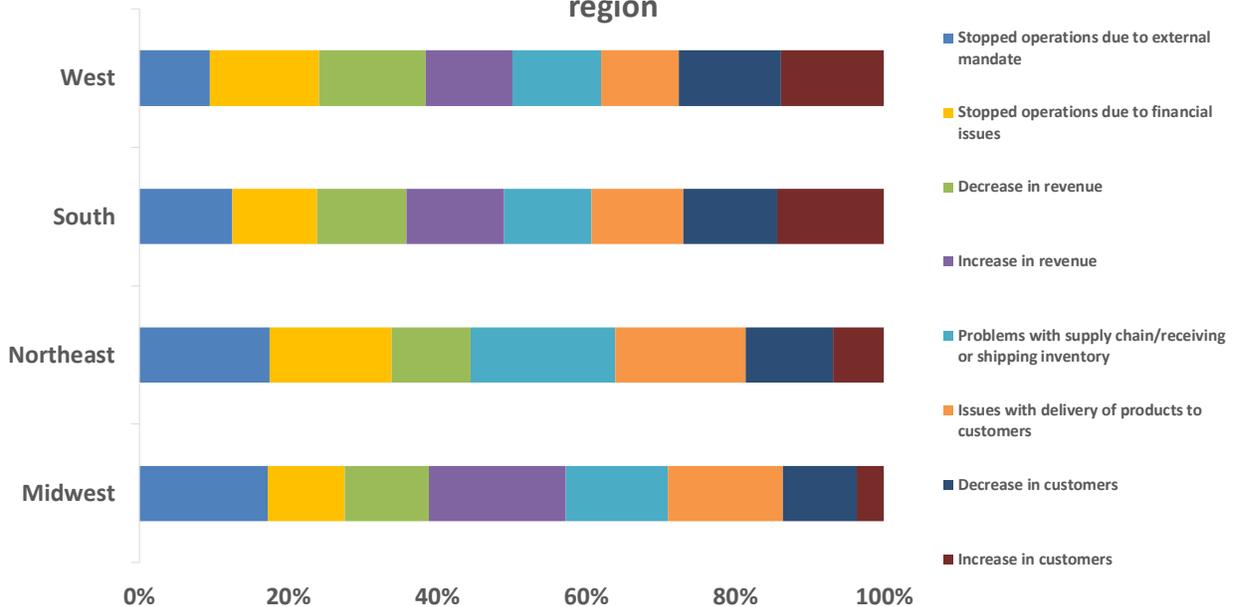


Figure A-5b. The impacts of the COVID-19 pandemic on business operations since March 13th in each Census region. n = 1079 (1-4 weeks)

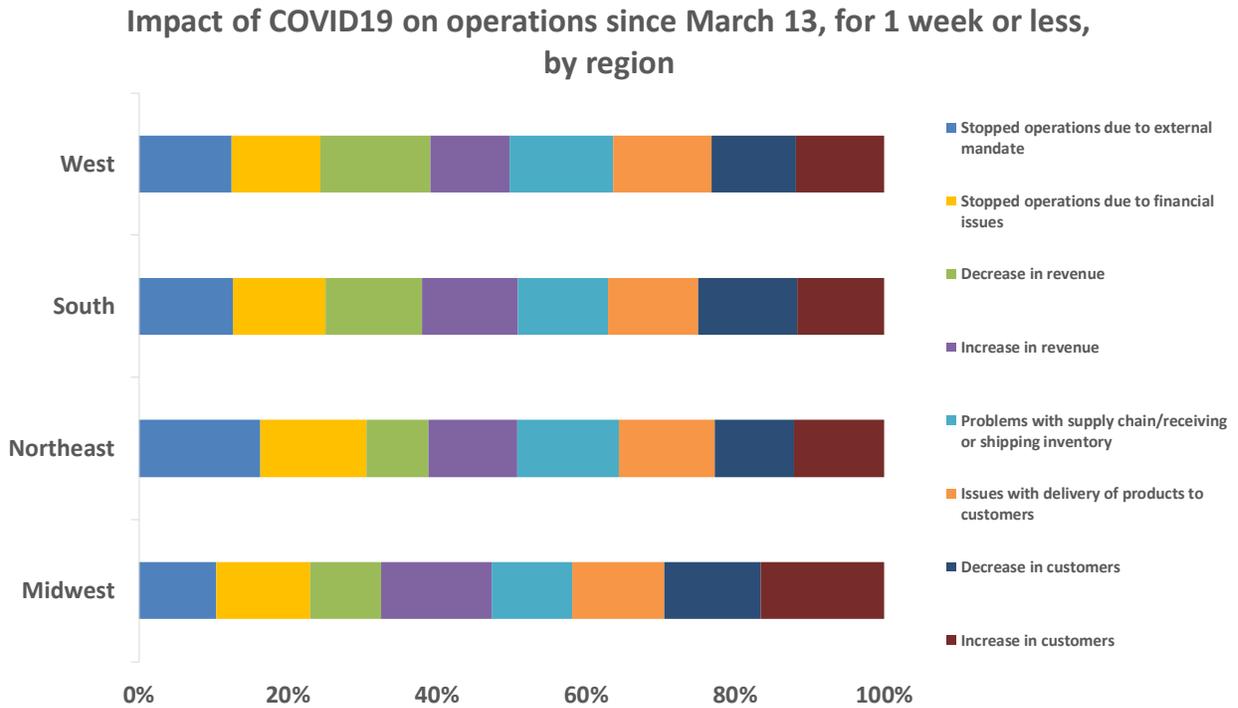


Figure A-5c. The impacts of the COVID-19 pandemic on business operations since March 13th in each Census region. n = 1079 (Less than 1 week)

