Organizations at Risk: What Happens When Small Businesses and Not-for-Profits Encounter Natural Disasters

by Daniel J. Alesch, James N. Holly, Elliott Mittler, and Robert Nagy

Small Organizations Natural Hazards Project
First Year Technical Report
University of Wisconsin-Green Bay
Center for Organizational Studies

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Table of Contents

ACKNOWLEDGMENTS .....

EXECUTIVE SUMMARY 1

SECTION 1: INTRODUCTION TO THE PROJECT 4
WHY CONDUCT THE RESEARCH? 4
Small Business and Not-for-profit Organizations Suffer from Natural Disasters 4
Small Businesses and Not-for-Profits are Important 4
Providing Jobs 5
Other Small Business Roles 5
We Have to Know Why Some Organizations Survive Natural Hazard Events and Others Do Not, So We Can Give Good Advice on How to Prepare and How to Survive 6
A Brief Look at Previous Research 6
Finding: Traditional precautions do not help businesses survive. 8
Finding: Most businesses do not fail immediately after the event 8
Finding: Most losses do not occur during and right after the event. 9
Finding: Most owners had few ideas about how they ought to try to recover. 9
Finding: There are strong indications that the variables that set apart those that survive from those that do not can be isolated. 9
Why This Project Was Needed 10
RESEARCH OBJECTIVES AND ANTICIPATED PRODUCTS 11
Project Goals and Objectives 11
Objective 1. Develop reliable findings and recommendations in which we can be confident 12
Objective 2. Learn what differentiates those organizations that fail from those that survive 12
Objective 3. Identify effective precautions and recovery strategies 12
Objective 4. Develop useful, practical guides for taking precautions and for selecting recovery strategies 12
Objective 5. Work with others to ensure that our findings and the materials we develop are applied by small businesses and not-for-profit organizations 13

SECTION 2: RECOVERY, ROBUSTNESS, RESILIENCY, AND COMPLEX SYSTEMS 14
RECOVERY IS AN ELUSIVE CONCEPT–AT BEST 14
ROBUSTNESS, RESILIENCY, AND SURVIVAL 16
FAILURE, SURVIVAL, AND CONTINUED VIABILITY OF SMALLER ORGANIZATIONS IN THIS PROJECT 18
Organizational Failure Takes Many Forms 18
Survival and "Recovery" Takes Many Forms 18

VARIABLES CRITICAL TO THE SURVIVAL AND CONTINUED VIABILITY OF INDIVIDUAL ORGANIZATIONS 20
Effects on Customers and Clientele 21
When business cannot supply them, the customer goes elsewhere 22
When the customer loses purchasing power, business suffers 22
When the customer moves away, the organization suffers 23
The customer's dependence on a single supplier of the good or service 23
Characteristics of The Industry in Which the Organization Is Doing Business and The Organization's Position Within That Industry 24
Exacerbation of Trends 24
Position on the curve 24
The Extent of Loss to the Business or Not-for-profit Organization 25
Taking Precautions 25
Insurance against losses 26
Financial strength prior to the event 26
Owner/Operator Business Acumen 26

SECTION 3: RESEARCH METHOD 28
THE BASIC APPROACH 28
SITE SELECTION 28
Northridge, California Earthquake 29
Floods on North Carolina's Tar River 29
The Red River of the North, Floods 30
South Dade County, Florida, Hurricane 30
Flint River, Georgia, Floods 31
Los Alamos, New Mexico Fires 31
Minnesota Tornado 31
SELECTING INDIVIDUALS AND ORANIZATIONS TO INTERVIEW 31
DATA COLLECTION 34
Unstructured Face-to-Face Interviews 34
Longitudinal Data Collection 35
DEFINING VARIABLES AND CODING DATA 36
The Process Employed for Defining Variables 36
The Independent and Dependent Variables Identified 37
The Dependent Variable: Survival and Recovery 37
Independent Variables 38
Variable 1. The extent to which the customer base was affected adversely 38
Variable 2. Industry competition 39
Variable 3. Product necessity 39
Variable 4. Position on the industry curve 39
Variable 5. Overall business stability before the event 40
Variable 6. The extent of direct organizational loss during the event 40
Variable 7. Extent of proactive entrepreneurial response to the disaster 40
Variable 8. The scale of the disaster. 40
DATA ANALYSIS 41

METHODOLOGICAL CONCLUSIONS AND CONCERNS 41
Traditional Challenges 41
Longitudinal Analysis is Essential 42
Our Inductive Approach Provided Unexpected Insights 43

SECTION 4: FINDINGS: VARIABLES ASSOCIATED WITH RUIN OR RECOVERY 44
APPROACH 44
CLUSTER ANALYSIS 44
Overview and Methodology 44
Cluster Exercise: Three Clusters Specified 45
Cluster Exercise: Two Clusters Specified 45
Differences Between Cluster Centers 46
DISCRIMINANT ANALYSIS 47
A Brief Overview 47
Discriminant Results and Analysis: the Trial Run 48
Discriminant Results and Analysis: D1 Dropped from Model and One Function Specified 50
Discriminant Results and Analysis: the Third Run (Holdout Sample Included) 51
Discriminant Results and Analysis Using Dummy Variables: The Fourth Run (Holdout Sample) 53
Summary of Discriminant Results 55
CORRELATION AND REGRESSION ANALYSIS 55
Correlation Analysis 55
Forced Entry Regression: All Variables 56
Forced Entry Regression Employing a Single Summed Variable 57
Conclusions From Correlation and Regression Analyses 58
ASSESSMENT OF WHAT WE LEARNED FROM THE ANALYSIS 59

SECTION 5: FINDINGS: RECURRING THEMES 60
THEME 1: THE ILLUSION OF SECURITY 60
Sometimes Coverage is Not Really Coverage 62
Adequate Insurance Protected Equity and An Array of Options 62
Insurance Did Not Always Work Out 62
Those Without Insurance Faced Tough Choices 63
Fraud, Abuse, and Questionable Practices 64
Floods, Levees, and Misplaced Confidence in the Technological Fix 64
This Building Has Stood Here for Fifty Years; Security Lodged in Ignorance 65
Reliance on Expert Opinion 65
THEME 2: "THERE WAS NOTHING I COULD DO TO PROTECT AGAINST ALL THIS" 67
THEME 3: THE CONTINUING NIGHTMARE–A 360-DEGREE DISASTER FOR THE INDIVIDUAL 68
THEME 4: SELF-IMPOSED LIMITS 71
THEME 5: IMPRUDENT USE OF FINANCIAL RESOURCES 72

THEME 6:NOT SEEING WHAT IS HAPPENING TO THE CUSTOMER BASE; CHANGING COMMUNITIES FOLLOWING DISASTERS 73
THEME 7: ASSUMING THINGS WILL GET 'BACK TO NORMAL' 75
THEME 8: THE SPECIAL CASE OF RETIREMENT-AGED PEOPLE 76
Allen, the Fish Market Owner 76
Brad, the Wallpaper Guy 77
Charlie, the Dry Cleaner 78
What Allen, Brad, and Charlie and Tens of Thousands of Other Small Business Owners Have in Common 79
Alice and Donald, the 'Clothing' Store Owners 80
Elliott and His Medical Equipment Store 80
Fergus' and His Son Gerald's Restaurant 81
Two Flooded Jewelry Stores 81
Beth's Restaurant 82
Claudia's Health Food Store 82
Any Disaster Event May or May Not Delay Retirement for Small Business Owners 82
THEME 9: HELP FROM THE COMMUNITY, ONE ANOTHER, AND GOVERNMENT 83
CONCLUSIONS 86

SECTION 6: CONCLUSIONS: PATTERNS OF RUIN AND RECOVERY; A MODEL OF POST-EVENT RESPONSE BY SMALL ORGANIZATIONS 87
RUIN AND RECOVERY: NOT A SIMPLE PROCESS 87
Firms That Survived and Recovered Quickly 87
The wall coverings shop 87
Sewing machines and painting supplies 88
Brakes and transmission repair 88
Floor cleaning 88
The optometrist 89
Metal plating 89
Some Organizations Struggle over Months and Years, but Do Not Survive 89
The custom cabinet shop 89
The small department store 90
The furniture shop 90
The specialty store 91
The nursery 91
The art center 91
Summing up Patterns of Demise 92
A CONCEPTUAL MODEL: SMALL ORGANIZATION RESPONSE TO NATURAL HAZARD EVENTS 93
No Simple Model Is Adequate to Describe The Quest For Viability 93
Initial Conditions: Extent of the Initial Impact on the Organization 94
Surveying the Damage and Cleaning up 95
The first assessment 96
Almost everyone closes for a while 96

Assessing how long they will be closed 96
The first critical decision 97
Looking for Resources and Struggling to Reestablish a Cash Flow 97
Reopening in temporary quarters 97
Obtaining inventory 97
The search for cash 98
Comparing the Resources Needed with Those Available: Another Decision 100
The Quest For Viability 100
The Time for Hard Choices 101
Survival or Demise 103

REFERENCES 104

TABLES

3.1 Sites in Which Interviews Were Conducted With Small Businesses and Not-For-Profit Organizations, by Year of the Natural Hazard Event 29

3.2 Businesses and Not-for-Profit Organizations Affected by a Natural Disaster in the United States 33

3.3 Summary of Respondents to Personal Interviews 33

4.1 Cluster Classification Results, Three Clusters Specified 45

4.2 Cluster Classification Results, Two Clusters Specified 46

4.3 Significance Tests of Differences between Cluster Centers, Three-Cluster Solution 47

4.4 Significance Tests of Differences between Cluster Centers, Two-Cluster Solution 47

4.5 Wilks' Lambda and Univariate F Test Results 49

4.6 Discriminant Coefficients from the Second Run 50

4.7 Discriminant Scoring Example 51

4.8 Confusion Matrix 51

4.9 Wilks' Lambda and Univariate F Test Results 52

4.10 Discriminant Coefficients From The Third Run 52

4.11 Confusion Matrix for Cases Selected for Use in Analysis 52

4.12 Confusion Matrix for Holdout Cases 53

4.13 Confusion Matrix for Cases Selected for Use in Analysis (Dummy Variables Employed) 54

4.14 Confusion Matrix for Holdout Cases (Dummy Variables Employed) 54

4.15 Correlation Analysis of Explanatory Variables with Recovery 56

4.16 Model 1. All Variables Entered Into Regression 57

4.17 Model 2. Recovery as a Function of the Sum of All Independent Variables 58

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This research could not have been completed without the hundreds of owners of small business and managers of not-for-profit organizations who took time from their busy schedules to talk with us. For many of them, talking with us brought back painful memories and, with those memories, tears and deep emotions. We are particularly appreciative of the frankness and openness with which almost every person affected by disaster was willing to help us understand what they faced and their journeys toward recovery.

We are grateful, too, to professional colleagues in the disaster community who took time to review our work to help ensure its quality. These included William Petak, University of Southern California; Kathleen Tierney, Director, Disaster Research Center, University of Delaware; Dennis Mileti, Director, and Mary Fran Myer, Co-Director, Natural Hazards Center, University of Colorado; Craig Taylor, Natural Hazards Management, Inc.; and Georgeanna Wilson-Doenges, University of Wisconsin-Green Bay. They added much of quality, but, as always, any shortcomings are the sole responsibility of the authors.

Executive Summary

Every year, large numbers of small businesses and not-for-profit organizations across the United States suffer major losses as a direct consequence of earthquakes, severe storms, and flooding. Small business and not-for-profit failures are significant losses for communities of all sizes. When even one of them must close, much is lost both to the individual and the community.

Small business owners and small not-for-profit organizations are often accustomed to life on the edge of security. For them, natural disaster events are often a matter of life or death.

We concluded that few small businesses, risk advisors, and natural hazard specialists have a very good understanding of how natural disasters cause small organizations to fail or suffer agonizingly long recoveries. Most owners had few ideas about how they ought to try to recover.

Other things being equal, we found that organizations that were smaller, weaker, and under significant stress before the event were much more likely not to reopen their doors after the event. Marginal firms and those tottering on the brink of failure often tumbled when the event struck, even if they suffered only peripheral damage. Sometimes the disaster was simply the straw that broke the camel's back. It afforded them a good excuse to give up a losing battle, presumably because the organization would, in any circumstance, have no staying power during the long, difficult weeks that follow the event.

Many business people who had marginal enterprises before the natural hazard event did reopen and hang on through long, painful recovery periods, only to exhaust their hope, their resources, and their endurance and, finally, give up the struggle.

Even strong firms can suffer badly from natural hazard events. Being out of business for any extended period of time can lead to a loss of market share. Even with business interruption and property and casualty insurance, it can be extremely difficult to regain market share.

We learned, especially, that there are no linear cause and effect relationships. The variables interact in complex, multidimensional ways. Some, but not all of the variables are, to some extent, under the control of business owners. The variables associated with customers and the business are multidimensional and complex.

The business owner's experience base and perceived competencies seem to be the guiding forces during the early post-disaster recovery stages. Owners and operators are constrained by a complex personal and social image of what they are and what they can do. The ones who are successful are those who take positive action to improve their business potential. Long-term survivors told us, "You can't look back. You have to keep looking to the future."

The struggle for viability for small organizations is continuous and fraught with obstacles. One of the most informative interviews came from a businessperson who had forgotten our previous interviews with him and who had put the earthquake out of his mind. The reason was that the damage and problems associated with a subsequent disaster supplanted the earthquake memories with new trauma.

We have coined another term – managerial mitigation – to describe management techniques employed to reduce both exposure and vulnerability through smart business practices. These techniques extend to include diversifying the organization's customer base, diversifying the location of the organization's inventory, protecting organizational electronic and hard copy data, and having multiple business outlets. Multiple business outlets include having several geographic locations or doing business by catalog or through e-commerce.

Managerial mitigation practices include things as simple as having sensible lease provisions – provisions that allow an organization to move out from a building if it fails to meet necessary performance characteristics and the owner cannot bring it back promptly. Firms that operate in leased space with inadequate lease provisions concerning who repairs earthquake damage and how quickly it will be done will find themselves in trouble. In Northridge, many business owners found themselves stuck in buildings that were not repaired for a long time by virtue of a lease that kept them from moving to another location where they could resume business.

In some instances, buildings and inventory are damaged despite precautions. In those instances, some form of insurance protection is extremely important to organizational survival. Property and casualty and business interruption insurance cannot bring a business back into business, but it can help owners protect their equity and open options for them after the cleanup.

The importance of appropriate and adequate coverage with a firm likely to remain solvent after the event is underscored by the number of organizations we interviewed that had inadequate or inappropriate coverage. Many of the respondents thought they were covered. In the case of earthquakes and floods, others thought they could get along without it, but found they could not – at least not without applying their life savings to their attempt to become viable again.

We have already noted the rather considerable psychological stress small business and not-for-profit managers experience during and following a damaging natural hazard event. Often, the event is a 360-degree trauma, involving home, family, livelihood, and self-esteem. For some, the strain was so great that they simply failed to reopen the business after the event. They simply melted away. Others showed enormous stamina, struggling against the pressures and stress with a level of psycho-social resiliency at which one can only marvel. Often, unfortunately, the stress wins, the firm closes, and the failure becomes a critically important incident in the owner or operator's life, which is forever altered.

Against this bleak backdrop of struggle and failure, we found individuals who were able to face business adversity and recreate organizations with true viability. A young man, faced with bankruptcy because of lack of customers, converted his auto repair business into a thriving business working on race cars. An optometrist assessed the adverse effects on his customer base and moved to a new location. A dry cleaner without customers saw the National Guard troops helping with the disaster as a built-in market and captured it. The young man with a shop that sold sewing machines transformed his product into a recreational service requiring a capital outlay on the part of the customer. The wall coverings retailer walked away from leased property as soon as he concluded the owner could not act quickly enough for the retailer to salvage his business. He moved, reopened, and survived.

We have concluded that perhaps the most important variable in the survival equation is the extent to which the owner or operator recognizes and adapts to the post-event situation. Communities never return to what they were before the event. The post-event environment is always different. Those who perceive the changes and respond appropriately have an excellent chance of surviving and becoming viable again. Those who continue to do business under the old paradigm, assuming that the community will return to pre-existing conditions, have all the cards stacked against their long-term survival. Doing what one did before will not work in changed circumstance.

The survivors seem to have an intuitive understanding of Ashby's Law of Requisite Variety. Ashby maintains that, to survive, a system must have a repertoire of responses at least equal to the array of environmental challenges. Only variety can deal with variety. Those who are adversely affected by the event and then flourish in the aftermath are those who can read the signs of the new environment and respond quickly and appropriately.

Now that we know what the major factors are that separate survivors from those that do not survive, we are positioned to convert that information into prescriptions for smaller organizations– both profit seeking and not-for profit organization. The stage is set for moving on to the second stage of the effort, that being the development of prescriptions to small organizations for enhancing the chances of surviving a natural hazard event and reestablishing financially viability after it.

SECTION 1: INTRODUCTION TO THE PROJECT

WHY CONDUCT THE RESEARCH?

We believe it is important to understand why small businesses and not-for-profit organizations fail following natural hazard events so we can devise ways to help them survive those events. We believe only understanding based on empirical research can provide an adequate basis for devising strategies that smaller organizations can employ to reduce initial damage to them from natural hazard events and to help them survive and flourish in the aftermath. The research reported here is dedicated to that effort.

Small Business and Not-for-profit Organizations Suffer from Natural Disasters

Every year, small businesses and not-for-profit organizations across the United States suffer major losses as a direct consequence of earthquakes, severe storms, flooding, and other natural hazard events. The losses they suffer are usually understated because the typical yardsticks for measuring loss are estimates of insured losses made by insurance firms and estimates by government of damage to public infrastructure. Typically, loss estimates exclude losses borne by owners, uninsured business interruption losses, income lost during post-event recovery, and losses to owners' capital assets when businesses fail as a direct result of the event.

Small business and not-for-profit failures are significant losses for communities of all sizes. Small businesses are big employers in most communities, but the losses caused by disasters often result in these organizations permanently closing their doors. Not-for-profits represent a significant investment of time, energy, and money by the community and are, typically, a very large part of each community's soul. When even one must close, much is lost.

Small Businesses and Not-for-Profits are Important

Small business is a major contributor to the economy, but the economic role of small business has not always been seen as important by economists.