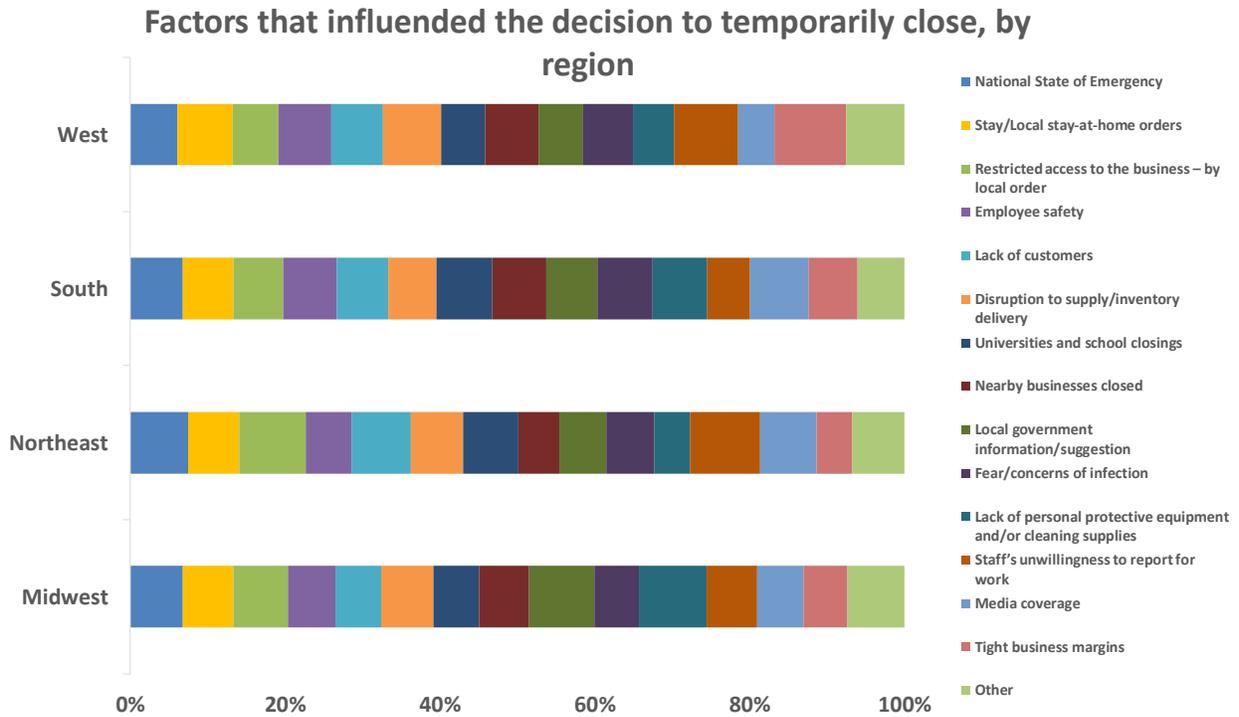


Figure A-6. Major factors that influenced the choice to temporarily close, change hours, or staffing changes by Census regions. n = 1111

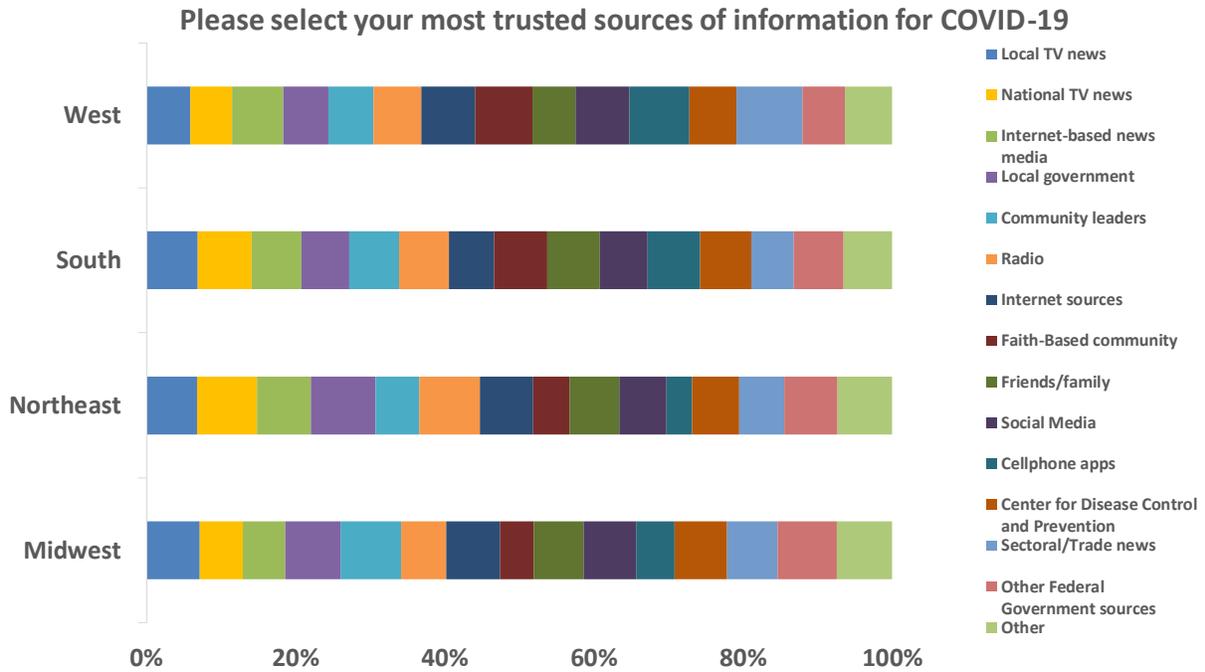


Figure A-7. The most trusted sources of information for COVID-19 in each Census region. n = 1109

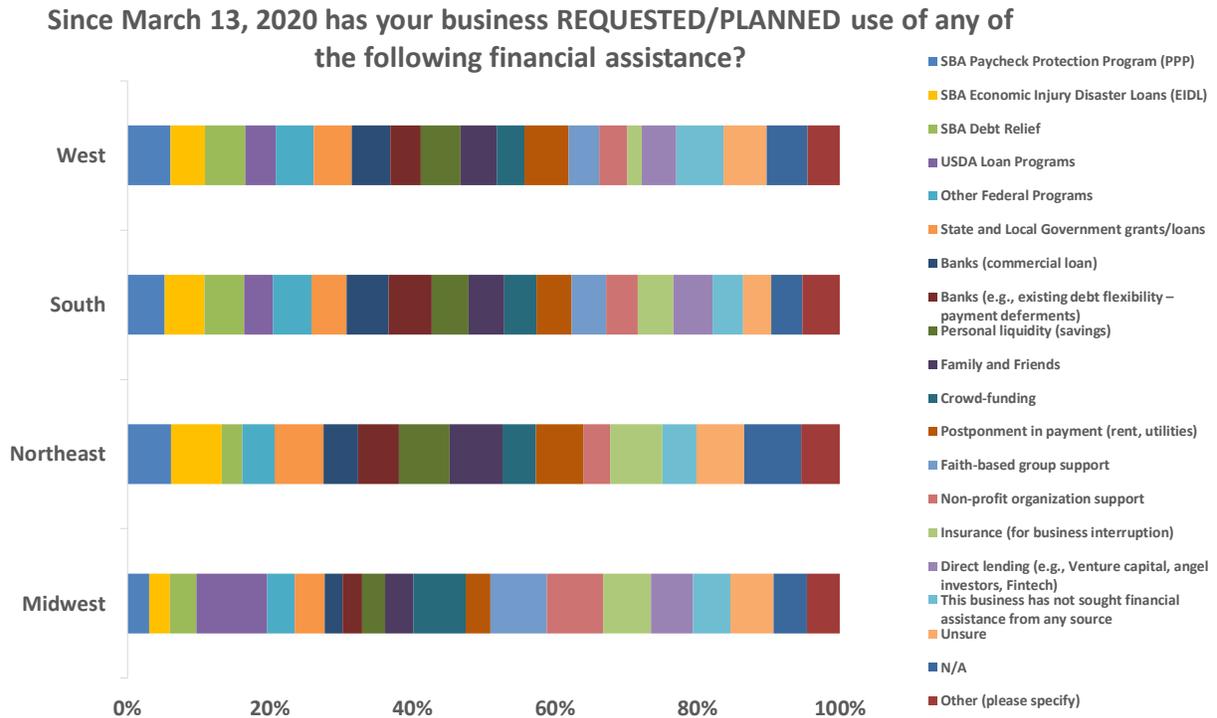


Figure A-8. Requested or planned use of financial assistances in each Census region. n = 1092

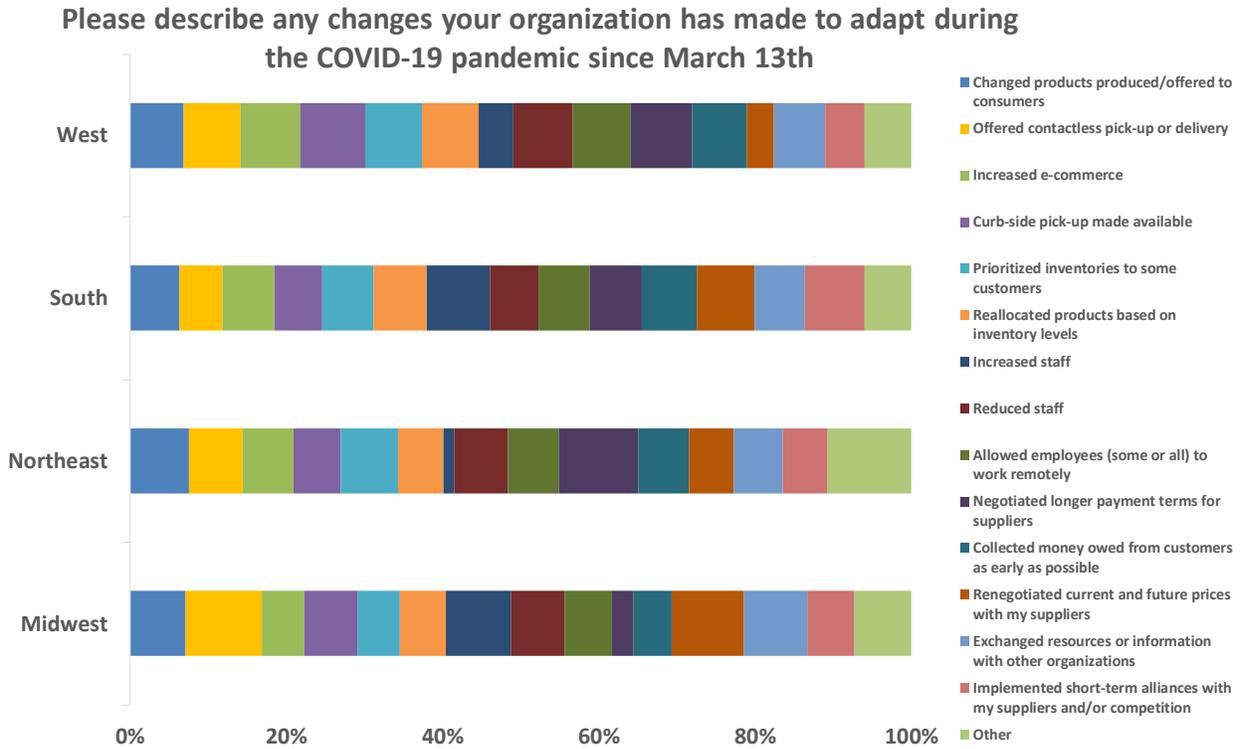


Figure A-9. Adaptation measures by region n = 1039

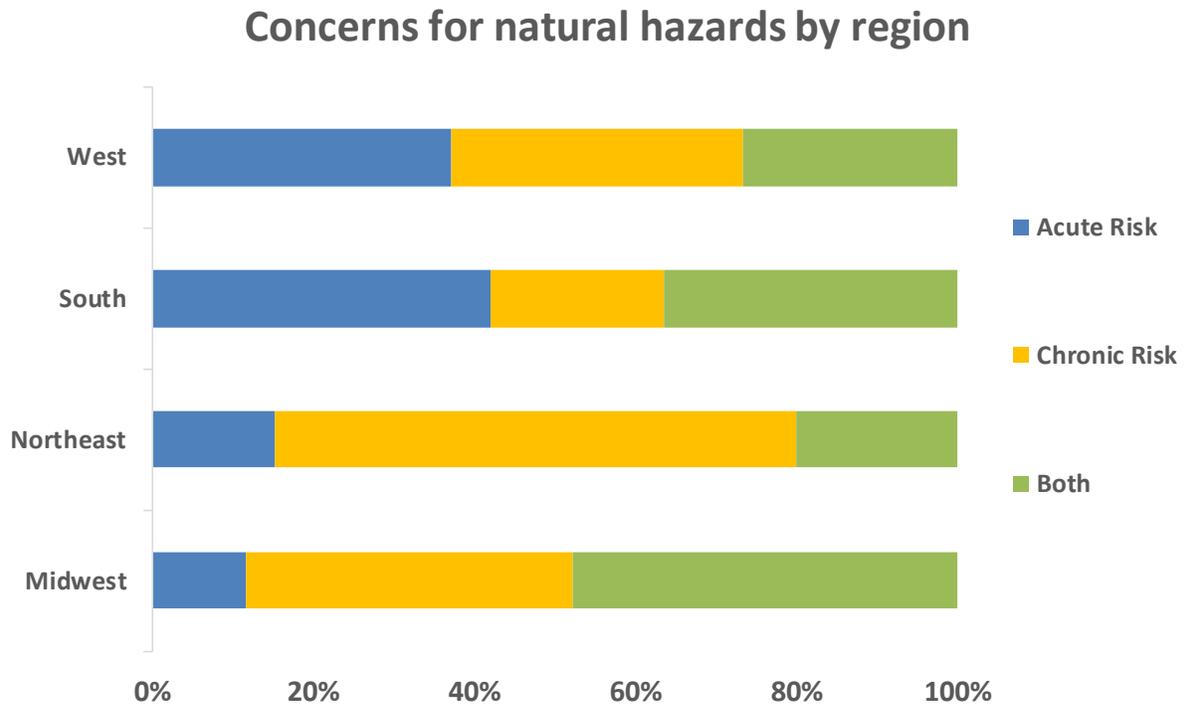


Figure A-10. Concerns for natural hazards by Census regions. n = 859 (Option 'None' is not included)

Since March 13th, 2020 has this/these event type(s) occurred at your location?