> With a few notable exceptions, for the better part of the history of the profession, economists have not spent much time studying small firms. However, this has begun to change in the last 20 years. The twin oil shocks during the 1970s triggered an unexpected reappraisal of the role and importance of small and medium-sized enterprises, because it undermined the mass production model. A surprising finding has been that small firms and entrepreneurship play a much more important role in economic growth than had been acknowledged previously (Office of Economic Research of the Small Business Administration, 1998).

Even with this recognition, the role of small business in the growth of the economy is not always evident day-to-day and week-to-week. The small business job-related statistics, though impressive, tell little of the dynamic nature of the small business process.

Small business' role in employment and job creation is important, but small business contributes much more to the economy than jobs.

In the following paragraphs, we discuss the role of small business in creating and providing jobs. We also review the role of small business as the "social glue" of the community and the significance and implications of these roles to the disaster recovery process.

Providing Jobs. Small business consistently provides more than one-half of the total employment in the United States and is responsible for creating an even greater percentage of new jobs.

> Small businesses with fewer than 500 workers employ 53 percent of the private nonfarm work force, contribute 47 percent of all sales in the country, and are responsible for 51 percent of the private gross domestic product. Industries dominated by small firms contributed a major share of the 3.1 million new jobs created in 1998. Over the 1990-1995 period, small firms with fewer than 500 employees created 76 percent of net new jobs (Office of Economic Research of the Small Business Administration, 1999).

Looking back, "From 1976 to 1990, small firms with fewer than 500 employees provided 53 percent of total employment and 65 percent of net new jobs." "From 1990 to 1994, based on Dun & Bradstreet data by firm size, virtually all net new jobs were generated by small firms with fewer than 500 employees; large companies continued to downsize, with separations exceeding hires" (Small Business Administration Office of Advocacy, 1996).

More interesting in the context of this research is the fact that "Micro businesses, those businesses with one to four employees, generated about 43 percent of the net new jobs, while firms with five to 19 employees created another 37 percent of new employment opportunities" (Small Business Administration Office of Advocacy, 1996). All of the owners, managers, and employees we interviewed were in companies with fewer than 100 employees and most of them had fewer than 20 employees, including corporations, partnerships, and sole proprietors.

Looking ahead, the impact of small business on the economy will continue undiminished. "According to recent projections of the Bureau of Labor Statistics, small business-dominated sectors will contribute about 60 percent of new jobs from 1994 to 2005" (Small Business Administration Office of Advocacy, 1996).

Other Small Business Roles. Small businesses do contribute more than employment and new jobs to the economy and the community. They provide the entrepreneurial spirit that drives innovation and change in local, regional, and national economies. Also, small businesses provide the means by which millions of people "enter the economic and social mainstream of American society." "Collectively, small businesses provide about 67 percent of all initial job opportunities and are responsible for most of the initial on-the-job

training in basic skills" (Small Business Administration Office of Advocacy, 1996). They also provide more jobs for workers under the age of 25 and over the age of 65 than big business (Office of Economic Research of the Small Business Administration, 1997). The dynamic small business process is supported by communities which "plays the crucial and indispensable role of providing the 'social glue' and networking opportunities that bind small firms together in both high tech and 'Main Street' activities" (Office of Economic Research of the Small Business Administration, 1998).

> What holds a disparate collection of small firms together, then, is social capital. Social capital is a powerful new force at work, recently recognized by economists. Economists are assessing how the social fabric affects individual choice and economic growth. The essential qualities of social capital, as opposed to physical or human capital, are that it reflects a community or group and that it impinges on individuals regardless of their independent choice. According to new research, what is important is the interplay between social dynamics in the community and economic performance over time. Strong community ties lead to strong commercial ties (Office of Economic Research of the Small Business Administration, 1998).

Natural disasters further complicate the already complex relationships and dependencies between community and small business. The implications for recovery of small business are not solely an entrepreneurial, economic issue. These implications suggest that survival of small business and community are not mutually exclusive.

We Have to Know Why Some Organizations Survive Natural Hazard Events and Others Do Not, So We Can Give Good Advice on How to Prepare and How to Survive

Not many people have focused their attention on why businesses fail or succeed following natural disasters. Conventional wisdom suggests that failure is a function of direct and indirect losses, so most advice to small businesses and not-for-profit organizations has focused on strengthening buildings against the hazard and buying adequate insurance. We have been convinced, based on what little prior research that exists, that the reasons for failure or recovery are much more complex than damage suffered from the event. Further, we believe that it is impossible to give sound advice about how to prepare for a possible natural hazard event, and about sensible recovery strategies once the event occurs. In short, we need reliable, robust conclusions about the variables that make a difference between surviving and failing in order to give sensible advice. To get that, we conducted empirical research on small business experiences from places that represent several kinds of damage patterns, several kinds of communities, and several kinds of economic bases.

A Brief Look at Previous Research. The list of research projects conducted on the experience of individual firms following natural disasters is short and the number of analysts few. Kroll, *et al*, (1991) conducted a survey to identify problems businesses encountered following the Loma Prieta earthquake. Here, we look at two sets of studies.

In subsequent technical reports, we will present an extended review of literature that extends beyond small organizations and natural hazards, but which is relevant to our work.

Members of this project team developed longitudinal case studies of 40 small businesses in the Northridge-Reseda area following the 1994 earthquake there and interviewed approximately 160 more by telephone (Alesch and Holly, 1996, 1997, Alesch, 1996a, 1996b, 1996c). Tierney, Nigg, and Dahlhamer examined the effects of the Midwest floods of 1993 (1996) on businesses generally and Dahlhamer and Tierney conducted a large-scale survey research project in metropolitan Los Angeles on the effects of the Northridge earthquake on small businesses there (Dahlhamer and Tierney, 1998 and Tierney, 1997a and b). Beyond that, not much post-event research has been conducted on the effects of disasters on small businesses and not-for-profit organizations.

The Tierney-Dahlhamer studies from the University of Delaware Disaster Research Center and our work are the two most relevant pieces of work to set the stage for this research project. As a prelude to their research, Dahlhamer and Tierney completed a thorough and thoughtful assessment of the literature concerning business survival and recovery. Their review comprised literature having to do with firm survival and failure from a wide array of causes, as well as the scarce literature concerning effects of natural hazard events on business and their relation to business failure and recovery. Some of the business/natural hazard literature is empirically based. Other cited references, like the chapter written by the principal investigators (Alesch, *et al*, 1993) consists of theoretical models intended to focus subsequent research on earthquake effects on business. Our work before Northridge was based almost entirely on financial models; we created an array of artificial firms using published financial data series and ran a series of earthquake scenarios through them to ascertain which "firms" became technically bankrupt under various scenarios.

In two papers cited above, Tierney and Dahlhamer suggest four basic sets of variables that affect business survival following a natural hazard event. These are: firm characteristics, direct and indirect disaster impacts, loss containment measures taken, and previous disaster experience.

Tierney and Dahlhamer tested their model using survey research following the Northridge earthquake. About 18 months after the event, they mailed a questionnaire to a sample of approximately 4,000 firms throughout the Los Angeles metropolitan area. They received about 1,100 responses. They sought information from the respondents for each of the variables in the overall model.

We (Alesch, Holly, and Mittler) took a different approach. We chose to look at a smaller number of organizations in much greater detail. We had hoped to test our financial models, but soon found that, not only were the data messy and unreliable, but financial data for individual firms could not account for the great variance we encountered. We chose to begin our studies with face-to-face interviews with victims to learn what happened to them in their own words, without presupposing any effects. Our choice was to employ qualitative methods to elicit information from them and then to interpret it. We

drew a random sample of approximately 250 small businesses in the Northridge-Reseda area. We then drew 50 businesses randomly from that list and were able to complete 40 in-depth, personal interviews from those 50 firms.

The first set of interviews was conducted almost exactly a year after the January 17, 1994 earthquake. Each interview involved two analysts, with one probing and the other taking notes. We then used Q-sort methods to identify and group the primary effects the business owners identified. Following the first round of face-to-face interviews, we conducted structured telephone interviews with another 100 firms from our initial sample, asking questions derived from what we learned in our in-person interviews. We interviewed the 40 owner-operators again, in person, about a year after the first set of interviews to develop a sense of the longitudinal effects and the pace of recovery for each of the several firms. About half the firms were interviewed a third time about 30 months after the earthquake.

Our Northridge findings surprised us and were eye-openers to us and to many of our colleagues across the country. We started out simply to learn the effects of the earthquake on small businesses in the affected area. We expected failures to be highly correlated with damage. We thought that, a year or two later, everything would be back to normal, but our research methods led us to important findings we had not expected.

Finding: Traditional precautions do not help businesses survive. We knew that almost all precautions against losses to natural hazards had been aimed at protecting the structure and its contents with the intent of reducing loss to life and property. We learned that it is a mistake to assume that those precautions will significantly increase the probability of business survival. The traditional goal of natural hazard mitigation has been to reduce losses to life and property by creating safer structures: e.g., "flood-proofing" buildings in flood plains and creating structures that resist seismic forces. More recently, hazard mitigators have emphasized preventing death, injury, and property losses from nonstructural elements of buildings; they recommend, among other things, fastening decorations to walls, bolting down computers, and strapping hot water heaters to walls. It has simply been assumed that reducing losses to life and property will help ensure business survival.

We were, however, unable to establish a statistical relationship between the amount of structural damage businesses experienced and business survival. Some businesses that suffered extensive damage survived and recovered quickly, while others experienced essentially no damage and failed as a direct consequence of the event. We had to conclude that traditional structural precautions are necessary to reduce losses to life and property, but not sufficient to help businesses survive.

Finding: Most businesses do not fail immediately after the event. A second assumption people sometimes make is that business failures caused by the event usually occur shortly after the event. In Northridge, a few businesses failed almost immediately, but most did not fail until two, three, or four years after the earthquake. Owners continued to struggle at recovery until, one by one, they exhausted their resources, their energy, and

their options and the business succumbed. We learned, firsthand, how the earthquake affected each of them over time. We watched many lose everything, but we saw others use the disaster as a business springboard. Our research suggests that only the weakest firms fail right after the disaster. Most firms that ultimately fail do so only after a desperate struggle to recover. We found, too, that Small Business Administration loans are not an adequate answer.

Finding: Most losses do not occur during and right after the event. A third assumption often made is that the primary losses to businesses stem directly from the natural hazard event and from associated events, such as fires that frequently follow floods and earthquakes. We found that business losses go far beyond initial damage to the structure, equipment, and inventory. They include business interruption, lost income to employers and employees, and lost assets in the form of business equity.

Finding: Most owners had few ideas about how they ought to try to recover. Without exception, small business owners and managers of not-for-profit organizations in Northridge went to work right after the earthquake, cleaning up the mess and trying to put things in pre-earthquake order; like everyone else, they were eager to get things back the way they were. However, "things" cannot go back to what they were. The earthquake changed things forever. Only after months of not getting back to business as usual did some owners recognize that they would never get back to business as usual. Some never got the message. Of those who figured out it would not get back to the pre-event conditions, some were able to devise highly effective strategies. Some of them moved to other places, some changed their business product or services, and some changed their processes. Others who figured it out could not come up with a good strategy. They were trapped by punishing lease provisions, by a shortage of capital, or by apprehension about change. Still others, unable to look up from their efforts to accurately perceive the changes that had occurred because of the earthquake, perished.

Finding: There are strong indications that the variables that set apart those that survive from those that do not can be isolated. We identified some variables that we believe are very important to determining whether an individual organization survives a natural disaster.

Based on our work in Northridge, we think that (1) other things being equal, businesses whose customers were not affected adversely by the earthquake had a much better chance of survival than those whose customers had significant losses, (2) businesses with more than one location were more likely to survive than those with a single location, (3) businesses that relied on consumers' discretionary income for their sales were more likely to fail than those that provided more essential goods and services, and (4) businesses whose owners were able to adjust to changes in consumer demand were much more likely to survive than those whose owners simply pursued their pre-earthquake activities in the same old way.

We looked at some things they did not look at, but, otherwise, our findings concerning key variables and the Tierney-Dahlhamer findings are quite similar. This is

reassuring because we had somewhat different research goals, quite different methodologies, and both our findings were somewhat counter-intuitive. Both found that firms that survived and were recovered or recovering a year or two after the earthquake were those that were larger, had fewer of their eggs in one basket (did business in more than one location and/or had customers in unaffected locations), and were financially stronger. We found that survivors had more flexible and innovative entrepreneurs. Tierney and Dahlhamer found more survivors further from the areas that experienced the most shaking.

Why This Project Was Needed

Based on our work in Northridge, we thought we could develop ways to help small businesses and not-for-profit organizations survive the initial shock of a natural disaster and then recover fully after the event. However, neither our Northridge research nor that of anyone else was designed to answer the questions that were raised in our minds during our fieldwork there. We had a quite naive model of what the effects of the earthquake would be on businesses. Our most interesting conclusions and subsequent hypothesis building took place after the project was finished.

We concluded that it was important to go back to the Northridge experience to answer important unanswered questions. Even if we had more cases and data from Northridge, it would be dangerous to generalize from that disaster. First, Northridge neighborhoods were changing before the earthquake. Second, the area was in a mild recession when the earthquake occurred. Third, damage was sporadic and spotty; one whole block would be flattened and the next block would be pretty much intact. Finally, people who lived in the area could travel 20 minutes to an undamaged major shopping center, experiencing only modest inconvenience from the earthquake in terms of shopping. We could not possibly control for the variables we think are critical to developing a real understanding backed up by statistical analysis. Consequently, even combining Tierney-Dahlhamer's work and ours would be adequate for an empirically-based understanding of the differences between those organizations that survive following a natural disaster event and those that do not. This project would, we believed, provide an adequate basis for understanding what variables affect the odds of survival and recovery.

Moreover, we were confident that this project would provide the basis for giving good advice to small organizations on how to make themselves more robust against natural hazards and good advice on recovery strategies.

We have concluded that natural hazard events cause problems for businesses unrelated to the amount of direct damage they sustain from the event and from related events, like fire following the earthquake. Illustratively, we think one key variable that sets survivors apart from failed businesses is what happens to their customers. If the disaster leaves customers with no discretionary money, if they move away, or if they develop new buying habits, the business fails without corrective action. We also think that businesses that rely on discretionary income or whose services can be postponed fail more often than do those that provide essentials. And, we think businesses that adjust rapidly to

community changes survive more often than those whose owners believe the community will or can return to what it was.

In short, we think there is a need for "management mitigations" -- changes in how a firm conducts its business that result in a reduction of the initial shock of the natural disaster and that increase the probability of survival and recovery following it. These management mitigations would be intended to increase the probability that the firm will survive external shocks, not only from natural hazard events, but from civil disruptions, terrorism, and even economic shocks stemming from events like reductions in defense expenditures, departure from the community of a very large employer, and a variety of other potential shocks.

We concluded, too, that few small businesses, risk advisors, and natural hazard specialists have a very good understanding of how natural disasters cause small organizations to fail or suffer agonizingly long recoveries. We think that initial losses could be reduced substantially using simple methods and that the probability of recovery can be increased substantially with a few simple guidelines for small businesses.

We have concluded that there is a need for an array of prototype recovery strategies for smaller businesses – an array of strategies to match an array of circumstances. We found a few entrepreneurs in our Northridge research who either devised or happened upon recovery strategies that enabled them to avoid almost certain disaster and, in some cases, led to profitable futures. Too many owner-operators simply continued, after the earthquake, to do what they had done before the earthquake. They failed to respond appropriately to the new, post-event environment and they fell by the wayside.

RESEARCH OBJECTIVES AND ANTICIPATED PRODUCTS

Project Goals and Objectives

We remain convinced that it is possible to decrease business and not-for-profit failure rates immediately following natural disasters and to increase the rate at which survivors recover fully. Consequently, our primary project goal is to develop effective business mitigation strategies and an array of effective recovery strategies for smaller firms. These will be based on empirical research focused on learning why some businesses fail and others do not following natural hazard events and why some of those that do survive recover so much more rapidly than others. We know that, when left to their own devices, many firms and individuals at risk do not take precautions against natural hazards. We believe that business mitigation strategies designed for natural hazards, if they are going to be implemented, will have to offer multi-peril protection. In addition, owner-operators will have to perceive them as appropriate and either inexpensive or profitable.

Northridge enabled those of us who studied the effects on business to advance our understanding significantly, but, despite the research gains made following the event, our collective understanding is still spotty. Consequently, we did not have sufficiently reliable

knowledge to give sound advice to businesses about what we call the "hazard mitigation investment decision" or about prudent recovery strategies. The fundamental challenge for this research, then, has been to learn how smaller businesses can increase the probability of their survival and quick recovery following a natural disaster. Knowing that, we will develop ways to help ensure this information is applied in mitigation and recovery decision making. Our objectives flow directly from those goals.

Objective 1. Develop reliable findings and recommendations in which we can be confident. Our first objective has been to ensure that our research findings are sufficiently robust that they can be generalized across kinds of communities and kinds of natural disasters and that our recommendations are solidly based.

Objective 2. Learn what differentiates those organizations that fail from those that survive. We had to first learn which variables differentiate businesses that survive from those that do not. Only by isolating critical variables affecting survival can we hope to devise means for owner-operators to overcome or to sidestep the pitfalls generated by the event. Once the variables critical to survival and recovery are isolated, it is important to identify the differences between firms, owners, and circumstances that affect how quickly surviving firms can reestablish financial viability. The first year of the project has been devoted to isolating and evaluating these two sets of variables. We documented and analyzed the post-earthquake experiences of smaller business entrepreneurs as they attempted to recover. We tried to learn what determines how long businesses that eventually fail hang on and to ascertain, if possible, what kind of interventions might have made a difference to their survival. We attempted to learn, for survivors, which variables affect the rate of recovery.

Objective 3. Identify effective precautions and recovery strategies. Our third project objective constitutes the second stage of the research. It is to use the products from the first year to develop cost-effective, simple precautions small businesses and not-for-profit organizations can take to reduce initial losses from natural disasters. We expect to develop strategies for organizations that will increase the probability of quick recovery. We expect to document the various ways that small business owner-operators who experienced natural hazard events have prepared for future events. Our interviews taught us that some business owner/operators had devised innovative, sometimes profitable, approaches to protecting against significant losses to natural hazard events. The more promising of these approaches will be documented and promulgated. In addition to knowing the kinds of precautions they are taking, we will learn the extent to which firms and owners have adopted structural and nonstructural mitigations, emergency preparedness measures, changes in how they do business, and changes in their personal lives.