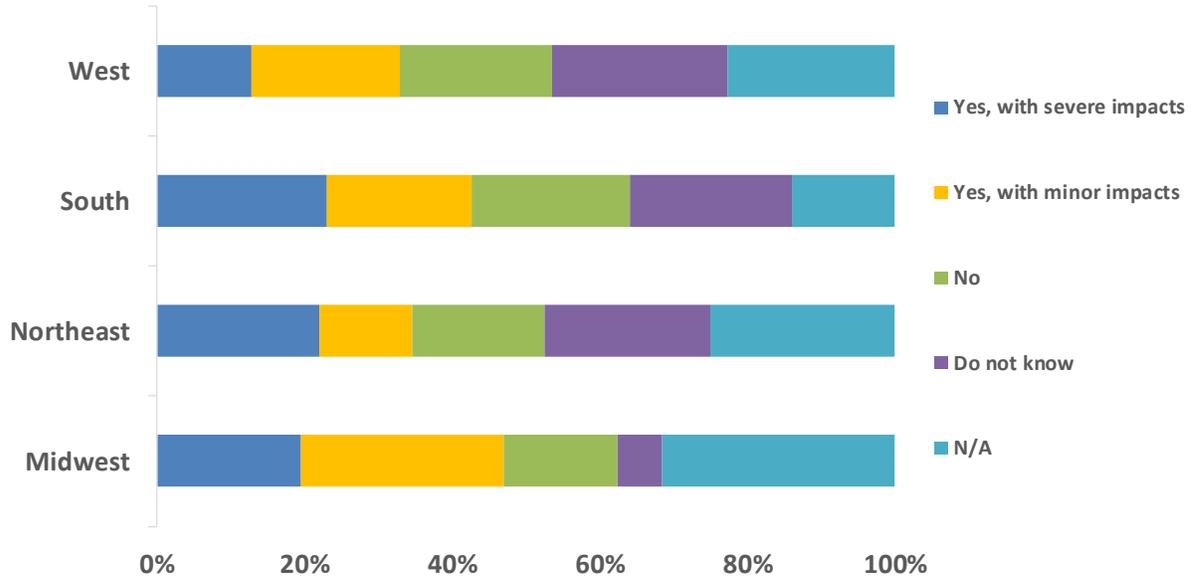


Figure A-11. Whether the event type(s) occurred at this location since March 13th, 2020 by Census regions. n = 1073

Was your organization's response to this event affected by COVID-19?

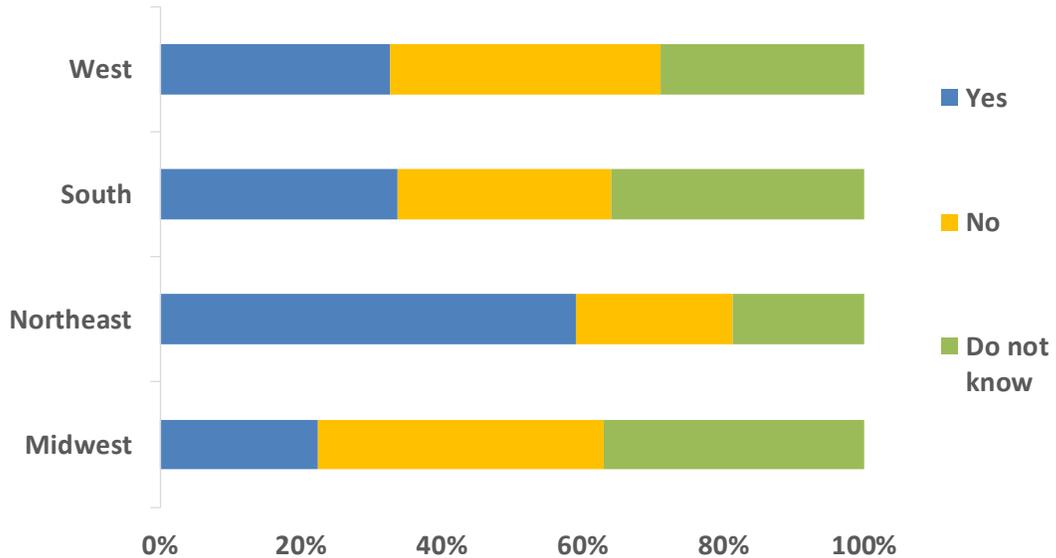


Figure A-12. Response to the event(s) during the COVID-19 pandemic by Census regions. n = 294

How many of these natural hazard events have affected* your organization in the past 10 years?

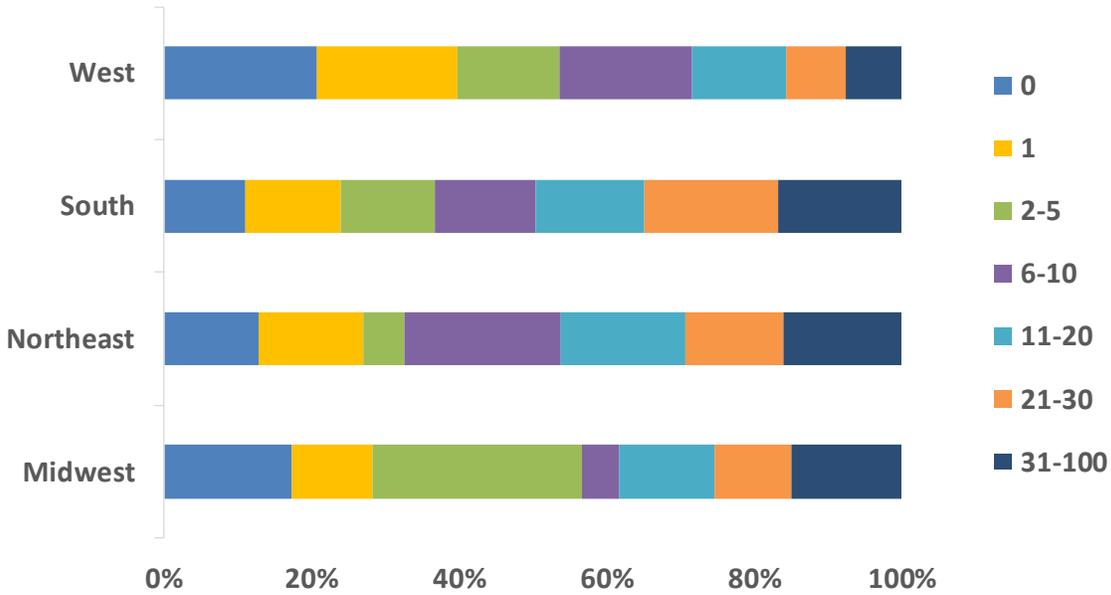


Figure A-13. Number of natural hazard events in the past 10 years by Census regions. n = 826