Objective 4. Develop useful, practical guides for taking precautions and for selecting recovery strategies. Our fourth goal is to convert what we have learned about the causes of failure, as well as the precautions and strategies we develop, into practical recommendations for small private organizations. We will use the information gained from our research to develop a set of empirically based, practical recommendations on how

to reduce the probability of failure and increase the probability of rapid, full recovery, as well as to develop strategies that will reduce initial losses and facilitate recovery.

Objective 5. Work with others to ensure that our findings and the materials we develop are applied by small businesses and not-for-profit organizations. Our final project goal is to ensure that the information we develop for small business firms and not-for-profit organizations is disseminated to them. We intend to work with other organizations that serve small businesses and not-for-profit organizations that can encourage them to adopt mitigations. Our multi-peril loss reduction guidelines will be made available in both print and electronic formats. They will be made widely available through PERI's networks and through those of other organizations that exist to serve such organizations.

SECTION 2: RECOVERY, ROBUSTNESS, RESILIENCY, AND COMPLEX SYSTEMS

When we began our research, we had a hopelessly naive view of what constitutes recovery following a natural hazard event. We came to believe, by the time we had concluded our field work, that "recovery," in the traditional sense, rarely, if ever, occurs in complex systems that experience a significant natural hazard event.

We found that, as we talked with one another following interviews, we were using different and multiple images of what constitutes recovery, confounding our communication and making the analysis more difficult. When we realized what was happening, we quickly agreed that, if recovery means return to the *status quo ex ante*, it doesn't occur following a large-scale event. We agreed, too, that small businesses and not-for-profit organizations do not "recover" in the sense of returning to what was before the event. Instead, they struggle to achieve viability in the new environment within which they exist, regardless of whether the owner/operators even perceived themselves as being in a new environment.

Several critical issues associated with recovery emerged as we continued our investigations. What constitutes recovery? Are there conceptual alternatives to "recovery" that are more useful than return to conditions before the event? If so, how might one define or measure "recovery" in those contexts?

Similarly, as we considered our core concerns, how to strengthen small business and not-for-profit organizations against external shocks from natural hazard event and how to help them recover after such events, we gained new appreciations for robustness and resiliency as they affect recovery. We became concerned with robustness and resiliency in terms of their contribution to system survival and with how to define, measure, and compare robustness and resiliency between and among systems, particularly as they apply to understanding which systems survive disastrous events and which do not.

RECOVERY IS AN ELUSIVE CONCEPT–AT BEST

The term "recovery" is used widely in the community of practitioners, public officials, and scholars who focus their attention on natural disasters. Members of the disaster community talk about preparation, response, recovery, and mitigation as stages in addressing disasters. The term is part of the litany.

The meaning of the word recovery, based on the intransitive verb "recover," as it applies to systems affected by natural hazard events, is to regain a normal position or condition. In that context, recovery has typically come to mean a return to conditions as they were before the event; i.e., a return *status quo ex ante*. More broadly, in systems terms, recovery means a return to dynamic homeostasis approximating conditions and relationships that existed before the event.

When we began our research, we thought we could measure business survival by learning whether the business was open and operating after the earthquake, hurricane, flood, fire, or storm. We thought that we could add to our understanding by learning the extent to which a business had recovered by comparing post-event profitability with profitability before the event. We had a very mechanistic and simplistic view of what constitutes recovery: a view suitable only for the simplest of systems, like automobile engines and electric power generating plants. We learned, during our research, that recovery, and failure, can take many forms and, if it is to be measured, must be measured with careful attention to a complex set of system characteristics.

At the simplest level, one could measure recovery in terms of the extent to which the system has returned to what was, provided one defines the critical system characteristics of the *status quo ex ante*. For a mechanic, an automobile engine with a broken camshaft has "recovered" when it produces RPMs, torque, and horsepower as specified for that particular engine model. For an engineer, recovery may occur when an electric power generating plant is generating as much power as it did before the event at the same cost per kilowatt-hour. Or, it may mean getting the natural gas or water network back in operation to, perhaps, 90 per cent of customers.

For urban planners, recovery may mean having buildings that were destroyed replaced or a buyout program completed along the river. For municipal finance officers, it may mean having a property tax base back in place that generates sufficient municipal property tax revenue to make the municipality solvent. For most people looking in at the community, recovery appears to mean returning to the *status quo ex ante*, or some rebuilt urban settlement where evidence of the natural disaster's physical effects is no longer visible. Indeed, return to the *status quo* before the event is part of the legislation authorizing post disaster assistance to individuals and to local government.

Recovery is only that simple, however, if one looks at one or two output or performance variables. One can do that for simple, mechanical systems, but not for complex, dynamic, self-directed systems. In communities, for example, long after the physical evidence of the destruction is gone, long after water is being distributed and sewage collected, long after new buildings are built, and long after the grass grows over scars on the land, the effects of the disaster linger. They linger economically, socially, and psychologically. We have come to believe that, for organizations that suffer significant losses from a natural hazard event, return to the *status quo ex ante* is a chimera – a mythical illusion that can never be achieved.

We came to understand how things can never be brought back to what existed before the event when we talked with the shopkeeper whose daughter was killed in the hurricane. It was driven home for us when we studied Homestead, Florida. The physical space is there and there are buildings and economic activity, but the place is, by no means, the Homestead that existed before the hurricane. It is harder to imagine, however, when the losses are less visible, though, nonetheless, just as real. Those losses cannot be brought back, even though physical assets can be replaced.

What happens following significant natural disasters is that the individuals, the organizations, and the communities change to adapt to the new realities within which they exist. Some individuals, organizations, and communities maintain or attain viability in the new environmental context. Others do not.

We have come to believe, based on our interviews, that the set of demographic, social, and economic linkages that actually define a complex organization or a community is changed irreparably by a major natural hazard event. This does not mean that every officially designated disaster results in the dissolution of communities. Indeed, many officially designated disasters result in relatively little damage to the overall community, but significant damage for a relatively few members of the community. For the larger disasters, like that inflicted by Hurricane Andrew on south Dade County and by Northridge in concentrated areas of Santa Monica, Northridge, and other smaller communities, there is no going back to what was. The term "recovery" is unfortunate, implying, as it does, a return to normality. It would be far better to talk about survival and viability within a new context.

ROBUSTNESS, RESILIENCY, AND SURVIVAL

We have come to conclude that system survival and, hence "recovery," does not mean a return to the state that the system was in prior to the event. Recovery can mean movement to a viable new system state following the major perturbation of the natural disaster. As long as the system continues to meet the objectives for which it exists, we consider the system to have "survived." We consider the system to have survived, even though the system's objectives may be modified somewhat after the natural hazard event. To the extent that the system becomes sufficiently viable to meet the objectives defined for it, we consider recovery to have occurred.

The more organizations we studied following a natural hazard event, the more the relevance of W. Ross Ashby's Law of Requisite Variety was called to mind. To paraphrase Ashby, one of the founders of General Systems Theory, a system will survive only to the extent that it has a repertoire of responses at least equal to the array of environmental challenges it experiences (Ashby, 1956). Our concern with robustness and resiliency in this project is that they are both mechanisms that can be part of the repertoire of system responses necessary to maintain system viability following significant environmental challenges to the system.

Robustness is a noun derived from the Latin, "robustus," and meaning "oaken and strong." Those of us concerned with natural hazards typically use the word in that sense: strongly formed or constructed. For us, robustness is the capacity or ability of a system to withstand shocks to it emanating from its environment.

Resilience is a slightly more complex concept, but only because it has two meanings of interest to those concerned with natural hazards. For engineers and those in the design professions, resilience, a noun, means the capability of a strained body to

recover its size and shape after deformation caused especially by compressive stress. To those of us who are concerned with more complex, dynamic systems, the second meaning is more relevant: i.e., the ability of a system to recover from or adjust easily to misfortune or change.

As we examined small businesses and not-for-profit organizations, we began to look for evidence of organizational robustness and resiliency. Typically, organizational robustness comes from hardened physical facilities (facilities that are resistant to the forces of nature), a large financial flywheel, diversity of markets and products, and multiple business locations -- characteristics that reduce the vulnerability of the organization to environmental shocks. Large system size sometimes produces a robustness of its own, simply because natural hazard events tend to affect only relatively small geographic areas. The extent to which an organization (system) must be robust or resilient to survive depends, of course, on the effects of the natural hazard event on it and on its environment. Had, for example, the Northridge Earthquake struck the heart of a smaller community, the impact on the system as a whole would have been considerably greater than it was in the massive urban settlement of Los Angeles. Most small businesses, simply because they are small, tend not to display those characteristics and, therefore, are not particularly robust.

One can "harden" even small business systems – make them more robust – to make them better able to withstand external shocks. To make small businesses more robust against natural hazards, one can reduce the likelihood that they will be exposed to an event, reduce their exposure to the event, reduce the vulnerability of the organization's assets to the event, or engage in some combination of those three activities. Accordingly, actions are taken to build dams or dikes to protect against flood and storm surge, to strengthen structures against winds or earth movement, and to build greater flexibility or toughness in utility distribution lines.

While we looked for robustness in the small business and not-for-profit organizations we studied, we did not find much.

Failing robustness, one would look for resiliency as a variable affecting survival; i.e., the ability to bounce back following a significant external shock. It turns out that resiliency is a variable of considerable importance to the survival of small organizations. Resiliency, however, is a function of many variables, only some of which are internal to the organization and could be controlled by owner/operators or developed prior to the event. Illustratively, to the extent that business interruption insurance provides resources that would otherwise be lost, insurance coverage must be obtained before the event to be useful. Similarly, owner/operators might increase their organization's resiliency by building redundancy into their systems, devising systems designed to fail safely, or ensure that damaged equipment or processes can be repaired or put back into place quickly.

Other variables that affect system resiliency, however, are almost entirely outside the control of the organization and require a different kind of response if the organization is to be resilient. For example, if the business' customers move away following the

hurricane, resiliency, and, hence, survival, require quite a different set of coping mechanisms on the part of the owner/operator.

FAILURE, SURVIVAL, AND CONTINUED VIABILITY OF SMALLER ORGANIZATIONS IN THIS PROJECT

Our research indicates that, immediately after the natural hazard event, owners and operators of smaller organizations work toward returning to the *status quo ex ante*. They expect to "put things back the way they were." Gradually, however, those who are able to keep their businesses afloat in the months that follow the event experience a transformation in expectations. They begin to say things like "You can't look back to what was. It's gone forever." They transform their goals into making life and the business or not-for-profit organization viable in the new reality. They come to understand that there is no such thing as recovery following a natural hazard event. If one is lucky or good, there is survival. Then there is rebuilding the business.

Organizational Failure Takes Many Forms

We came to understand that a small business or not-for-profit organization can be considered to have failed as a direct consequence of a natural hazard event under any of several conditions. First, failure occurs when there is a formal declaration of bankruptcy and the business closes. Second, we define an organization as having failed when it is placed in receivership for purposes of liquidation of its remaining assets. Third, we class the organization as having failed when there is informal bankruptcy; that is, when the owner closes the door and walks away forever or when neither the original firm nor the entrepreneur can be found and nothing is left but a memory. Finally, we define organizational failure as having occurred when the entrepreneur continues doing business, but at a significantly lower level than before the event – a level that systematically and regularly fails to meet fixed plus variable costs and that has little prospect of continued viability. We call that "dead business walking."

We apply one additional criterion. We decided that it would be necessary for us to be able to attribute the organization's failure directly to the natural hazard event. The reasons for this are obvious. Businesses cease operations for many reasons. One sometimes hears that half the business start ups fail within the first five years. We think that is an overstatement. Often, even successful small businesses close. Some close when the owner retires. In other cases, the entrepreneur takes the earnings from one business and moves on to something else. Some are sold to larger companies. Businesses also close because they fail. Many of those small businesses fail even though they were not affected adversely by a natural hazard event.

Survival and "Recovery" Take Many Forms

We said that we have come to think of recovery for small organizations in new ways. We found it was not adequate to think of survival in terms of a business or not-for-

profit organization having survived the initial assault from the earthquake, tornado, flood, or hurricane and then, subsequently, having stumbled on, found, or devised means for achieving continuing viability.

For us, "recovery" can be said to occur when any of several conditions are met. First, we believe that an organization has survived and become viable when the firm that was in the disaster area before the event has been conducting business for several months or years after the event and is generally at least as profitable as it was prior to the event. This is the simplest case and the one that most closely approximates the way people generally think about recovery.

Second, recovery can also be said to have occurred when a business that existed in the disaster area before the event remains in business for a significant time following the event and is profitable within a new economic environment, even though profitability may not be as great as before the event and the community may be generally in decline. In the months following a natural disaster event, communities change. In Northridge, a great number of middle-class, middle-aged whites moved out, replaced by immigrant Hispanics and Koreans. Many retail and service establishments that served the former population remain to serve the new population. The business has changed. Typically, it is not as profitable. Nonetheless, we count these as recovered businesses. Similarly, downtown businesses in small towns within a comfortable drive of larger urban areas face an uphill struggle all across America today. If, following a flood or earthquake, a business located in such a small town core continues to operate profitably, even though the long-term prospects are not bright, we call that recovery.

Sometimes, the industry within which an organization exists is in general decline or faces fierce competition from new marketing methods or competition from new marketing methods. If the organization we interviewed is caught in that struggle, a struggle which it might well lose in a few years, but has reopened following the disaster and has sufficient revenue to meet costs and provide a modest return to the owner, we call that survival. Viability may be in question, but not as a consequence of the natural hazard event.

Third, recovery can also be said to occur if the entrepreneur preserved his or her financial assets or recovered his or her equity from the business following the event and has moved onto a new business that is both profitable and viable. Not all businesses are meant to go on forever, and our concern is not with the pre-event business as much as it is with the continued economic viability of the entrepreneur in terms of providing service to his or her customers and providing jobs to workers. Indeed, moving on to a new business is often the most prudent use of one's recovered resources following a natural hazard event.

Finally, we say that survival has occurred when the entrepreneur is back in business, even though he or she is operating below pre-event profitability, provided there are good prospects of reaching or exceeding previous levels of business.

VARIABLES CRITICAL TO THE SURVIVAL AND CONTINUED VIABILITY OF INDIVIDUAL ORGANIZATIONS

In this research project, we sought to identify and isolate the key variables that affect the survivability of small businesses and not-for-profit organizations following natural disaster events. Based on our prior research, prior research by others, and the extensive data gathering and analysis from our current research in thirteen municipalities across six distinctly different disasters, we concluded that five key variables are central to determining the probability that a smaller business or not-for-profit will survive and, over some longer period, become viable.

Two variables critical to organizational survival have to do with robustness. The first of these is the extent to which the business or not-for-profit organization lost critical production or service capacity, inventory, and capital assets as a consequence of the natural hazard event. Insurance coverage for small businesses and not-for-profit organizations varies dramatically by type of event and by type of risk. Firms are generally insured against losses from wind such as hurricanes and tornadoes, and from fire. They are less frequently insured against damage from floods and rarely covered against earthquake damage. Many business owners thought their assets were safe behind dikes and levees, only to learn they were not. All thought their insurance carrier would remain solvent.

The second variable having to do with robustness is a little more exotic. It has to do with the robustness of the kind of activity in which the organization does business. At any given time, some kinds of business activity are in the ascendency and others are in decline, some locations are favored by consumers and others are not, and some kinds of products have greater demand than others. A small house wares shop in a declining central city is not likely to be a good investment as people, increasingly, choose to shop at giant national and international discount stores in suburban malls and in highway strip commercial areas. The likelihood is extremely small that a small firm in a declining small town business district would recover following a major event that puts it out of business for several weeks or months. Such a business is behind the developmental curve for retail establishments. Even if the owner were insured, the chances of reestablishing a thriving business are diminished because the firm faced the prospects of long term secular decline simply because it is running counter to retail trends.

A third variable having to do with robustness is the extent to which the organization's customers or clientele are affected adversely by the event. If a very large proportion of the firm's customers suffer significant losses, then sales will suffer, often significantly. A major share of customers' discretionary money dries up if they suffer losses, whether they are retail, wholesale, or industrial customers. For the damaged customer, discretionary resources are used to make themselves whole. Even if they are insured, there are often exclusions and deductibles that must be covered. If, however, the firm sells goods or services needed by the customers to make themselves whole, then the firm can experience a windfall following the disaster. A firm can become more robust by ensuring that its customers are distributed geographically across a significantly large

enough area to reduce the likelihood that most will be affected by the same event. Not all firms are able to develop a geographically diverse clientele.

Three variables we have concluded are central to organizational survival are associated with organizational resiliency. The first of these variables is relevant when the organization suffers losses from the event and is unable to resume business immediately. If the organization's customers have not suffered significant losses, need the organization's product, can get it somewhere else at a similar cost, and the firm cannot supply the product, then the firm's resiliency is diminished. There is not much customer loyalty to individual firms, especially when price is the basis of competition and the product or service is needed. In this case, the longer the firm is unable to supply its previous customers with the goods and services it wants, the less likely is it that the organization will survive, unless, of course, the product or service cannot be obtained easily elsewhere.

The second resiliency variable is the financial strength of the firm prior to the event. Firms that are stronger going into the disaster seem to be better able to attain post-event viability.

The third resiliency variable that is central to organizational survival has to do with the ability of the owner/operator to recognize and adapt to the post-event market for goods and services. Everywhere, we saw businesses and not-for-profit organizations struggle to achieve viability by doing the same thing after the event that they were doing before the event occurred and changed their environment both substantially and irrevocably. Doing business as usual was fine as long as the relevant environment was unaltered. Doing business as usual when the customers had no discretionary money or moved away was disastrous. The firms that survived and attained viability within the new environment were those where the owner/operator adapted, consciously or unconsciously, to the new realities surrounding them.

Going into the research, we had thought that the scale of the disaster would be an important factor. That is, frankly modest events, such as the 2000 fire in Los Alamos, would have relatively little effect on the future of individual firms when compared with true disasters, such as Hurricane Andrew in south Dade County, Florida. We still think, to some extent, that is true. We have come to believe, however, that the scalar effects of the disaster, up to some unknown point, are reflected in other variables, including the effects on customers and the losses suffered by the individual organization.