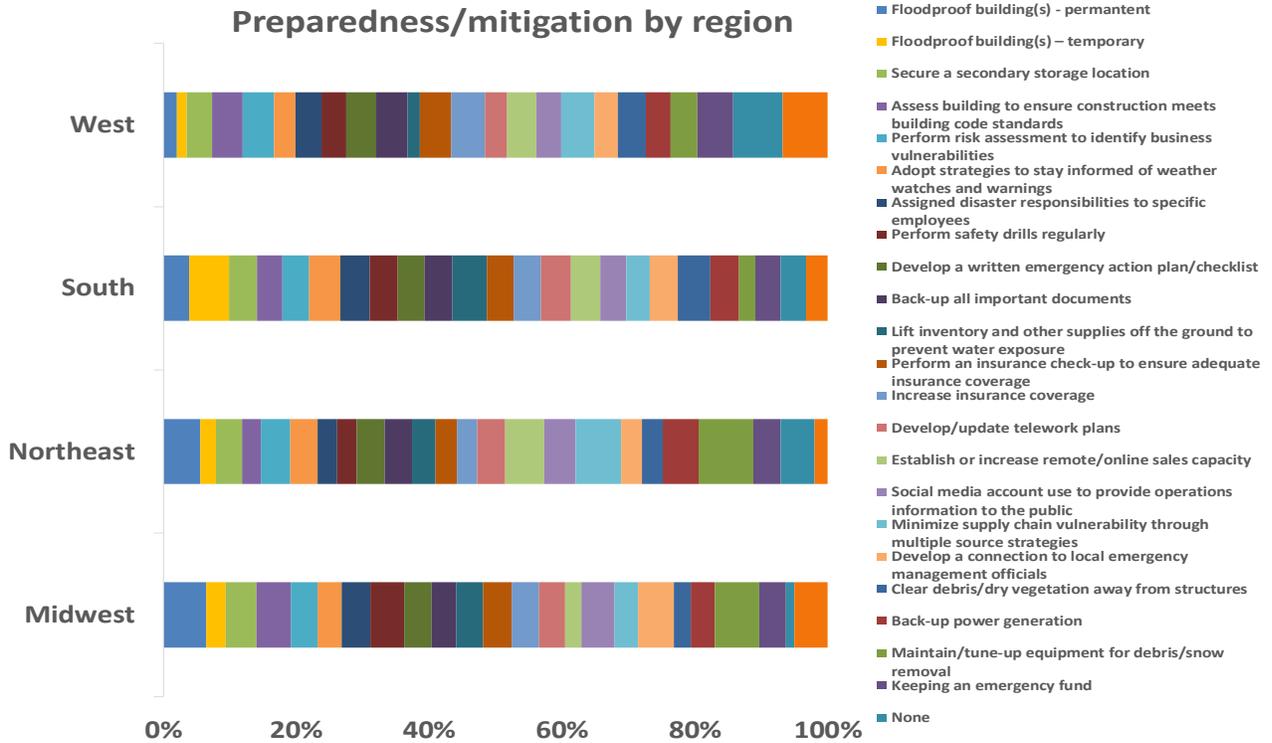


Figure A-14. Mitigation/preparedness actions taken in the past to prepare the business against natural hazards by Census regions. n = 888

Have actions taken by your organization to prepare for natural disasters in the past helped prepare/cope with the impacts of COVID-19?

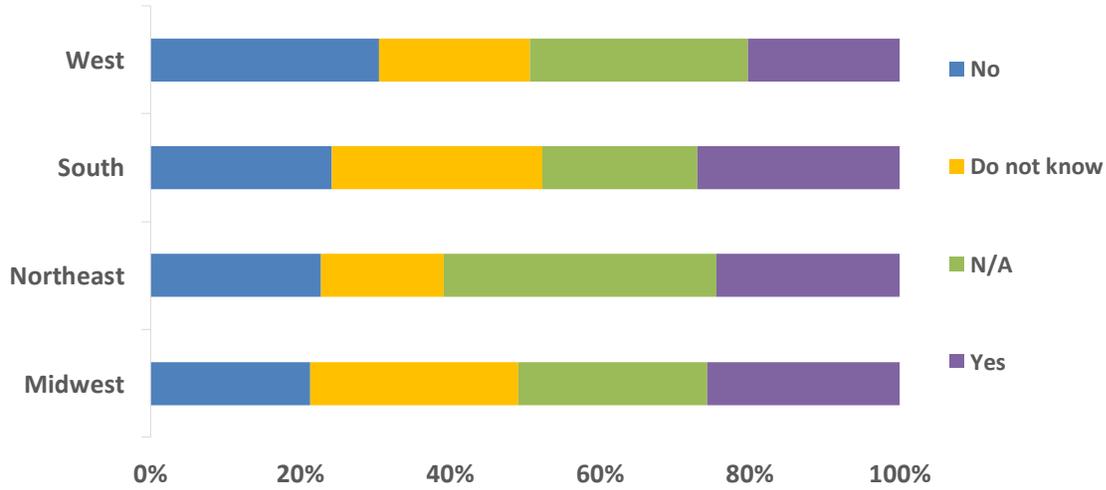


Figure A-15. Responses to whether past actions have helped the business to cope with COVID-19 by Census regions. n= 1025

Will your planning for natural hazards change in the future due to the COVID-19 pandemic?

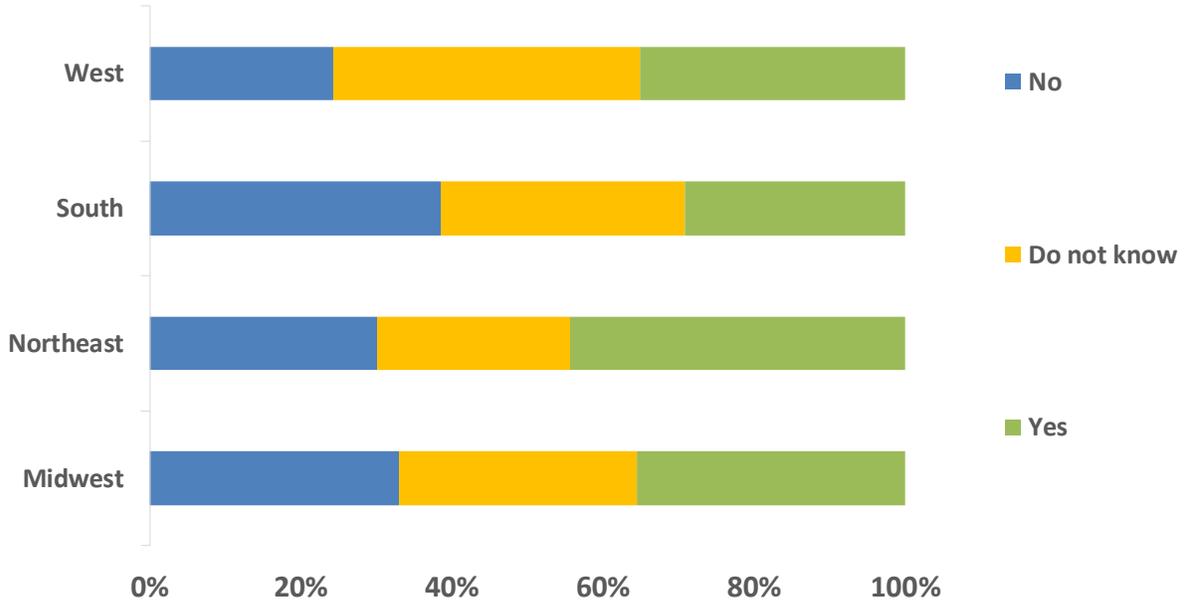


Figure A-16. Responses to whether planning for natural hazards would change in the future by Census regions. n= 620