These variables are discussed more thoroughly in the following pages.

Effects on Customers and Clientele

In our original research in Northridge, we found that various economic sectors experienced significantly different survival and recovery rates. Manufacturing firms generally recovered much more quickly than service and retail firms did. This was confirmed in our research in a dozen other communities and other disasters. We believe

that differential recovery rates among sectors are primarily a function of the effects of the disaster on customers and clients. The customer effect can show up in any of several ways.

When business cannot supply them, the customer goes elsewhere. If the business is damaged to the extent that it cannot reopen promptly or cannot meet its customers' needs from inventory, then customers who are either unwilling or unable to defer purchase will go somewhere else.

We first observed this phenomenon in Northridge, California. When the Northridge Fashion Center was badly damaged by the earthquake, customers who chose not to defer spending simply drove another twenty minutes to other shopping centers. When the Fashion Center reopened, they did not come back in any appreciable numbers.

In Montezuma, Georgia, the flood centered on the town's downtown business district. Retail and service establishments there were closed for periods ranging from a week or two to several months. Downtown refurbishing by the city slowed traffic to the organizations for another seven to nine months. Former downtown customers found that it was relatively easy to drive over to the freeway and up the highway toward Warner-Robbins and Macon where new, large stores beckoned. So far, they have not come back to downtown Montezuma in any large numbers, despite its fresh, attractive look.

Even in Grand Forks, isolated as it is from other cities, customers who had been avoiding downtown in favor of suburban strip malls and stand-alone retail outlets like Wal-Mart, have avoided downtown even more, despite the fact that many millions of Federal tax dollars have been spent to rebuild and refurbish it. At this writing, downtown Grand Forks remains largely vacant, much as it was before the flood, while the suburban discount outlets flourish.

When the customer loses purchasing power, business suffers. A business or not-for-profit need not suffer damage in a natural hazard event to find itself in peril following the event. One reason manufacturing firms recover more quickly than many kinds of retail firms are that their customer base tends to be geographically diverse. Retail and service organizations that serve a customer base that is geographically concentrated suffer badly when the area is damaged or destroyed, even if the firm itself receives no damage at all.

When residential or commercial customers suffer extensive damage, they change their buying habits. To the extent that they have money or credit following the event, they buy what they need to survive and to get their homes or place of business repaired or rebuilt. Consequently, plywood, lumber, paint, and floor covering sales boom, at least for a while, and to the extent that those suffering damage had insurance. Depending on the scale of the event, vendors from across the state and even from across the country descend on the stricken city to ply their wares to contractors repairing the damage.

On the other hand, while fast food restaurants do well, better restaurants do not appear to do particularly well following disasters. Specialty shops, like upscale sport shops, do not do well. Suppliers who depend on discretionary income for sales tend to do

badly following events that have adverse effects on their residential customer bases. The reasons are a little involved, but logical. In the case of earthquakes, even insured homeowners have extremely high deductibles – typically 10 percent of the entire value of the home – before payments kick in. Those owners become strapped for cash as they look for ways to meet the deductible. Even when owners are insured with low deductibles, as is usually the case in wind damage, they often decide to upgrade the home while repairing the damage. Consequently, much of their discretionary money goes toward upgrading the kitchen or bath or adding that extra bedroom.

When the customer moves away, the organization suffers. Following Hurricane Andrew, large numbers of people left south Dade County for other parts of Florida. Homestead Air Force Base was permanently evacuated just hours before the hurricane struck, reducing the population of the area significantly. Moreover, the base closure removed families and individuals with reliable incomes and a set of skills needed in the community. Following the Air Force personnel and dependents, winter residents and retired people left in great numbers, never to return. Homestead is still there, but it is an entirely different place than it was before the hurricane a decade ago. Community demographics have changed dramatically. Businesses that did not adapt to the new reality did not survive.

People often show good sense, reasoning that, if you do not have to live in a disaster-prone area, it makes sense to leave it. And they do. Tens of thousands appear to have left the Northridge area and south Dade County area. Many moved away from Grand Forks. In every community we visited, we were told of people who simply moved away from the risk. Whenever that happens, local merchants and not-for-profit organizations are faced with the prospect of a decline in support. Even if those who move away are replaced by others, the smaller organization is faced with the challenge of turning the new population into customers and patrons. In most of the communities we visited, those who moved away were replaced by others with lower incomes and less education, and were primarily people of color and relatively recent migrants to the United States. This, of course, poses special challenges to small organizations.

The customer's dependence on a single supplier of the good or service. Assuming the firm has some down time following the event, and other things being equal, we expect that an organization is less likely to survive and become viable again if its customers can easily meet their needs for the product or service somewhere else and if customer loyalty is low. We also expect a lower probability of recovery if other products can be readily substituted for the firm's products. Finally, we expect a lower probability of recovery if customer outlays for the firm's goods or services represent discretionary rather than essential expenditures.

The organization is in comparatively good shape if it is the only or principal supplier of the good or service needed by the customer or constituent group, or if alternative suppliers are located far away and are unable to supply needs quickly. In that case, the principal challenge to the owner/operator is to get back into a position quickly where it can begin resupply in sufficient time to preclude effective competition from emerging.

Characteristics of the Industry in which the Organization Is Doing Business and the Organization's Position within that Industry

Exacerbation of Trends. Natural hazard events appear to exacerbate existing trends in urban areas, hastening demographic changes and adding additional pressure for land use succession. Government planners seem slow to recognize those impacts and to act accordingly.

Many retail firms that had been in business in Northridge long before the earthquake still experienced reduced revenues long after the event because their pre-event customers moved away and did not return. For more than a year before the earthquake, Northridge had been suffering a recession induced by cutbacks in defense expenditures. The recession affected area retailers adversely. In addition, the Northridge-Reseda area was already undergoing demographic changes when the earthquake occurred. The combination of the recession and the earthquake appear to have exacerbated neighborhood changes already underway. Casual empiricism suggests that many white, middle-class defense industry employees, former employees, retirees, and others said "enough is enough" and moved away from the layoffs and the shaking. They were replaced mostly by recently arrived Hispanics and ethnic Koreans, changing the community forever.

Grand Forks' central business district was hurting before the floods of 1997. Retail had been moving out toward the urban periphery along major highways. The same thing was happening in Montezuma, Georgia, although the town is much smaller. This is not to be unexpected; that is the pattern in almost every small and middle-sized urban area in North America. Retail sales patterns have been changing dramatically in the United States; the old downtown shopping core is a thing of the past except in unusual circumstances. In both Grand Forks and Montezuma, however, municipal governments opted to shovel sand against the tide, pouring vast sums of money into the downtown areas, with little effect on consumer behavior. Downtown Grand Forks remains relatively empty of retail outlets and, in downtown Montezuma, almost none of the merchants we interviewed find being there very profitable.

It is difficult to know how much of the failure and recovery problems in the retail and service sectors were occasioned by natural hazard events and how much by the changes they seem to have accelerated. We concluded that it is extremely difficult to separate effects in the community from disaster effects on businesses. Some of the effects are tied into the set of variables we call "effects on customers," but the effects on the community go well beyond that and also have an effect on business recovery.

Position on the curve. When we interviewed businesses, we tried to judge where they were on the industry curve. That is, we tried to assess whether the organization was in the forefront of location, product or service mix, marketing approaches, and innovation, or whether it was near the middle of the pack or lagging far behind.

We believe that the firm's location on the industry curve is a good indicator of whether the firm can weather the aftermath of the disaster. Businesses forward of the

middle of the industry curve do much better, on average, than firms that are lagging beyond industry trends. We think this is because the firm's position vis-à-vis the industry reflects the owner/operator's business acumen, previous business success, and flexibility in adapting to changing circumstances. We believe, too, that position on the curve is sometimes simply a matter of good fortune.

The Extent of Loss to the Business or Not-for-profit Organization

Some businesses fail as a direct consequence of natural hazard events without having suffered any damage at all, but there is a much higher probability of failure if the organization suffers extensive losses.

Earthquakes, floods, hurricanes, and tornadoes damage and destroy buildings, equipment, and inventory. They cause business to be interrupted. Small organizations can, however, protect themselves in ways that reduce their losses. Both businesses and not-for-profit organizations can employ both traditional and nontraditional means of mitigating their vulnerability. Fundamentally, organizational precautions are intended to reduce its exposure to a damaging event or its vulnerability to loss should the event occur.

Taking Precautions. Traditional precautions (mitigations) against natural hazards generally include structural and nonstructural approaches. Structural mitigation is essentially a technological fix. In the case of earthquakes, it includes building to earthquake resistant standards. For hurricanes, it means designing and building structures that have considerable resistance to high winds and storm surge. Nonstructural mitigations include protecting building occupants from falling objects within structures, stabilizing dangerous objects, such as water heaters and gas connections, within structures, and, generally, reducing the likelihood of adverse effects on people and property from nonstructural elements within structures

We have coined a term, "management mitigation," to describe management techniques used to reduce both exposure and vulnerability through smart business practices. These techniques extend to include diversifying the organization's customer base, diversifying the location of the organization's inventory, protecting organizational electronic and hard copy data, and having multiple business outlets. Multiple business outlets include having several geographic locations or doing business by catalog or through e-commerce.

Nontraditional mitigation practices include things as simple as having sensible lease provisions – provisions that allow an organization to move out from a building if it fails to meet necessary performance characteristics and the owner cannot bring it back promptly. Firms that operate in leased space with inadequate provisions in the lease concerning who repairs earthquake damage and how quickly it will be done will find themselves in trouble. In Northridge, many business owners found themselves stuck in buildings that were not repaired for a long time by virtue of a lease that kept them from moving to another location where they could resume business.

Insurance against losses. In some instances, buildings and inventory are damaged despite precautions. In those instances, some form of insurance is extremely important to organizational survival. Property and casualty and business interruption insurance cannot bring a business back into business, but it can help owners protect their equity and open options for them after the cleanup.

The importance of appropriate and adequate coverage with a firm likely to remain solvent after the event is underscored by the number of organizations we interviewed that had inadequate or inappropriate coverage. Many of the respondents thought they were covered. In the case of earthquakes and floods, others thought they could get along without it, but found they could not–at least not without applying their life savings to their attempt to become viable again.

Financial strength prior to the event

Other things being equal, we found that organizations that were smaller, weaker, and under significant financial stress before the event were much more likely not to survive the event. Marginal firms and those tottering on the brink of failure often tumbled when the event struck, even if they suffered only peripheral damage. Sometimes the disaster was simply the straw that broke the camel's back. It afforded them with a good excuse to give up a losing battle, presumably because the organization would, in any circumstance, have no staying power during the long, difficult weeks that follow the event.

Many business people who had marginal enterprises before the natural hazard event did reopen and hang on through long, painful recovery periods, only to exhaust their hope, their resources, and their endurance and, finally, give up the struggle.

Even strong firms can suffer badly from natural hazard events. Being out of business for any extended period of time can lead to a loss of market share. Even with business interruption and property and casualty insurance, it can be extremely difficult to regain market share.

Owner/Operator Business Acumen

We have already noted the rather considerable psychological stress small business and not-for-profit managers experience during and following a damaging natural hazard event. Often, the event is a 360-degree thing, involving home, family, livelihood, and self-esteem. For some, the strain was so great that they simply failed to reopen the business after the event. They simply melted away. Others showed enormous stamina, struggling against the pressures and stress with a level of psycho-social resiliency at which one can only marvel. Often, unfortunately, the stress wins, the firm closes, and the failure becomes a critically important incident in the owner/operator's life, which is forever altered.

Against this bleak backdrop of struggle and failure, we found individuals who were able to face business adversity and recreate organizations with true viability. A young man, faced with bankruptcy because of lack of customers, converted his auto repair business into

a thriving business working on race cars. An optometrist assessed the adverse effects on his customer base and moved to a new location. A dry cleaner without customers saw the National Guard troops helping with the disaster as a built-in market and captured it. The young man with a shop that sold sewing machines transformed his product into a recreational service requiring a capital outlay on the part of the customer. The wall coverings retailer walked away from leased property as soon as he concluded the owner could not act quickly enough for the retailer to salvage his business. He moved, reopened, and survived.

We have concluded that perhaps the most important variable in the survival equation is the extent to which the owner or operator recognizes and adapts to the post-event situation. Communities never return to what they were before the event. The post-event environment is always different. Those who perceive the changes and respond appropriately have an excellent chance of surviving and becoming viable again. Those who continue to do business under the old paradigm, assuming that the community will return to pre-existing conditions, have all the cards stacked against their long term survival. Doing what one did before will not work in changed circumstance.

The survivors seem to have an intuitive understanding of Ashby's Law of Requisite Variety. Ashby maintains that, to survive, a system must have a repertoire of responses at least equal to the array of environmental challenges. Only variety can deal with variety. Those who are adversely affected by the event and then flourish in the aftermath are those who can read the signs of the new environment and respond quickly and appropriately.

SECTION 3: RESEARCH METHOD

THE BASIC APPROACH

Our basic research strategy has been to interview scores of owners and operators of small organizations who have experienced significant natural hazard events in their communities. We used open-ended interviews to elicit information from them, in their own words, about what happened to them during and after those events. We then used both qualitative and quantitative methods to the data to draw inferences about distinctions between those whose businesses survived and those whose did not.

Our work has been primarily inductive. We started with observations from each case to build upward to our understanding of failure and survival. Initially, our work was exploratory. As it has progressed, we've begun, more and more, to add nuances to our basic understandings. We then used quantitative methods to verify what our qualitative analysis had been telling us.

We do not pretend to have rigorously tested hypothesized relationships. Our work has emphasized gaining understanding of processes and relationships rather than on seeking statistical significance of more narrowly formulated hypotheses. We believe our approach to the work is a necessary prerequisite to that activity.

SITE SELECTION

One of our primary goals is to be able to generalize our findings beyond one kind of disaster in one kind of urban area. This required that we select sites for our research that varied from one another, but that, together, represented a significant cross-section of communities. We also wanted a cross-section of kinds of disasters. We selected sites that had experienced, respectively, earthquakes, floods, hurricanes, and tornadoes. The communities we selected vary in terms of community size, the community's relation to larger urbanized areas, the nature of the disaster and the extent of the damage suffered within it, and the communities' dominant economic bases. We selected seven disaster sites to provide a wide array of communities, disaster types, and disaster intensities. In addition, we believe that the recovery process is long and arduous, so we wanted to ensure that we selected sites in which the disaster occurred as much as a decade ago and as recently as within the past year.

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Table 3.1 Sites in Which Interviews Were Conducted With Small Businesses and Not-For-Profit Organizations, by Year of the Natural Hazard Event.

	Year	Hurricane	Tornado	Riverine Flooding	Earthquake	Wildfire
Florida City, FLA	1992	X				
Homestead, FLA	1992	X				
Montezuma, GA	1994			X		
Northridge, CA	1994				X	
Breckenridge, MN	1997			X		
East Grand Forks, MN	1997			X		
Grand Forks, ND	1997			X		
Wahpehton, ND	1997			X		
St. Peter, MN	1998		X			
Princeville, NC	1999			X		
Rocky Mount, NC	1999			X		
Tarboro, NC	1999			X		
Los Alamos, NM	2000					X

Northridge, California Earthquake

Northridge was the only earthquake site selected. We selected it partly because we already had excellent data on businesses in the site. More important, however, Northridge represents a very typical natural disaster event. It occurred in a large metropolitan area. Damage was extensive, but spotty, and the property loss represented a fairly small proportion of property values in the metropolitan area. Residents were able to shop with relatively little inconvenience following the earthquake by simply traveling a few more miles. The Northridge earthquake occurred in January 1994, six years before our field work for this project was initiated.

Floods on North Carolina's Tar River

The Tar River and many of its tributaries overflowed their banks in 1999 as a result of rains associated with Hurricane Floyd. Floyd dropped copious amounts of rain on the area over several days. We conducted interviews in three widely different communities along the Tar. Princeville is a small African-American community that was almost completely destroyed by flooding. Tarboro, across the river from Princeville, suffered substantial losses, but not nearly as much as Princeville in terms of the proportion of the community destroyed. Rocky Mount, upstream from the other two communities, was

extensively flooded in areas along the creeks and river as well, but had a different set of experiences. Each of these municipalities is relatively small and not located within a large metropolitan area. Princeville had a population of about 2,000, Tarboro about 10,000, and Rocky Mount about 50,000. The Tarboro and Princeville economies are relatively fragile, without a dominant, growing industrial base. Rocky Mount has a more substantial economic base.

The Red River of the North, Floods

Towns and cities up and down the Red River of the North in both Minnesota and North Dakota suffered significant flooding in Spring, 1997. The communities remained under water for some time, primarily because the land is very flat and because the river flows north. The northerly flow of the river means that, in the Spring, ice melts upstream before it melts downstream. Floods in the south have a tendency to pile up ice in the north; the ice, in turn, acts as a dam to slow drainage from inundated land and communities.

We conducted research in Breckenridge (MN), Wahpeton (ND), Grand Forks (ND), and East Grand Forks (MN). Each is a twin city. Breckenridge and Wahpeton are across the river from one another as are Grand Forks and East Grand Forks. Wahpeton was largely unaffected by the floods, since it is on relatively high ground, while Breckenridge was largely inundated. Substantial areas of both Grand Forks and East Grand Forks were inundated. Both sets of communities are remote from large metropolitan areas, even though the Grand Forks and East Grand Forks (MN) area has a combined population of approximately 100,000 persons. Wahpeton and Breckenridge are very small. An Air Force base is located near Grand Forks, the community is home to the University of North Dakota, and there is a small, but significant industrial base. All communities along the Red River of the North depend heavily on agriculture and related industries.

South Dade County, Florida, Hurricane

Hurricane Andrew cut a 27-mile wide swath through southern Dade County, Florida in 1992. With few exceptions, nothing that was not made of steel or reinforced concrete survived. Of the thousands of mobile homes housing “snow birds” and permanent residents in Homestead, only one mobile home remained intact the next day. Damage was the most extensive of any site we visited.