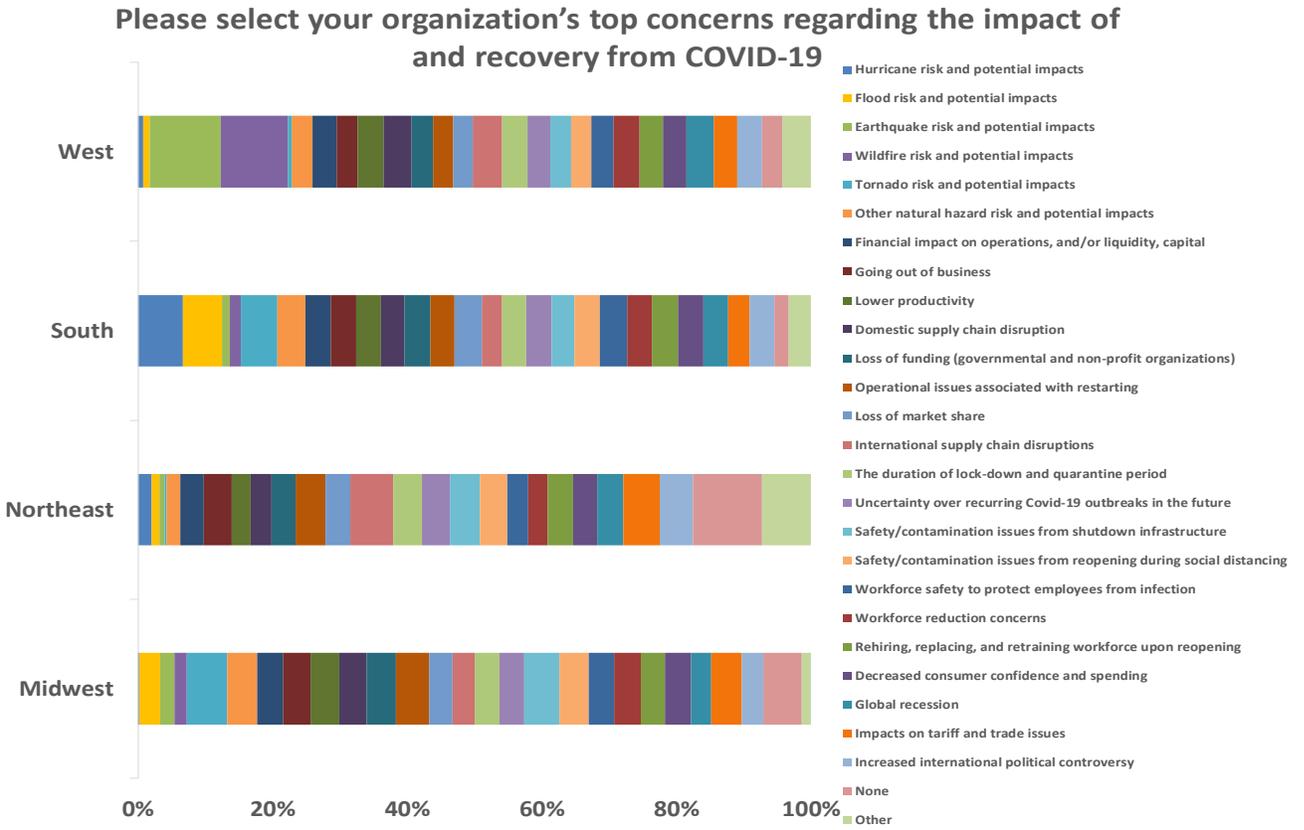


Figure A-17. Organization's top concerns regarding the impact and recovery from COVID-19 by Census regions. n= 997

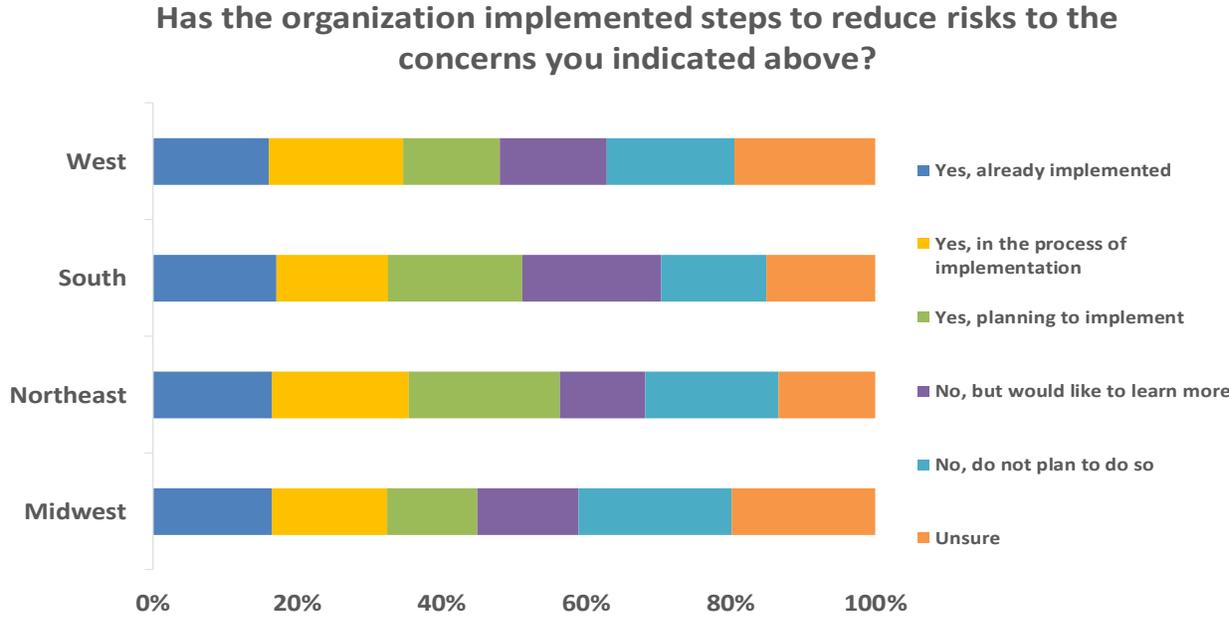


Figure A-18. Responses to whether the organization has implemented steps to reduce concerns by Census regions. n= 992

Do you feel you have the resources you need to protect your business against the risks you identified above?