We conducted interviews with organizations in Homestead and in Florida City. Even though they are adjoining municipalities, the two are distinctly different from one another. Both jurisdictions lie at the southern edge of the sprawling Miami metropolitan area, so the residents who survived the hurricane had access to the larger metropolitan area. For the first few weeks following the hurricane, however, Homestead and Florida City residents did not have easy access to the rest of the metropolitan area, partly because of the damage to roads, but partly, too, because the National Guard had set up a cordon around the damaged area.

Flint River, Georgia, Floods

Hurricane Floyd caused massive rainfall in south central Georgia, generating considerable flooding on the Flint River and its tributary creeks. Montezuma, Georgia, is a small town a little off the beaten path about an hour southwest of Macon and about 20 minutes west of the Interstate Highway. It is an old river town that had a faltering economic base even before the flood. Jobs there do not pay particularly well and much of the labor force is unskilled and poorly educated. The flood, which inundated the entire central business district for several days, came not from the river, but overland from badly flooded creeks. Only a score or so homes were damaged. This community represents a set of smaller towns outside the immediate impact of a larger metropolitan area with a modest economic base and an uncertain economic future.

Los Alamos, New Mexico Fires

Los Alamos experienced a wildfire in the spring of 2000. We included the site for several reasons. First, the fire, set by federal employees, was intended as a controlled burn on forest land, but became an uncontrolled burn. We wanted to know whether victims perceived differences in the effects between natural disaster events and events that could be attributed directly to public action.

Los Alamos is essentially a company town, dominated by the Los Alamos National Laboratory. The community was once extremely remote. Indeed, until the mid-fifties, it was a garrisoned military post with tight security. Today, however, Los Alamos is only 35 minutes by four-lane highway from Santa Fe with its bustling shopping areas and economy.

Minnesota Tornado

St. Peter, Minnesota, was struck by a devastating tornado in March 30, 1998 about 4:30 in the afternoon. The tornado damaged or destroyed one-third of the buildings in this small, south-central Minnesota community. This small municipality in southern Minnesota is home to a small private college, which was damaged extensively, and is only a short drive to Mankato, a larger community with a substantial economic base.

SELECTING INDIVIDUALS AND ORGANIZATIONS TO INTERVIEW

Within each of the sites we selected, we chose to interview people from organizations that would give us a representative array of businesses and not-for-profit organizations and respondents with a representative array of experiences.

We began our sampling procedure more formally. In Northridge, we randomly selected an array of city blocks within areas of Northridge that suffered extensive damage. We then randomly selected 150 business addresses within those blocks. Of those 150, we

sought personal interviews with 50 of those firms and were able to complete 40. We then conducted 100 telephone surveys, using the remaining 100 businesses and drawing an additional ten firms to fill in for firms where we were unable to complete interviews.

As we prepared for research in the next 12 sites, we concluded that, in those remaining sites, we would take a somewhat different approach. We would continue to interview organizations in areas that suffered damage from flooding or storms. In those areas, we would attempt to interview representative organizations from an array of organizational types. We then selected organizations opportunistically to build a representative portfolio. We sought interviews in not-for-profit organizations and businesses in retail, wholesale, manufacturing, and professional and service sectors. We picked organizations based on their apparent financial strength, size, the owner/operator's age, and the owner/operator's race and ethnicity. We sought interviews from persons in organizations where knowledgeable people in the community suggested there was an interesting story of set of circumstances or experiences.

To find small business people who would talk with us, we went to areas damaged by a disaster and "dropped in" on retail store, machine shops, dry cleaners, computer board makers, green houses, optometrists and other business people who were located in a damage area. Interviewing business owners at their place of business made it easier for the informant to "tell and show" us what happened and is happening to their business. It helped us understand the context of the events discussed, and it provided security and a comfort zone for the informant. With very few exceptions, people found time to talk with us when we just dropped in. The few people we made appointments with, business owners, bankers, or local public sector employees, often canceled or rescheduled one or more times.

About 10 percent of the organizations we interviewed were not-for-profits. Slightly over half were retail firms, including restaurants. About 3 percent were wholesalers, 22 percent were service and professional organizations, and 9 percent were manufacturing firms. The largest proportion of organizations interviewed were retail firms, amounting to about 39 percent of all the organizations (See Table 3.2).

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Table 3. 2 Businesses and Not-for-Profit Organizations Affected by a Natural Disaster in the United States: Distribution of Cases Interviewed by Economic Sector and Profit-Nonprofit Status.

	Small Business	Not-for-Profit	Total
Manufacturing	10 (9.4 %)		10 (9.4 %)
Community Service, Arts, Recreation, and Education	2 (1.9. %)	8 (7.5 %)	10 (9.4 %)
Construction and Related	6 (5.7 %)		6 (5.7 %)
Health and Medical	5 (4.7 %)	3 (2.8 %)	8 (7.5 %)
Food and Drink	15 (14.2 %)		15 (14.2 %)
Service	13 (12.3 %)		13 (12.3 %)
Retail	41 (38.7 %)		41 (38.7 %)
Wholesale	3 (2.8 %)		3 (2.8 %)
Totals	95 (89.6 %)	11 (10.4 %)	106 (100.0%)

Overall, about three-fifths of our respondents were male and two-fifths female. Two-fifths of our interviews were with white males who appeared to be of European descent. One-third were with women of similar ethnicity. About one-fifth of all respondents were African-American, Asian, or recent immigrants from the Middle East. These were about equally divided between male and female respondents. Distributions of respondents by gender and apparent ethnicity are detailed in Table 3.3.

Table 3.3 Summary of Respondents to Personal Interviews

	Male	Female	Total
Persons of European Descent	61 52.6%	34 29.3%	95 81.9%
Persons Who Were Hispanic, Asian, Black, and Recent Middle-Eastern Immigrants	11 9.5%	10 8.6%	21 18.1%
Totals	72 62.1%	44 37.9%	116 100.0%

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DATA COLLECTION

Unstructured Face-to-Face Interviews

The primary research question is "What differentiates smaller businesses and not-for-profit organizations that survive and recover from natural hazard events from those that do not?" To discover why some small businesses do not survive while others do, we conducted face-to-face, undirected interviews with small business owners and operators to collect data. We also conducted well over 100 interviews with public officials, newspaper reporters, community leaders, and other people who were knowledgeable about individual communities. Newspaper articles, disaster-related publications, photographs, and personal and public records provided additional background data.

In planning the initial Northridge Earthquake research project, we found that the small business recovery knowledge base was extremely limited and the information that was available focused on the short-term effects and outcomes to business recovery. Early on, in light of the limited literature available, the research project became oriented toward discovery. Rather than refining our preconceptions through structured surveys, we chose to talk with and listen to small business owners who had experienced the Northridge earthquake. Discovering what they found important and hearing what they had to say, with minimal prompting, seemed important in identifying and understanding their individual "recovery process."

With a knowledge of what individuals found important, what they did and did not do, and how they felt about what they did and still are doing, we anticipated finding themes, categories, patterns, and relationships. We further expected that in understanding this knowledge, important variables, processes, and practical methods would emerge, evolve, and prove explanatory and useful in various conditions and circumstances.

Data collection was undertaken in each of thirteen municipalities. In each site, we interviewed city managers, mayors, disaster officials, housing officers, planners, and economic development staff to obtain background on the community and the disaster. They confirmed the location of damage, extent of damage, infrastructure damage, and other effects of the event. They also gave us useful leads for subsequent interviews. We interviewed people from other organizations as well to get background to guide our data gathering. These included newspapers, banks and other financial institutions, Chambers of Commerce, and so forth. However, the primary source of data for what happened to small businesses and not-for-profit organizations was the people who are living their recovery experience.

The interviews were conducted by teams of two interviewers. Occasionally, a one interviewer or a larger team conducted an interview. We introduced ourselves, developed some common ground, promised confidentiality, asked if we could take notes, and then asked two simple questions. "Were you in business here when the earthquake (flood, hurricane, tornado, fire) occurred?" If the answer was "yes," we asked, "What happened?" Interviews lasted from thirty minutes to several hours. We talked with nearly three

hundred people, approximately one-half of whom were small business owners and operators who had sustained damage from the disaster. Almost everyone was willing to talk, often enthusiastically, about their story. We listened, took notes, asked that the informants amplify or clarify their story, and followed-up with specific questions related to the story we heard or other stories we had heard.

During each interview, one team member took notes, while the other engaged the respondent, probing for additional information when necessary, but, generally, allowing the respondent to tell his or her story as he or she wished. In each interview, the researchers paid particular attention to obtaining information in several areas we deemed to be particularly important following our research in Northridge. These areas are the extent of losses to the organization as a direct consequence of the event, the effects on the organization's customers or clients, the characteristics of the firm before the event, the owner/manager's business acumen, and efforts made by government to help business recover. After each interview, we transcribed our field notes and recollections separately for later discussion and analysis.

Occasionally, someone would say "don't write this down," but most of the people interviewed were very open with the information they had to share and with their opinions. Some people we talked with had been interviewed previously by researchers and media people. As a result, the information and opinions developed during the discussion were conditioned by the questions asked and related discussion with previous questioners. Some people told stories influenced by what they came to understand to be what researchers wanted to know or what news people wanted to hear. It was usually easy to distinguish practiced stories that were contrived and those that were genuine with directed questions.

An example is a banker who had played an important role in many small business recoveries over several years after the disaster. He had developed an informally scripted response that could be shared, with those interested, in about twenty minutes. (This also made planning appointment scheduling easier because he knew could reserve thirty minutes for anyone who wanted to discuss the disaster and he knew he would have ten minutes to spare.) It appeared to us as though his presentation had become more and more prescriptive and authoritative as time passed.

This effect also influenced the interviewers. If themes or categories that we had heard in earlier interviews were not mentioned in the present interview, our questions would be suggestive and the responses to our suggestive questions became problematic. During interviews, people sometimes asked for advice or explanation based on their perception of our expertise. As time passed our responses became more prescriptive and authoritative.

Longitudinal Data Collection

As part of a previous research project, we were able to revisit people and visit new people three times in the four years after the earthquake. From the initial Northridge

research we learned that a few businesses failed immediately after the earthquake, but most of the businesses that failed did not do so until one, two, or more years after the earthquake. As part of the current research we were able to revisit Northridge and talk with business owners we had talked with one or more times over the six years since the earthquake. During our latest visit (June 2000), 16 of the 25 businesses we were following up on were still operating. Of the 16 still operating, four had changed ownership for reasons not related to the earthquake. Ten of the twelve owners whose businesses were still operating talked with us. We were also able to confirm that three of the nine businesses we could not find had failed in the last two to three years. We were unable to find the remaining six businesses in the Northridge area. People had moved, died, sold out, retired, had their lease terminated, and vanished.

With one exception, the owners we talked with remembered the previous interviews, Two people produced the business cards we had given them several years earlier. Many asked about the balding, big guy with whom they had previously talked. During the most recent interviews, business people were still very concerned with disaster related issues and effects. The day we arrived in California for the latest follow-up interviews, the State's top insurance official was to be questioned about his handling of insurance settlements associated with the 1994 Northridge earthquake.

The follow-up interviews in Northridge added considerable depth and several new dimensions to the small business disaster recovery process. These findings also provide a baseline for comparing similar processes in different locations and after other types of disasters.

Our sample of disasters and, hence, our sample of victims was an attempt to create what our economist colleagues call "pooled time series and cross-sectional data." That is, we purposely set out to collect information from sites in which the disaster happened a decade ago, a few years ago, and during the past year. This afforded us the opportunity to view "recovery" of communities, infrastructure, businesses, and not-for-profit organizations through time. This was the case even though we were really only able to study Northridge organizations repeatedly over a five-year period. We interviewed dry cleaners, for example, in every stage of reestablishing their businesses from a few months after a disaster through almost a decade after the disaster.

DEFINING VARIABLES AND CODING DATA

The Process Employed for Defining Variables

From our initial work in Northridge and from the work by Tierney and Dahlhamer, we had a starting point from which to begin developing variables that we thought would distinguish organizations that survive natural hazard events from those that do not. Following each site visit, we discussed each community and each case in the context of each community. Through discussion and debate, we identified what appeared to be the most important about each case and each community.

We employed content analysis and affinity diagramming techniques to look for initial patterns and anomalies among the data. For each case, we identified characteristics that seem to have made a difference and identified issues and concerns that recurred across interviews the data collected.

The resulting categories and themes became the bases for coding subsequent interview data. This process sensitized us to issues that were not always expected or obvious. For example, the role that building leases play in the early recovery process proved to be significant, not because individual business owners identified it as important, but because these issues recurred across interviews conducted by three interview teams. The significance of leases to the earthquake recovery process became manifest in the Q-sort results.

The themes that emerged from this process were used to develop a set of variables that appear relevant to business recovery in Northridge. During subsequent interviews, in Northridge and other disaster sites visited, we used follow-up questions to establish how important these variables were to the informant if they did not spontaneously bring up related information in telling their recovery stories.

We also looked for responses that did not fit entirely into existing categories. This process provided the opportunity to develop and test new themes during subsequent interviews and use our field notes to test for relevance in earlier interviews. Interviews continued to be unstructured, but as themes emerged we structured questions to test for relevance.

Interpreting this data and identifying dimensions and patterns within these categories and understanding their interrelationships and their relationships with disaster recovery will help develop practical small business recovery insights and guidelines. Developing practical guidelines for small business recovery is the next phase of this research project. We reduced those to several key variables and then coded each variable for each of 106 cases for which we had developed case data.

The Independent and Dependent Variables Identified

In the paragraphs that follow, we describe the variables we identified through our interviews as important in differentiating organizations that survive natural disasters from those that do not. We were reluctant to code our variables in ratio or cardinal scales; the way we collected the data and the way we assessed it did not permit that kind of scaling. Instead, we chose to code each variable as a dummy variable; that is, variables were coded -1, 0, or +1. We were thus able to employ each quantitative technique without pressing the assumptions underlying the methods past limits that were to us acceptable, given our exploratory intent.

The Dependent Variable: Survival and Recovery

We defined three states in which firms we interviewed could be classified: failed, uncertain, and recovered. Failed businesses were those that were formally bankrupted, had closed without hope of reopening, or were still open but had no prospect of recovery. These firms were given a score of -1. Organizations whose future was still in doubt, months and perhaps years after the event, were said to be "hanging on." These organizations could go either way. The jury is still out concerning their ultimate viability and, to the extent we could tell, their current status could be attributed directly to the event; they had been doing well before the event. We coded them as "0."

The third category was defined as a recovered organization. These organizations were coded with a 1. The category includes organizations whose business was at least as good as it was before the event. It also includes organizations whose business is not up to pre-event levels, but with excellent prospects for continued viability in the post-event environment. Also included are organizations that are new and doing well; organizations that grew out of pre-event organizations or from entrepreneurs who took substantial losses from the event.

Independent Variables

We drew the dependent variables directly from our distillation of the case studies. Each relates directly to one of the sets of dominant variables we identified from the interviews. Each variable is operationalized so that it could be incorporated into quantitative models intended to ascertain whether we can account for a significant amount of variance between organizations that fail and those that survive.

Variable 1. The extent to which the customer base was affected adversely. Organizations whose customer bases were diminished appreciably were scored -1. The customer base may have been diminished because the customers moved, because they stayed in place and found new sources of supply, or because they stayed and lost purchasing power.

Organizations whose customers and customer base were largely unaffected by the natural hazard event were given a score of 1. Customers are largely unaffected by the event when only a small portion of the customers are located within the damage area. Many organizations have customers throughout a region or across the country or internationally. In other instances, the commercial area of the community suffered extensive damage while residential areas did not.

Some disasters left mixed impacts on the customer bases of various organizations. This occurred when some parts of the city were damaged while other parts were not, when some customers suffered and others did not. Firms with this experience were given a score of 0.

Variable 2. Industry competition. We wanted to define a variable that helped us understand the effects of an organization being closed for even a relatively brief time. We elected to use a variable that described the level of competition among organizations within the subject organization's product or service line. Illustratively, retail household goods is an extremely competitive industry, given the emergence of retailers like Wal-Mart. Similarly, optometrists operate in a highly competitive business. Other industries, such as pecan packing and wholesaling are only somewhat competitive. Pecans don't grow everywhere, so the competition is relatively limited. Community historical societies have few direct competitors, but compete for attention in a time when travel is easy and most viewers have at least 50 channels from which to choose. Some organizations have little competition because they hold a patent or are virtually the sole supplier of a particular service to an industry. We interviewed some such organizations.

Organizations in a fiercely competitive field were coded -1. Those in a modestly competitive field garnered a 0. The relatively few organizations we interviewed that faced only modest competition got a score of 1.

Variable 3. Product necessity. Sandhya's restaurant served very fine food with an extremely small market niche–vegetarian Indian food, Madras style. Tim's Tackle Shop featured very high-end fishing gear. Both firms had a limited clientele niche before the event and purchases from either could be deferred for a while without much discomfort for the customer. Low-necessity items and items that can be deferred for an extended period following a disaster pose special problems for small businesses that supply them. Such firms earned a score of -1 in our analyses.

Following disasters, hardware stores and lumber yards harbor supplies that people need urgently. So do grocery stores and pharmacies. Purchase cannot be deferred. Organizations that supply such products and services were given a score of 1.

All other firms and not-for-profit organizations fell somewhere between and earned a score of 0. The YMCA provides an outlet for young people and a means for stress reduction for adults struggling with post-event concerns. Some of the clothing lost in a flood has to be replaced and other clothing needs dry-cleaning. Lots of kinds of organizations provide services that can be deferred for a little while, but are still in demand.

Variable 4. Position on the industry curve. Firms that we determined to be behind the midpoint of the industry curve are those that appeared less competitive because of location, marketing approach, product mix, and market niche. Some firms we interviewed are ahead of the industry curve; they are those firms that are providing goods and services with a growing market, they are in the right location, and they are marketing their wares effectively. Firms behind the industry curve, even if they seem to be doing well financially, were scored -1. Those that appeared to be generally in the mainstream, but not in front, got a 0 and those that are on or ahead of the industry curve a +1.

Variable 5. Overall business stability before the event. The owners and operators we interviewed managed organizations that, before the natural hazard event, ranged from marginal to extremely successful financially. Our interviews suggested strongly that, other things being equal, marginal firms were more likely to collapse after the event than were stronger firms. For purposes of the analysis, firms with significant assets and income prior to the event were scored as +1, while organizations that were marginal or failing before the event were scored -1.