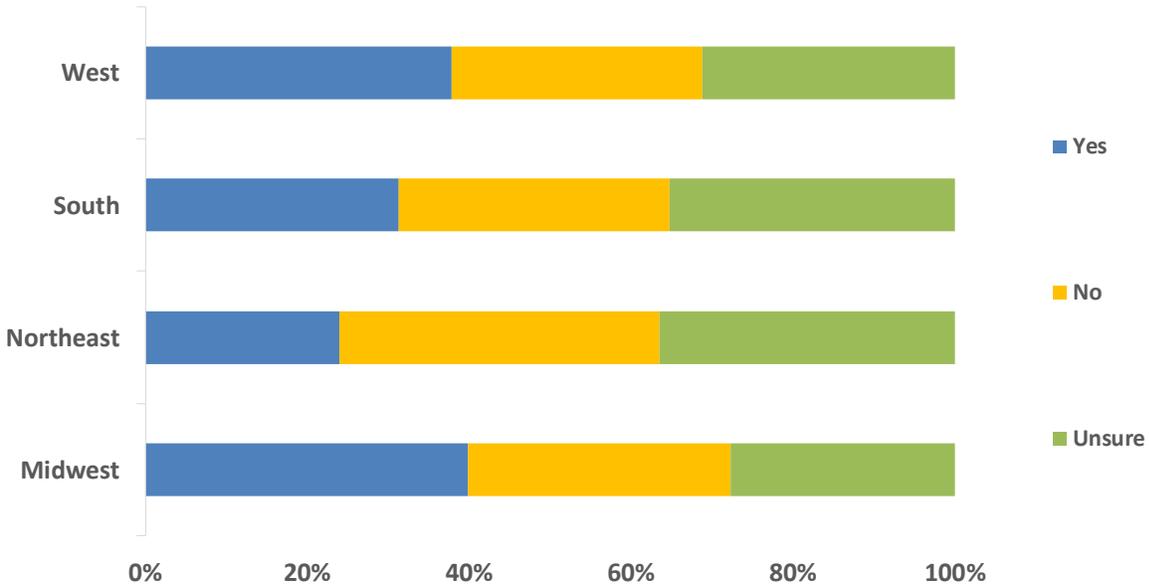


Figure A-19. Responses to whether the organization has the resources to reduce concerns by Census regions. n= 994

How much time do you think will pass before this business returns to its pre-COVID conditions?

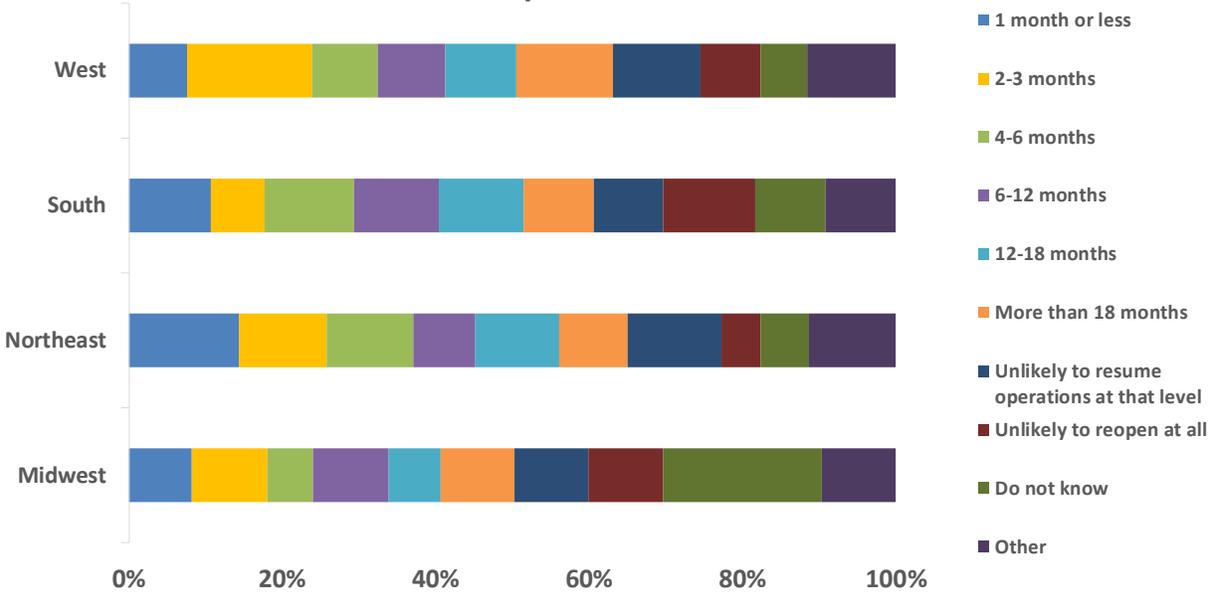


Figure A-20. Time before returning to pre-COVID conditions by Census regions. n= 984