Variable 6. The extent of direct organizational loss during the event. Some organizations took massive losses from natural hazards – their buildings were destroyed and equipment and inventory were lost. Organizations that suffered severe direct damage from the flood, hurricane, fire, tornado, or earthquake, and did not have adequate insurance or, for that matter, any insurance coverage, received a score of -1. Organizations that took moderate losses were given a score of 0. Organizations that suffered little direct loss, because the event spared them, because they had taken precautions, or because they were fully insured, received a score of +1.

Variable 7. Extent of proactive entrepreneurial response to the disaster. We have noted previously in this report that owners and operators of not-for-profit organizations and small businesses responded differently from one another to the natural hazard event. Some were "stuck in Lodi." They firmly believed that the event was just a bump in the road and that things would return to normal, so they tried hard to do the same thing after the event as they did before the event, as though nothing had changed or would change. These people received a score of -1.

A second set of respondents gave a little thought to recovery strategy, but did not do much to actually recognize and adapt to new circumstances. These people received a score of 0.

The third group of owners and operators responded proactively to the event. They recognized there were changes in the business environment and, while they may not have understood exactly what was happening in the community, they knew they could not continue to do what they had done before the disaster and maintain a viable enterprise. These people were given a score of +1.

Variable 8. The scale of the disaster. One can hardly examine variables affecting the survival of organizations without controlling for the scale of the disaster. Consequently, we have included a variable to approximate the scope of the disaster. Those events that resulted in widespread community destruction, such as Hurricane Andrew, rated a score of -1. Some disasters, however, result in extremely limited losses and then only to a relatively few people. The Los Alamos fire burned about 200 buildings, making about 400 families homeless. While one empathizes with the households that lost everything in the fire, the event did not result in even a vague approximation of the damage suffered in Northridge; the Tar, Red, and Flint River Valleys; or even in tiny St. Peter, Minnesota where a tornado damaged or destroyed fully one-third of all the buildings in the community. Los Alamos and similar sites received a +1, indicating very little damage.

Communities that got scores of 0 were those that had significant parts of the city severely damaged, but with other areas left intact or very nearly intact.

DATA ANALYSIS

We used both qualitative and quantitative methods in an attempt to learn what appears to differentiate organizations that fail from those that do not. We have already described our application of affinity diagrams and content analysis to interview data to help identify variables we believed to be critical to differentiating survivor organizations from those that fail following a natural disaster event.

After we analyzed the cases qualitatively and coded the variables based on our analysis, we applied statistical methods to the same data. Our intent was to learn the extent to which the explanatory variables we selected and coded could differentiate between businesses that we identified as having failed, recovered, or whose future was still in doubt. This was not a hypothesis test; it was simply further triangulation.

The quantitative analysis was intended, too, to expand our understanding of the relationships among the variables and between the variables and organizational survival. We used discriminant analysis to learn which factors are most closely associated with failure and survival. We then used multiple regression to learn how much of the variance we could explain in the behavior of a dependent variable (failure or survival in this case) given independent variables (like the effect of the disaster on the firm's customers). We were able to rank the variables in terms of their relative contribution to "explaining" the difference between firms that survive and those that do not. The regression model is central to our ability to predict the conditions under which individual organizations are most likely to survive. Finally, we used cluster analysis as yet another technique to help us understand the way the dependent variables were associated with failure or survival.

We then used the results of both the qualitative and the quantitative analyses to develop a conceptual model of what happens to small organizations following a natural hazard event. That conceptual model is intended to guide further analysis and to help us communicate the results of our work to others.

METHODOLOGICAL CONCLUSIONS AND CONCERNS

Traditional Challenges

The issues and concerns here are essentially the same as for all research. We experienced the problems that all researchers face when trying to understand and explain why something happened after it happened. We can build a compelling argument, but it is essentially impossible for us or anybody else to prove that we know what happened. Our biggest research challenge has been determining how much of what happened to individual

organizations is because of the disaster and how much is due to long-term secular trends or non-disaster related variables.

We have attempted to observe and record the behaviors that occurred subsequent to the disaster and have tried to understand how those behaviors, conditioned by the event, contributed or detracted from the "fuzzy" condition we have referred to as recovery. In so doing, we have relied, to a considerable extent, on what people remember having happened during a particularly stressful and defining time in their lives. Because the event was so important to our respondents, they have strong recollections. Selective recall has probably shaped those recollections. We do not know the extent to which they may have subconsciously rationalized facts and actions to make the memories more tolerable. Nor do we know the extent to which business people talked with each other following the event and, over time, developed a party line to difficult questions. If an informant selectively or inaccurately recalled events or actions, understanding how and why these discrepancies and lapses occurred is often more important than the inconsistency or memory lapses themselves. All of what happens after disasters, indeed, after most traumatic events, are important research issues themselves. Perhaps individual and group memories evolve and condition long after the "facts" of the disaster are forgotten. When people tell us that "getting back in business as fast as you can to increase your chances for recovery," it remains a valid comment even though our evidence suggests that it is not always a sensible strategy.

There are, of course, always opportunities for observer error and bias in interviews and in qualitative coding. After a dozen interviews in the same community, one hears the same thing repeatedly. We worked hard not to be numbed by hearing certain stories repeatedly. We tried, too, to remain objective while sympathizing with victims who bared their souls to tell of personal crises and continued pain through tears and sobs and, occasionally, people reaching out for compassionate hugs and, literally, a shoulder on which to cry.

Though the research team was entirely male, we worked hard to avoid any obvious gender bias in terms of those we talked with, our recording what they said, and our interpretation of their actions. We believe that gender is less a researcher's bias and more a cultural bias manifested in gender. We saw or heard few gender-based responses to recovery. Men and women did much the same, maintained the same roles and relationships; they did very little in the recovery process that would identify their conduct as particularly feminine or masculine in ways that are different under ordinary, day-to-day circumstances. No one we talked with found gender sufficiently compelling in the context of their disaster to bring it up.

Longitudinal Analysis is Essential

We have come to believe that developing longitudinal case studies of those who experience an externally-induced disaster is essential to developing a complete understanding the "recovery" process. There are two reasons. The first is that reestablishing viability takes a long time, but the length of time is highly variable. For

some organizations in some circumstances, it takes only weeks or months. For others, it takes the better part of a decade before viability is achieved or the organization disappears. The second reason is that the process of achieving viability for a small organization is extremely complex; it is much more than simply a business proposition. Typically, achieving organizational viability requires parallel attempts to reach emotional and psychological stasis at a level that permits the owner/operator to cope with both everyday and strategic challenges and choices. Often, this requires changes in the entrepreneur – changes in perceptions, comprehension, and response. To the extent that the disaster directly affected the owner/operator's home and family, the process is more complex and more difficult to complete successfully.

Our Inductive Approach Provided Unexpected Insights

The choice to employ both qualitative, inductive methods and statistical analysis resulted in creative tensions that we believe greatly benefited our efforts to develop an understanding of what happens when small organizations collide with natural disasters.

The research team is multi-disciplinary. It brings together analysts who employ significantly different methodologies in their research in business and disasters. One completed his doctoral dissertation assessing nonparametric statistical methods. Another employs discriminant analysis in business and finance. A third focuses on systems and policy analysis employing regression techniques. The fourth employs qualitative methods in understanding organizational communication and behavior. The interplay of the multiple perspectives, we believe, has been instrumental in helping us to gain insights that might have otherwise eluded us. We are, first and foremost, interested in addressing a significant concern: that of helping small organizations prepare for and survive significant jolts from their environments. We believe the application of multiple methodological perspectives has contributed greatly to our efforts.

SECTION 4: FINDINGS: VARIABLES ASSOCIATED WITH RUIN OR RECOVERY

APPROACH

We used open-ended interview techniques with more than a hundred people associated with small businesses and not-for-profit organizations in disaster sites all across the country. Our goal was to learn, from their perspective in their words, what happened to them during and after the event. We wanted to draw them out – get them to tell us what happened to them, what worked and what didn't, and about the journey they took from the event until we talked with them.

We applied qualitative analysis techniques to boil down the hundreds of interviews and the scores of cases to distill the primary factors that differentiate businesses that survive and are viable following natural hazard events from those that falter and fail. The themes we identified and the conclusions we drew from our qualitative analysis made it possible for us to define a dependent variable, recovery, and several explanatory (or independent) variables. We then employed various quantitative analyses to assess the extent to which our selection of explanatory variables was capable of differentiating survivors from those that did not.

CLUSTER ANALYSIS

Overview and Methodology

Cluster analysis (i.e., Q analysis or typology construction) is a multi variate technique that groups responses based on the characteristics they possess. Used in many disciplines, the technique seeks to classify using natural groupings of the data. It is primarily an exploratory technique with strong mathematical properties, but it lacks a statistical basis upon which inferences can be drawn. The standard requirements of parametric techniques, such as normality and homoscedasticity, are of little concern in cluster analysis. The clustering algorithm employed was the Quick Cluster method available on SPSS-PC+ software.

The method has three steps. First, *k* clusters are selected , where *k* is the number of clusters requested. Second, the values of the initial cluster centers are updated to derive the classification cluster centers. Cases are assigned to the nearest cluster as measured by the squared Euclidean distance. The centers migrate to observation concentrations as the assignment process evolves. Third, cases are reassigned as the algorithm updates the classification centers.

Cluster Exercise: Three Clusters Specified

Our interest in performing a clustering algorithm was purely exploratory. Do our variables, in the aggregate, allow us to identify how successfully businesses survive a natural disaster? We specified three clusters to see if our sample clustered into three groups similar to the three categories of SURVIVAL represented in our sample. The variables (defined earlier in Section 3.) used in the analysis were:

Customer Impact (C1)
Product Necessity (P1)
Industry Curve (I1)
Product Competition (P2)
Prior Stability (F1)
Asset Loss (F2)
Entrepreneurial Skill (E1)
Nature of Disaster (D1)

Table 4.1 presents a cross-tabulated summary of the cluster exercise. Forty-six of the 64 (72%) recovered businesses were assigned to cluster 2. The "undetermined" and failed businesses were clustered in relatively equal proportions between clusters 1 and 3.

Table 4.1 Cluster Classification Results, Three Clusters Specified

	Cluster 1	Cluster 2	Cluster 3	Total
Recovered	4	46	14	64
Undetermined	11	4	14	29
Failed	6	0	7	13
Totals	21	50	35	106

Chi-Square = 42.73
Significance = .0000

Cluster Exercise: Two Clusters Specified

We restrained our second clustering algorithm by dropping all businesses whose future is "Undetermined". We were thus left with only businesses that had clearly survived or failed as a consequence of the natural disaster (77 of the original 106 observations). The variables used in the analysis remained unchanged.

Table 4.2 Cluster Classification Results, Two Clusters Specified

	Cluster 1	Cluster 2	Totals
Recovered	56	8	64
Failed	1	12	13
Totals	57	20	77

Chi-Square = 31.763
Significance = .0000

Table 4.2 presents a cross-tabulated summary of the results of this exercise. Fifty-six of the 64 recovered businesses clustered in Cluster 1 (87.5%) while 12 of the 13 failed businesses clustered in Cluster 2 (92.3%). Overall, 88.3% of the cases joined unique clusters.

Differences Between Cluster Centers

Tables 4.3 and 4.4 summarize the ANOVA results for both the four-cluster and two-cluster specified models. In both cases, cluster means are significantly different for all variables except Nature of Disaster (D1). The two-cluster model more closely approximated the actual distribution of failed and recovered businesses.

Cluster 2, which primarily contains cases of failed businesses, has significantly higher means in seven of the eight variables examined. The only instance in which means were not significantly different was Nature of Disaster (D1). In other words, firms assigned to cluster 2 were more likely to be in circumstances in which customers were severely impacted by the disaster, there was high product competition, purchase of the product was easily deferred, the company was lagging the industry curve, there was poor prior stability, there were major asset losses, and management was not proactive.

(continued on next page)

Table 4.3 Significance Tests of Differences between Cluster Centers, Three-Cluster Solution

Variable	Cluster MS	DF	Error MS	DF	F Value	Significance
Customer Impact (C1)	1.7309	2	.5043	103	3.4323	.036
Product Competition (P1)	5.0720	2	.3119	103	16.2598	.000
Product Necessity (P2)	5.9273	2	.4272	103	13.8742	.000
Industry Curve (I1)	3.5527	2	.3052	103	11.6417	.000
Prior Stability (F1)	15.4994	2	.2245	103	69.0388	.000
Asset Loss (F2)	11.1420	2	.4465	103	24.9541	.000
Entrepreneurial Skill (E1)	9.6596	2	.3716	103	25.9942	.000
Nature of the Disaster (D1)	.0420	2	.1311	103	0.3202	.727

Table 4.4 Significance Tests of Differences between Cluster Centers, Two-Cluster Solution

Variable	Cluster MS	DF	Error MS	DF	F Value	Significance
Customer Impact (C1)	5.3299	1	.4640	75	11.4868	.001
Product Competition (P1)	8.8421	1	.3025	75	29.2265	.000
Product Necessity (P2)	5.3455	1	.3931	75	13.9532	.000
Industry Curve (I1)	2.5595	1	.2949	75	8.6800	.004
Prior Stability (F1)	2.6908	1	.4268	75	6.3044	.014
Asset Loss (F2)	13.1161	1	.4159	75	31.5335	.000
Entrepreneurial Skill (E1)	8.5239	1	.4266	75	19.9806	.000
Nature of the Disaster (D1)	.0496	1	.1251	75	0.3968	.531

DISCRIMINANT ANALYSIS

A Brief Overview

Discriminant analysis (or MDA) forms linear combinations of independent (i. e., predictor) variables as the basis for classifying cases into distinct and identifiable groups. A linear equation (or set of equations in a multifunction model) is derived that incorporates the influence of each predictor variable. The predicted numerical discriminant score determines group membership for each case from the derived equation. For example, a score less than 3.00 might result in a case being assigned to group 1, a score between 3.00

and 15.00 might result in a case being assigned to group 2, and a score greater than 15.00 might result in a case being assigned to group 3. Predicted membership is compared to actual group membership as a way of assessing the utility of the resulting model.

The grouping (dependent) variable in this case is RECOVERY and the relevant number of groups to be classified is three (Recovered, Undetermined, and Failed). The hope is that a model will be derived from the data that accurately predicts a business's recovery from a natural disaster (RECOVERY) as a function of the following variables:

C1 Impact of Disaster on Customer Base
P1 Product Competition
P2 Product Necessity
I1 Location on Industry Curve
F1 Prior Stability
F2 Asset Losses
E1 Entrepreneurial Skill
D1 Impact of the Disaster on the Community

A discriminant model generally contains *k-1* functions with *k* representing the number of categories in the dependent or grouping variable. A comprehensive model would thus contain the following elements per function:

$$D_{Recovery} = \hat{a}_0 + \hat{a}_{C1}C1 + \hat{a}_{P1}P1 + \hat{a}_{P2}P2 + \hat{a}_{I1}I1 + \hat{a}_{F1}F1 + \hat{a}_{F2}F2 + \hat{a}_{E1}E1 + \hat{a}_{D1}D1$$

Where,
$D_{Recovery}$ = discriminant score (predicts group membership based on the values of C1, P1, etc.),
$\hat{a}_{C1}$ to $\hat{a}_{D1}$ = coefficients for C1 to E1 estimated from the data, and
$\hat{a}_0$ = the intercept

Summary results and analysis are discussed in the following section.

Discriminant Results and Analysis: the Trial Run

Table 4.5 presents the results of the univariate F-ratio and Wilks' lambda calculations. The univariate F-ratio tests for the equality of group means for each independent (predictor) variable. In other words, we are seeking to learn if the average values of each variable are the same across each category of RECOVERY. One or more affirmatives suggest that discriminant analysis will not produce a satisfactory model because there is a basis lacking for statistically significant discrimination.

The F values and their associated significance (p-values) are essentially one-way ANOVAs with RECOVERY as the grouping variable. The null and alternate hypotheses, using standard notation, are:

H_0: ö$_{Group\ 1}$ = ö$_{Group\ 2}$ = ö$_{Group\ 3}$
H_a: not all means are equal

The p-value is the minimum significance level required to reject the null hypothesis. Thus, the lower the p-value the better the results (assuming one wants to reject the null hypothesis). Note that the means are significantly different across groups for seven variables at the á = .10 level. Indeed, six of the eight variables have significantly different means at the á = .01 level.

Variable D1 means (Scale of the disaster) are not significantly different across categories. This was primarily due to lack of responses for one on the variable's categories. D1 was consequently dropped from subsequent analyses.

Table 4.5 Wilks' Lambda and Univariate F Test Results

Variable	Wilks' lambda	F Statistic	Significance
C1 Customer Impact	.95307	2.5360	.0841
P1 Product Competition	.90029	5.7040	.0045
P2 Product Necessity	.90753	5.2470	.0068
I1 Industry Curve	.71081	20.9500	.0000
F1 Prior Stability	.68038	24.1900	.0000
F2 Asset Losses	.82800	10.7000	.0001
E1 Entrepreneurial Skill	.64054	28.9000	.0000
D1 Extent of Damage to Community	.99364	.3296	.7199

Table 4.5 also displays Wilks' lambda for each independent variable (also called the U statistic). This statistic is found by dividing the within-groups sum of squares into the total sum of squares. The closer the U statistic is to 1, the closer the group means are. Thus, E1, F1, and I1 means differ most by RECOVERY grouping (lambdas of .64054, .68038, and .71081 respectively).

The grouping variable RECOVERY has three categories (k = 3). The discriminant analysis procedure calculates two functions (k–1). The first derived function has the largest ratio of between-groups to within-groups sums of squares. The uncorrelated second function has the next largest ratio. The Wilks' lambda associated with Function 2 after Function 1 is removed was .9039 with a significance level of .1858. This indicates that Function 2 does not contribute substantially to RECOVERY group differences. This first foray resulted in a two-function discriminant model that accurately predicted membership in 79.25% of the cases. However, the empirical model was recalculated with the specification that only one function be extracted. In this case, the option also allows the resulting model to be more easily interpreted without significant loss of predictive power.

Discriminant Results and Analysis: D1 Dropped from Model and One Function Specified

The procedure was repeated with commands to drop variable D1 and to extract only one function. Table 4.6 summarizes the resulting discriminant function coefficients.

Table 4.6 Discriminant Coefficients from the Second Run

Variable	Unstandardized Coefficients
C1 Customer Impact	.2278878
P1 Product Competition	.0270729
P2 Product Necessity	.7194168
I1 Industry Curve	.7551319
F1 Prior Stability	.5048526
F2 Asset Losses	.7111702
E1 Entrepreneurial Skill	1.1283480
Â0 (constant)	-7.6106260

Application of the derived equation is straightforward. Let us use the first case from the database to demonstrate how it is done. One simply takes the observed value for each variable and plugs the data into the equation, as shown below.

Case number 1 received a score of 1.484439. Each of the other 105 cases also received individual scores. The size of each of the coefficients tells us the relative importance of each variable as a discriminator (the variables are all measured on a 3-point scale). For example, entrepreneurial skill has the largest coefficient. The owners and managers of ten of the twelve failed organizations in the case studies received scores of -1 for entrepreneurial proactiveness following the natural disaster event.

The results of the classification exercise are summarized in Table 4.6. To illustrate, recovery was predicted for 87.5% of the firms that actually recovered. Failure was predicted for 84.6% of the firms that actually failed. Overall, the model successfully predicted group membership in 83.02% of the cases.

The average discriminant score for firms in each of the three categories is also displayed (group centroids) in Table 4.8. The group centroids are used, in turn in the final task of developing optimum critical Z values or optimum cutting scores. The resulting values allow the researcher to predict which outcome will occur for a firm given the attained discriminant score. In our case, the optimum cutting scores are midway between the group centroids. The decision rules can be summarized as follows for this particular exercise:

Table 4.7 Discriminant Scoring Example

(1) Variable	(2) Coefficients	(3) Data from case 1	(4) Coefficient x Value (2) x (3)
C1 Customer Impact	.2278878	3	.6836634
P1 Product Competition	.0270729	2	.0541458
P2 Product Necessity	.7194168	3	2.1582504
I1 Industry Curve	.7551319	2	1.5102638
F1 Prior Stability	.5048526	2	1.0097052
F2 Asset Losses	.7111702	2	1.4223404
E1 Entrepreneurial Skill	1.1283480	2	2.2566960
Â0 (constant)	-7.6106260	NA	-7.6106260

Discriminant Score = 1.484439
(sum of column 4)

Table 4.8 Confusion Matrix

		Predicted Group Membership		
Actual Group	**Number of Cases**	Recovered	Undetermined	Failed
Recovered	64	56 87.5%	8 12.5%	0 0%
Hanging On	29	3 10.3%	21 72.4%	5 17.2%
Business Failed	13	0 0%	2 15.4%	11 84.6%
Average Score Of Group Member (Group Centroids)		-1.05776	1.21948	2.48707

Percent of Grouped Cases Correctly Classified = 83.02%

Z Score	Predicted Outcome
< .08	Business will recover
.09 to 1.85	Business will probably hang on
> 1.85	Business will fail

Discriminant Results and Analysis: the Third Run (Holdout Sample Included)

A major problem with discriminant analysis is that it is good at explaining the past, but often poor at predicting the future. This certainly is not unique to discriminant analysis. It is fairly easy to develop a robust model using historical data. However, it is very difficult to determine whether the model will actually be of any use in the real world (ask political scientists who use discriminant analysis to predict election outcomes). One solution is to run the discriminant procedure on only a portion of the data and to then test the resulting model's accuracy on the remaining unexamined cases. We arbitrarily re-ran

discriminant on the first 80 cases and left the remaining 26 cases as our holdout sample. The results are summarized in Tables 5 through 8 with a brief discussion following.

Table 4.9 Wilks' Lambda and Univariate F Test Results

Variable	Wilks' lambda	F Statistic	Significance
C1 Customer Impact	.89568	4.4840	.0144
P1 Product Competition	.95886	1.6520	.1984
P2 Product Necessity	.92528	3.1090	.0503
I1 Industry Curve	.75233	12.6700	.0000
F1 Prior Stability	.69633	16.7900	.0000
F2 Asset Losses	.81785	8.5740	.0004
E1 Entrepreneurial Skill	.71656	15.2300	.0000

Table 4.10 Discriminant Coefficients From The Third Run

Variable	Unstandardized Coefficients
C1 Customer Impact	.3377174
P1 Product Competition	-.2717496
P2 Product Necessity	.7914472
I1 Industry Curve	.8273964
F1 Prior Stability	.5012970
F2 Asset Losses	.7227674
E1 Entrepreneurial Skill	1.0511170
Â0 (constant)	-7.1738330

Table 4.11 Confusion Matrix for Cases Selected for Use in Analysis

		Predicted Group Membership		
Actual Group	**Number of Cases**	**Recovered**	**Undetermined**	**Failed**
Recovered	52	44 84.6%	8 15.4%	0 0%
Undetermined	19	3 15.8%	10 52.6%	6 31.6%
Business Failed	9	0 0%	1 11.1%	8 88.9%
Average Score Of Group Member (Group Centroids)		-.89417	1.24885	2.52983

Percent of Grouped Cases Correctly Classified = 77.50%

The classification success rate was 77.5 percent. Classification was weakest for the "in between" group (Undetermined). The group centroids moved slightly with the following changes to the decision rules:

Z Score	Predicted Outcome
< .18	Business will recover
.18 to 1.89	Business may recover
> 1.89	Business will fail

Table 4.12 Confusion Matrix for Holdout Cases

		Predicted Group Membership		
Actual Group	Number of Cases	Recovered	Undetermined	Failed
Recovered	12	10 83.3%	2 16.7%	0 0%
Hanging On	10	0 0%	8 80.0%	2 20.0%
Business Failed	4	0 0%	1 25.0%	3 75.0%

Percent of Grouped Cases Correctly Classified = 80.77%

Table 4.12 shows the results of applying the discriminant function to the 26 holdout cases. The results for the holdout sample were quite impressive. The model correctly classified 80.77% of the observations (21 of 26).

Discriminant Results and Analysis Using Dummy Variables: The Fourth Run (Holdout Sample)

Our data is interval at best and categorical (non-metric) at worst. Most statisticians believe that only metric data is should be used for independent variables in discriminant analysis. One way to address this problem is to create indicator or dummy variables via data transformation. Our categorical independent variables were transformed into dummy variables in the following way (using Variable C1 as an example).

Old Variable	New Variable
C1 (Customer Impact)	If C1 = 1, C1dummy1 = 0 and C1dummy 2 = 1. If C1 = 2, C1dummy1 = 1 and C1dummy 2 = 0. If C1 = 3, C1dummy1 = 0 and C1dummy 2 = 0.

This technique has been applied widely in analysis with data similar to ours. The key difficulty is that the results become harder to interpret and the intercept grows in importance. For example, if we coded all variables with an initial value of three, in the manner shown above, the intercept would become the predicted Z value for that particular

case. This is because all of the other variables in the equation would have a value of 0. The confusion matrix from this portion of the analysis is presented below.

The classification success rate was an overall rate of 85.00%. Classification was once again weakest for the "in between" group (Recovery is Undetermined). The group centroids changed considerably because of the dummy coding.

Table 4.13 Confusion Matrix for Cases Selected for Use in Analysis (Dummy Variables Employed)

		Predicted Group Membership		
Actual Group	**Number of Cases**	**Recovered**	**Undetermined**	**Failed**
Recovered	52	46 88.5%	5 9.6%	1 1.9%
Hanging On	19	2 10.5%	14 73.7%	3 15.8%
Business Failed	9	0 0%	1 11.1%	8 88.9%
Average Score Of Group Member (Group Centroids)		1.17738	-1.31709	-2.85819

Percent of Grouped Cases Correctly Classified = 85.00%

Z Score	Predicted Outcome
> -.0698	Business will recover
-.0698 to -2.09	Business will probably hang on
< -2.09	Business will fail

The results for the holdout sample of 26 cases were again impressive. The model correctly classified 76.92% of the observations (20 of 26).

Table 4.14 Confusion Matrix for Holdout Cases (Dummy Variables Employed)

		Predicted Group Membership		
Actual Group	**Number of Cases**	**Recovered**	**Undetermined**	**Failed**
Recovered	12	11 91.7%	1 8.3%	0 0%
Hanging On	10	2 20.0%	6 60.0%	2 20.0%
Business Failed	4	0 0%	1 25.0%	3 75.0%

Percent of Grouped Cases Correctly Classified = 76.92%

Summary of Discriminant Results

All of the models had strong explanatory and predictive powers. In the various tests, the models were able to correctly predict the outcome for at least three-fourths of the businesses and, in some tests, correctly predicted the outcome for nearly nine of ten small organizations in the sample.

We learned that the amount of damage to the community is not a significant factor in whether an individual business or not-for-profit organization "recovers," at least within the range of disasters we investigated. We learned, too, the extent to which the organization's customer base was adversely affected – either by suffering losses or by moving to another supplier – was statistically significant, but only at the .10 level of confidence. All other variables we included in the model were significant at the .01 level of confidence or better.

The most significant factor in whether the organization survived, either in approximately its original form or in a new form, was entrepreneurial skill in adapting to new circumstances. The new incarnations of the organization included, for example, reopening in a new location, modifying the product line of goods or services, or passing ownership of the business to the owner's offspring.

The extent to which the organization was in competition for customers and clients was significantly related to survival; organizations with less competition did better. Organizations whose products or services were deemed essential and acquisition could not be deferred did better than those whose products were not. Organizations that lagged behind industry curves in location, product mix, and marketing did not fare well following disasters. Organizations that were financially stable and profitable before the event survived more often, other things being equal, than those that were marginal. Finally, as one might expect, firms that suffered large losses from the event were much less likely to survive.

CORRELATION AND REGRESSION ANALYSIS

Given that our data are arguably non-metric, most statisticians would be reluctant to apply correlation and regression analysis to them. We have chosen, however, to apply the techniques in our efforts to "triangulate" our findings. Since we are not relying exclusively on the correlation and regression models and since there is evidence that one can stretch the assumptions underlying data in ordinary least squares applications without appreciably invalidating the results, we have chosen to use this powerful tool to help us gain further insight into the phenomena at hand.

Correlation Analysis

Table 4.15, below, summarizes the results of correlation analysis. Seven of the eight variables (all except D1, the scale of the disaster) are positively correlated with the

dependent variable, RECOVERY (Survival). P1 (Product Competition), P2 (Product Necessity), I1 (Industry Curve), F1 (Prior Stability), F2 (Asset Loss), and E1 (Entrepreneurial Skill) are all positively correlated at or above the a = .01 level. In fact, the lowest p-value among the variables is .003.

Forced Entry Regression: All Variables

The purpose of this portion of the analysis was to employ a regression model that jointly employed all eight independent variables as predictors of RECOVERY (i.e., survival). The resulting R^2 was .644 and adjusted R^2 was .615. In other words, 61.5 percent of the variation in RECOVERY (survival) can be explained by variation in the independent variables. Table 4.16 presents the model parameters and t-test results.

Table 4.15 Correlation Analysis of Explanatory Variables with Recovery

	Pearson Correlation	Significance(two-	N
Recovery	1.000	–	106
Customer Impact	.153	.117	106
Product Competition	.301(**)	.002	106
Product Necessity	.290(**)	.003	106
Industry Curve	.503(**)	.000	106
Prior Stability	.544(**)	.000	106
Asset Loss	.415(**)	.000	106
Entrepreneurial Skill	.598(**)	.000	106

** Correlation is significant at the 0.01 level (2-tailed).

(continued on next page)

Table 4.16 Model 1. All Variables Entered Into Regression.

Dependent Variable: Recovery
Independent Variables entered: Nature of Disaster, Asset Loss, Product Necessity, Entrepreneurial Skill, Product Competition, Industry Curve, Customer Impact, and Prior Stability.

Model 1 Summary of ANOVA Results
R = .803 R^2 = .644 Adjusted R^2 = .615 Std. Error of the Estimate = .4387
df (total) = 105 F = 21.950 Significance = .000

Model 1 Coefficients

Model 1	Unstandardized Coefficients		Standardized		
	B	Std. Error	Beta	t	Significance
Constant	-.834	.347		-.2405	.018
Customer Impact	.134	.070	.138	1.910	.059
Product Competition	-.000849	.076	-.008	-.112	.911
Product Necessity	.235	.082	.242	3.776	.000
Industry Curve	.241	.084	.207	2.888	.005
Prior Stability	.154	.074	.157	2.090	.039
Asset Loss	.246	.058	.280	4.362	.000
Entrepreneurial skill	.393	.070	.412	5.586	.000
Scale of Disaster	-.122.	.139	-.082	-.883	.380

The overall model was very strong with an F statistic of 21.950 with an associated p-value of .000. Thus, we have a robust model at nearly any chosen level of significance.

Table 4.16 also shows the individual regression coefficients (use the unstandardized) and t-tests for each independent variable. The t-test, in this case, essentially is a way to see if each variable contributes in a meaningful way to the overall model. Using a significance level of a = .10, we can say that Product Competition (P1) and Nature of Disaster (D1) are the only two variables that fail to contribute to the model at the .10 level. If we had selected a significance level of .05, we also would have questioned the merit of Customer Impact (C1).

Forced Entry Regression Employing a Single Summed Variable

This model employed a variable that was the sum of the original eight independent variables as a predictor of RECOVERY (i.e., survival). The resulting R^2 was .539 and

adjusted R^2 was .535. In other words, 53.5% of the variation in RECOVERY (survival) can be explained by the variation in the independent variable.

Table 4.17 shows ANOVA results and the individual regression coefficients and t-tests for the summing variable. The t-test, in the case of simple OLS (ordinary least squares) regression, is identical to the F-test in the ANOVA table. The summing variable is a significant predictor of RECOVERY (survival).

Conclusions From Correlation and Regression Analyses

The correlation and regression analyses reinforce the finding from the discriminant analysis. In Model 1, the more elaborate model, we are able to explain 62 percent of the variance in organizational survival following a natural hazard event. The overall model is significant

Table 4.17 Model 2. Recovery as a Function of the Sum of All Independent Variables.

Dependent Variable: Recovery
Independent Variables entered: the sum of the scores of Nature of Disaster, Asset Loss, Product Necessity, Entrepreneurial Skill, Product Competition, Industry Curve, Customer Impact, and Prior Stability.

Model 2 Summary of ANOVA Results
R = .734803 R^2 = .539 Adjusted R^2 = .535 Std. Error of the Estimate = .4822
df (total) = 105 F = 121.610 Significance = .000

Model 2 Coefficients

Model 2	**Unstandardized Coefficients**		**Standardized Coefficients**		
	B	**Std. Error**	**Beta**	**t**	**Significance**
Constant	-1.513	.279		-5.426	.000
Sum of All Variables	.193	.018	.734	11.028	.000

given the p-value of .000. Indeed, simply summing all of the explanatory variables (each of which is scored as -1, 0, or +1) and using that as the explanatory variable generates a robust predictive model. In that formulation, we are able to explain 54 percent of the variance, using a rigorous measure of correlation, and obtain statistical significance at the .000 level of confidence.

We conclude from these analyses that the variables we concluded were critically important from our qualitative analysis are confirmed as critically important by the quantitative analysis. In the natural sciences, one would look for adjusted R^2 scores

substantially higher than those achieved in these tests. In the social sciences, however, the adjusted R^2 score and the level of statistical significance are extremely impressive.

ASSESSMENT OF WHAT WE LEARNED FROM THE ANALYSIS

No single approach to research yet devised is able to provide a complete understanding of the phenomenon under study. We chose to use both qualitative and quantitative methods because we expected that each would help us understand the phenomenon of natural hazard survival and recovery more thoroughly and that, together, they would help us triangulate our conclusions. We believe that has, indeed, been the case. The cluster, discriminant and regression analyses provided confirmation of our qualitative conclusions about the important variables that distinguish between those organizations that survive and those who do not.

The quantitative analysis contributed some important insights to our understanding. First, we were surprised that the variable that described the effects of the natural hazard event on the organization's customers was not identified in either the discriminant analysis or the regression analysis as critically important. Our qualitative research demonstrated clearly that what happens to an organization's customers or clientele is very important to the survival of individual organizations, even though it did not show up as particularly important in the statistical analyses. We think this is a consequence of how we initially understood the variable and subsequently coded it. Despite evidence from Northridge to the contrary, we focused on looking at direct losses to customers. We came to understand that three different things that happen to customers and that customers do have serious adverse impacts on organizations. Organizations have a better chance of failing when customers experience direct damage and have little or no discretionary income, they find other suppliers while the organization was closed and do not come back when the organization is back in business, or they move away. We should have coded the variable so that it reflected any of the three occurred, causing a loss of customers. We are confident that doing so would have increased the statistical significance of customer impact on business survival.

Second, we confirmed the importance of the role of the owner/operator in organizational survival. In retrospect, it may have been prudent for us to have developed our statistical models without the entrepreneurial response variable. That may have enabled us to better isolate the effects of events outside the entrepreneur's control (customer effects, product competition) and those that measured the state of the organization before the disaster event (position on the industry curve, organizational stability before the event, and the extent to which assets were lost in the event). That, in turn, may have enabled us to get a better quantitative fix on their relative importance.

SECTION 5: FINDINGS: RECURRING THEMES

Throughout the disaster-stricken communities we visited across the country, business owners and managers of not-for-profit organizations told us their stories. From their stories, we identified recurrent themes across kinds of communities, kinds of disasters, and kinds of organizations. These themes give insight to the problems associated with survival and recovery.

THEME 1: THE ILLUSION OF SECURITY

A recurring theme among almost all the owners and managers we interviewed was their general lack of concern about suffering losses from a natural hazard event right up to the time that it changed their lives unalterably. For the most part, our respondents believed "this could never happen to me." Most of those who suffered losses to earthquake, hurricane, or tornado appear to have thought that the chances of their being a victim were extremely remote – sufficiently remote that they could largely ignore the phenomenon or simply buy insurance to deal with losses should the event ever occur.

Those who were flooded out had tended to put their faith in technical fixes. Too often to count, we heard respondents tell us "there used to be floods here, but the Corps of Engineers built a levee and made it safe." Consequently, our respondents happily built homes and businesses in flood plains, ignoring the fact that, somewhere, levees fail essentially every year, flooding other hapless souls. And they ignored, as did the Corps, the fact that floods sometimes come from overland or from a different direction than the main river channel.