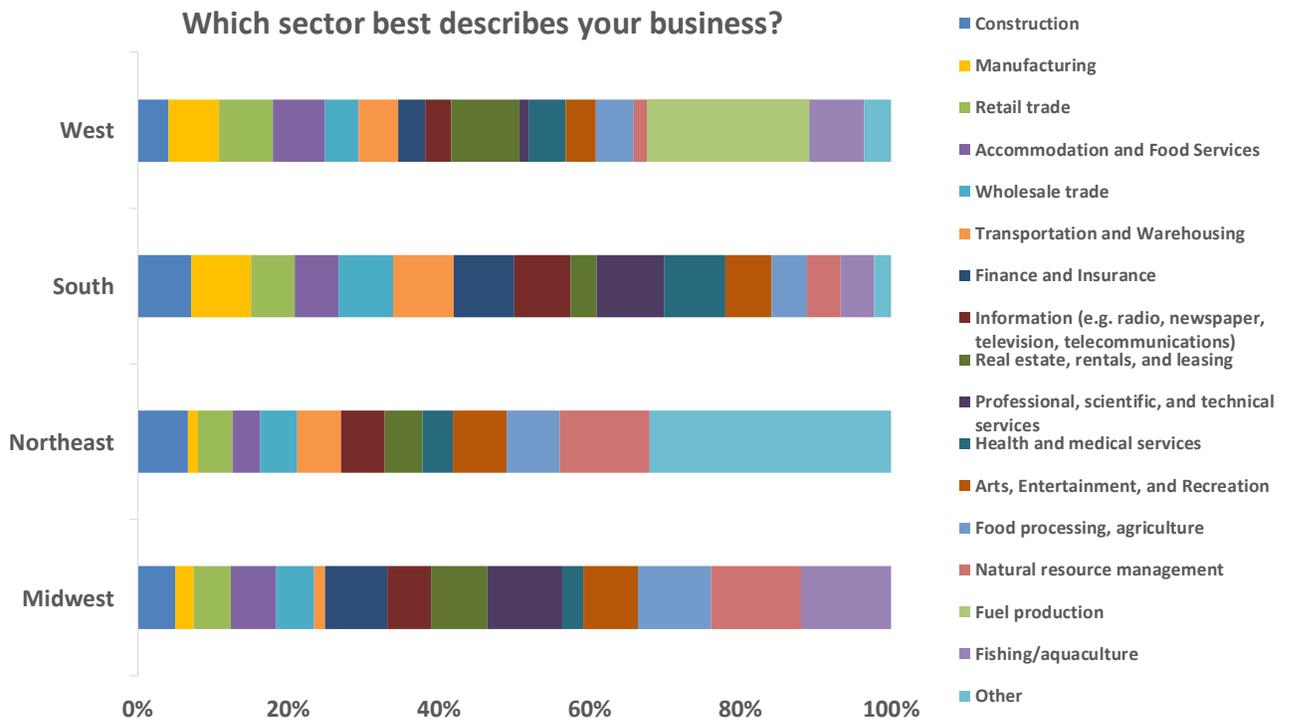


Figure A-21. Business sector by Census regions. n= 922

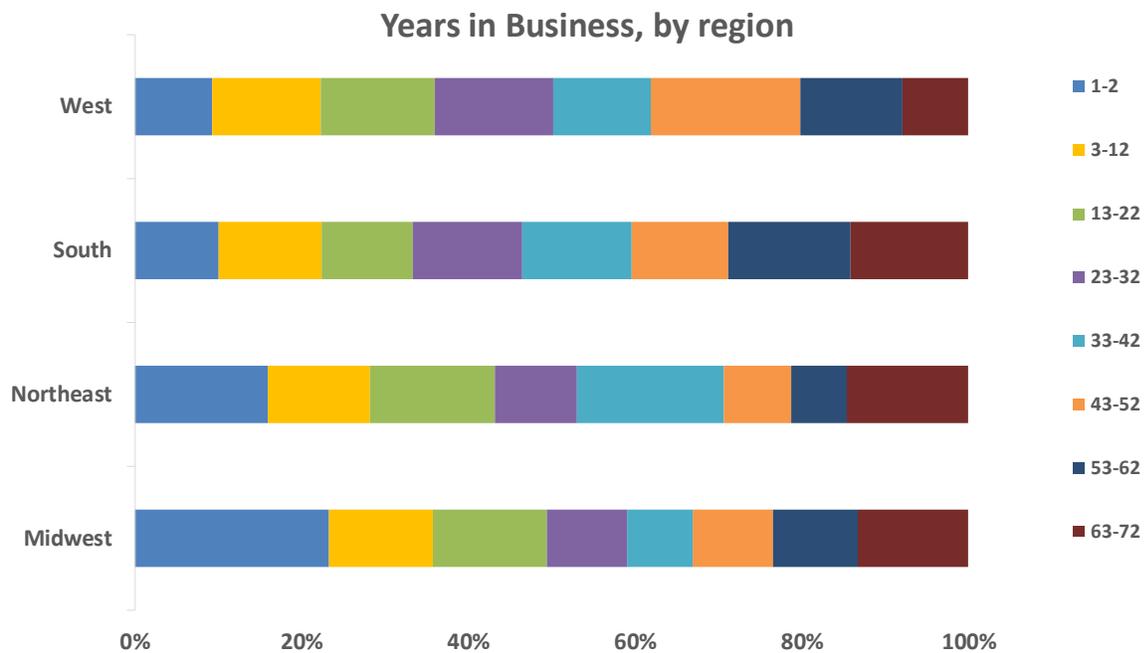


Figure A-22. Years in business by Census regions. n= 907

How would you describe this organization?

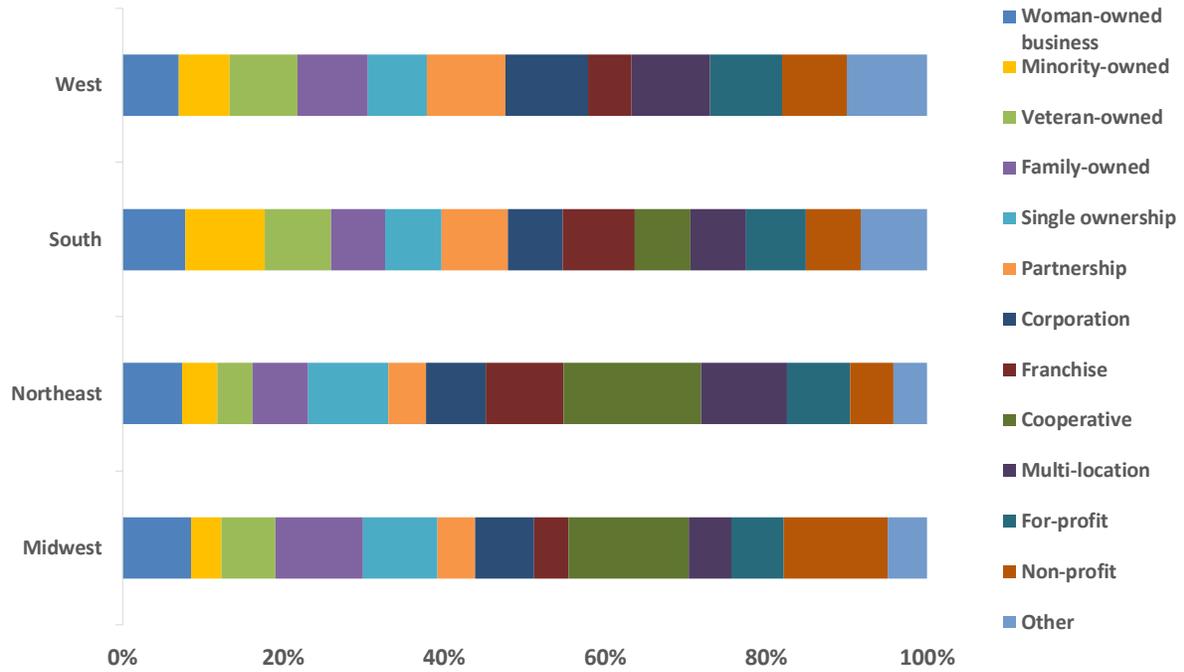


Figure A-23. Description of business by Census regions. n= 845