Organizations fail to take precautions against natural hazards for four basic reasons. First, they do not take precautions when the organizational decision makers do not perceive that a risk exists. This happens when the decision makers do not perceive that the hazardous event is likely to occur, or that their firm is not exposed to the event, or that, if exposed, they are not vulnerable to loss from the event.

Second, if decision makers are aware that the organization is at risk, they may believe there is nothing they can do about it. The decision makers may not know of precautions that can be taken to reduce exposure or vulnerability of organizational assets. Sometimes, the inventory of ways to protect oneself is small. For example, it took a long time to come up with relatively inexpensive ways to strengthen existing unreinforced masonry buildings against even moderate earthquakes. In addition, decision makers are sometimes fatalistic. "When your number is up, there's nothing you can do about it." Or, they may have a reduced sense of personal or organizational efficacy; "I suppose we could try to find some way to take precautions, but I don't think it would work out."

Third, it is possible that the organization's decision makers know the risk and understand there are means to reduce the risk, but choose not to take precautions at this

time. This could happen for any number of reasons. The organization may have higher priorities; the next dollar earned may have to go to pay the electric bill. The probability of going out of business because the electricity is shut off is much higher than the probability of being struck by a hurricane this year, so the electric bill gets paid and the organization defers building a secure structure in a secure location.

Finally, organizational decision makers may understand the risk, know how to reduce risk, and want to take action, but find themselves blocked in doing so. We sent one of our staff members in to visit an insurance agent in Northridge, posing as a would-be restaurateur. He asked the agent about earthquake insurance. The agent laughed, telling him it simply wasn't available. Property and casualty insurance firms, bitten badly from earthquakes and hurricanes have reconsidered rates and availability (often in conflict with state insurance regulators), so organizations, in some places, have difficulty getting the coverage they want. In other cases, the organization may not have the time or the technical capacity to reduce risks at this time. The agenda may be full. In these cases, risk reduction is deferred.

Small business owners and small not-for-profit organizations are often accustomed to life on the edge of security. They typically have a small financial flywheel to keep them going should the cash flow stop. For every dollar that comes in, there are several high priority claims made on it. No wonder it is often easier for the operator of a small organization to prefer to assume the organization is secure from the effects of natural hazards. In the pages that follow, we discuss some of the more commonly encountered reasons we encountered for the illusion of security.

"I Thought I Was Covered"

"The insurance agent said, 'I won't sell it (flood insurance) to you. You don't need it.' I believed him. Right! See that line near the ceiling. That's where the water crested."

"I told him I wanted the same coverage that I had with the other carrier. He told me I had exactly the same coverage. In fact, he had dropped earthquake insurance portion so he could come in at a lower premium and he never told me."

"The agent sold us the wrong kind of policy. As a consequence, none of our buildings were covered. We paid premiums all those years and got nothing. Never buy insurance from somebody who doesn't know what they are doing."

"They told me I couldn't buy flood insurance because I wasn't in the 100-year flood plain, so here I am. No building, no inventory, and out of business."

"I was fully covered, but the insurance company defaulted after the hurricane. I got a dime on the dollar."

"The insurance adjuster said that the green houses were not buildings, so they weren't covered! We paid premiums all these years because the agent said we were fully

covered. He either lied or was stupid, but we ended up being the victims. We've lost our business."

"I thought I had everything taken care of, but they said only my building was covered. I got nothing for the contents. Then they depreciated my building besides. People who didn't have flood insurance were far better off. They got bought out at full value and were eligible for other aid programs. What a rip-off!"

Sometimes, the insurance agent is the agent of disaster. The litany of complaints against insurance agents, insurance adjusters, insurance companies, and the National Flood Insurance Program is almost endless. In some cases, the complaints listed above have been paraphrased, but they reflect fairly the sentiments of dozens of business owners from across the country who were trying to recover from the effects of natural hazard events. This section reports what we learned from our respondents concerning insurance, business survival, and business recovery.

Sometimes Coverage is Not Really Coverage. Property and casualty insurance coverage varied dramatically by type of disaster. Almost every respondent in areas suffering a tornado or hurricane was covered by insurance. Far fewer than half the flood victims we interviewed were covered, to any extent, by flood insurance. Of those respondents in the hundred-year flood plain, significantly more had coverage; none of those we interviewed in the 500-year flood plain were insured. Only about 10 percent of our business respondents in the Northridge area were insured against earthquakes.

Adequate Insurance Protected Equity and An Array of Options. Those respondents that were adequately covered by insurance typically recovered their equity and had choices about what to in terms of their business following the event. Proper insurance coverage will usually enable the business owner to recover his or her equity in the business following the natural hazard event, including the costs of lost inventory. On the other hand, proper coverage with a solvent firm does not ensure that one can go back into business or that the business will be successful if one does reopen. It will, however, provide the owner with options. He or she may choose to reopen in the same business in the same location, open the same business in a new location, go into a different business, or retire from business and move on. Those who did not have insurance or who had inadequate insurance coverage had fewer options with significantly more downside consequences.

Insurance Did Not Always Work Out. In some cases, property and casualty insurance adjusters and companies were generous, affording the insured a windfall. That was not always the case. More often, business owners reported that they thought they were insured against the peril they experienced than were actually covered. But, even those who did have insurance sometimes found that it did not work as expected. In Florida, a respondent who believed herself to be fully covered against hurricane losses, lost her business and her equity. She reported to us that her insurance company failed. She ultimately got a small settlement from the State, but it was nowhere near enough to cover her losses or the amount for which she was insured.

Other respondents found themselves at odds with their insurers. In some instances, negotiations dragged on and on, with settlements not occurring until two or more years after the disaster. A few cases resulted in litigation. Some respondents, feeling as though they were fighting a losing battle, settled for much less than they thought they should get.

Those Without Insurance Faced Tough Choices. Those who did not hold insurance policies or who learned, subsequently, that they were not covered, were faced with difficult choices. Once their equity was gone, the small business person had the choice of taking the loss and walking away or attempting to recover the lost assets by reopening the business. Most chose not to take the initial loss, but, instead, to try to reestablish their business and to recover their equity. For many of these people, their entire savings and their expected retirement was wrapped up in the business; if they did not try to get the business up and profitable, they would be unable to retire as they had expected.

Some of those who decided to work to reestablish their business chose to use all or most of their life savings to repair their space and equipment or to acquire new space in which to operate the business and to buy inventory. Usually, this was to no avail. One man, call him Harry, owned and operated a fresh fish store. The hazard event destroyed his refrigerators, freezers, and inventory. He used all his savings to replace the equipment and the inventory and to reopen his shop. Unfortunately, the lion's share of his customers moved away. His gross sales dropped and never recovered. Harry felt compelled to comply with the terms of his lease. Three years passed during which he lost money almost every day. When the lease terminated, he locked the doors. At age 65, he and his wife took jobs in the service sector at near minimum wages. "With that and social security, we can probably get by," he told us.

Another retailer whose business had been quite profitable suffered a similar fate. He lost his place of business and approximately $500,000 in inventory. His agent told him he didn't need flood coverage. By the time he re-established a place to do business and bought inventory, he had used essentially all his savings and had to take out a sizable loan. At age 65, he was starting over and, after 18 months, his business was still not breaking even.

A third respondent lost most of her inventory and had significant damage to her place of business. She, too, drew heavily on savings to re-establish inventory, but her sales are far below what they used to be. In her seventies, she sits in the store, waiting for customers who are few and far between. She cannot quit, she reasons, "Everything I have is in this store and the inventory."

These stories are typical of small business persons, especially older ones, who suffer the effects of a natural disaster without insurance and who choose to put their savings back into the business without first assessing whether a market still exists for their goods or services.

Some business people who did not have insurance chose to borrow money. Firms with exceptional credit and considerable assets often do not qualify for Small Business

Administration (SBA) disaster loans and are referred to conventional lenders if they want to borrow money. Those who do qualify, but who do not obtain SBA loans find that they must use their homes and other personal assets as collateral. SBA loans are typically based on the firm's pre-event business experience. SBA does not require a reassessment of what the market might be. Consequently, if the small business finds itself in a new business environment within which it is not viable, then the individual entrepreneur faces loss of all his or her assets up to the value of the loan.

Fraud, Abuse, and Questionable Practices. We found very little insurance fraud among disaster victims. One carpet dealer claimed that looters made off with some of his carpet rolls shortly after the disaster event. In the same interview, he told us that all his carpet rolls had been soaked by water and ruined. We found it difficult to believe that looters had made off with rolls of wet carpet weighing many hundreds of pounds. Another retailer, one who was insured, told us that the event wasn't all bad news. "It destroyed all of the items that I've been unable to sell over the years," he told us. "All of them?" we asked. "Every single, solitary unsalable piece," he smiled.

It is difficult to know the extent to which insurance agents engaged in sleazy practices, were ignorant of basic concepts in business risk management, or simply did not know their products very well. Disaster victims, like the rest of us, have selective recall. It is perhaps easier to blame an absent insurance agent that it is to recall that one chose not to have a certain coverage or deferred obtaining coverage. Who can say?

"They Built this Levee; We Were Safe"

Floods, Levees, and Misplaced Confidence in the Technological Fix. Despite endless evidence to the contrary, Americans maintain a steadfast belief in the technological fix and in the advice of experts who have a stake in their proposed solutions to floods. As a consequence, once the Army Corps of Engineers builds a levee against the hundred-year flood or a flood control dam, people put highly vulnerable buildings, equipment, and inventory into extremely hazardous locations with no thought to the fact that, every year, a dam fails somewhere and a levee is overtopped or fails.

In our investigations into more than half a dozen communities that experienced floods in the past five years, almost everyone we talked with who was flooded out maintained that they had felt absolutely safe from floods. "They told us it couldn't happen here." "They built this levee and told us we were safe." "This river was under control!"

What many people do not understand is that 100 year flood maps are notoriously and almost invariably erroneous. The flood plain changes whenever someone adds a building or a parking lot in it, when people upstream cut trees or fail to provide buffer strips, when the river changes course, and because the designation of what constitutes a hundred year flood changes through time.

They also seem to think that levees and dams are always placed in the correct location to protect them from all floods. Along the Red River of the North, people now

know better. Breckenridge was flooded because heavy rain and rapid melting of the snow pack came down from higher ground toward the town, not from the river, but sheeting across the land surface, flooding the community as surely as if the water had risen from the river.

A similar phenomenon occurred along the Tar River, when small tributary streams to the Tar flooded, washed out earthen pond dams on farms along the small creeks and, then, the water sheeted overland into the towns and only later rose up from the Tar itself. And in Montezuma, Georgia, water sheeted in overland only to be trapped on the supposedly dry side of the levee, inundating the town's entire central business district and remaining there, trapped in the bowl, for days.

This Building Has Stood Here for Fifty Years; Security Lodged in Ignorance. In Northridge, as elsewhere, small businesses and not-for-profit organizations, short on resources, often occupy older buildings. These buildings rarely meet contemporary standards for seismic protection. Some have essentially no seismic design features. Others are designed to a level once thought to be relatively safe, but now considered unsafe and subject to extensive damage during some kinds of ground motion that can be expected from earthquakes. Some buildings, obviously, are much more subject to failure than others.

Because small businesses often occupy buildings not built to contemporary standards, their owners, employees, and inventory are typically at significant risk from building failure during earthquakes.

It turns out, however, that older buildings remain intact throughout California, despite frequent earthquakes. How can this be? Older buildings remain standing for several reasons. First, earthquake forces in California occur in many locations that are geological somewhat isolated from other areas within the state or even the same community. That occurs because California's geology (scraped off the bottom of the sea as it is) contains many fracture lines and the soil is generally dry. Those factors work to attenuate earthquake forces. In the Midwest, however, earthquake forces encounter far fewer fracture lines and travel through moister soil, and thus travel further with less attenuation.

Further, since the Northridge earthquake, seismologists have learned that geological shapes below the surface of the earth focus and redirect earthquake energy, creating greater damage in one area and less in another that may be only a few blocks away. Santa Monica, for example, took more damage than areas closer to the Northridge epicenter.

Still, we heard people say "this building has stood here for fifty years. It withstood the Sylmar quake in '72 . . ." Each of these people has a sense of security lodged in ignorance. Either the risk has not been communicated effectively to these people, or they are rationalizing their situation by understating to themselves the risk they are taking. Perhaps they cannot afford better, or they may be willing to take their chances, hoping that

a devastating earthquake will not strike in sufficiently close proximity to their buildings to kill or injure them or their workers and damage or destroy their inventory.

Reliance on Expert Opinion. We have been conditioned from childhood to rely on expert opinion. Experts, by definition, know more about the phenomenon and have better information. We might be able to get that information, but it would take time and resources to get it. But even experts can be wrong. Consequently, when experts give faulty information, it often has serious consequences.

In the case of the flooded communities we visited, levees did not protect against the floods. All along the Red River of the North, people told us that NOAA (National Oceanic and Atmospheric Administration) and the Army Corps of Engineers said the river would crest below the levees, right up until the morning the flood overtopped the levees. Consequently, few of our respondents bothered to take extra precautions, like moving inventory. Today, however, people up and down the river are convinced that both NOAA and the Corps knew better, but lied to them. "They said it would crest at 26 feet, but they knew better." The allegations are difficult to believe, since there was arguably no benefit to NOAA by understating the level of the flood waters.

In the communities flooded out by the Flint and Tar Rivers, the flood came from an unanticipated direction. Everyone was focused on watching the water rise in the river, but they got blind-sided and suffered the consequences. They had been conditioned, by the technological fix, to focus on the river as the only source of danger.

In Florida, shoddy construction practices and inadequate code enforcement exacerbated the losses to Hurricane Andrew.

In the case of earthquakes, structural engineers and others in the design professions have fared quite well. In other countries, thousands die from an earthquake that, in California, would kill only a handful of people. But even the best are sometimes surprised. Welded steel buildings were thought to be secure against moderate earthquakes like the one that occurred in Northridge. Apparently, they were not. While none of the welded steel buildings suffered collapse and no one died in any of them, welded joints failed in some unknown number of buildings. The cost of repairing the cracks in these joints is extremely high because they are behind plaster walls and ceilings and one cannot tell whether a joint failed without testing it individually. The failure of welded steel joints surprised everyone and is the subject of extensive research and analysis to learn why and to keep it from happening again.

"How Can You Have a Hundred Year Flood Every Three Years?"

Overall, natural hazards experts and emergency managers are not particularly good at communicating information about the risks associated with natural hazards, at least in terms of how often they might occur and what one might protect against.

One reason is that experts sometimes choose to use language to describe a phenomenon that is misleading. One such term is "the hundred-year flood." Business owners voiced their exasperation, "How can we have another 100-year flood? We just had one." It is time to use different terms. We should tell people in flood prone areas that there is one chance in one hundred of an event of this size this year. And, if you had one this year, the chance of having one next year is even higher–maybe four or five out of a hundred.

One reason for the inadequate communication is that the experts are learning more. Scientists' improved understanding of El Niño and Las Niña effects provides increased understanding of the likely effects on weather patterns, rainfall, and flooding.

It isn't only flooding where people have mistaken beliefs in the frequency of natural hazard events. "We had our earthquake just 25 years ago, where did this one come from?" Even in seismically active areas, relatively few people apparently understand earthquake phenomena at even basic levels. This is, unfortunately, underscored in Seattle following the recent Nisqually earthquake there. Some Seattle locals, including the mayor, are feeling comforted by the fact that the Nisqually and Northridge earthquakes were about the same magnitude on the Richter scale and, while there was major damage in Northridge, there was less damage in Seattle. It apparently escaped their notice that, while the Northridge earthquake was close to the surface and caused surface rupture, the Nisqually earthquake occurred 52 kilometers below the earth's surface. Horizontal ground acceleration in Seattle was in no way comparable to the forces unleashed at the surface in the Northridge area.

Basic information about natural hazards is relatively simple. The information does, however, change from time to time as more is learned about the phenomena. People still, however, typically choose to internalize very little of the information about the risks and the potential consequences for them.

THEME 2. "THERE WAS NOTHING I COULD DO TO PROTECT AGAINST ALL THIS"

Sometimes a series of chance events all turn out wrong and one truly experiences something very close to the worst case scenario. When we first interviewed the owner of a floor covering shop in the Northridge area, we found him sitting in his cubicle at the rear of the store channel surfing–staring vacantly off into space and obviously somewhere else. We interviewed him on three separate occasions and found him doing the same thing. In the last round of interviews, the shop was closed and he was nowhere to be found.

His story is one of one bad thing following another. The building he occupied when the earthquake struck was damaged badly; the rear wall of the structure simply peeled away and collapsed. The sprinklers, installed to protect against fire, were triggered by the earthquake, ran until the water supply was exhausted, soaking dozens of rolls of uninsured carpet.

Without a place to do business and without inventory, our hapless merchant struggled to get back in business. He had some carpet stored in another location (undamaged), which, we believe, he sold door to door from the back of a truck–since he had no shop. In the first interview, he maintained his shop had been looted of carpet. We wondered, privately, why someone would try to walk off with a two-ton roll of sodden carpet when the next door shop, similarly accessible, had much more valuable and undamaged products, none of which were looted.

The merchant applied for an SBA loan and was turned down. While it looked to us as though the business had been prosperous, tax records apparently showed that it was not sufficiently prosperous for the SBA to find the merchant loan-worthy. So there he was. The rebuilding of Northridge had begun. Large carpet wholesalers from across the country were swarming over building contractors like ants at a picnic, offering spectacular deals for large lot orders. Our merchant had no inventory to sell, wasn't positioned to compete with large wholesalers, and had just recently found a place into which he could move. The giant rebuilding boom passed him by as he was getting ready to do business.

Once new carpet is installed in homes and offices, barring major accidents, it doesn't have to be replaced for at least seven years. Most of the Northridge area was recarpeted following the earthquake. After that rebuilding, the carpet and floor covering market dropped precipitously. In five or six years, demand would climb up toward normal replacement levels, but for the next few years, demand would be minimal.

The chain of events set into motion by the earthquake, the loss of inventory, the lack of a place from which to do business, the intense competition from large, out of region businesses, and the precipitous market decline were too much to overcome. How could our merchant deal with all of that? It caught him unprepared and faced with overwhelming odds. No wonder he spent most of his time staring vacantly at the television in his cubicle, absent-mindedly surfing 500 channels and growing steadily depressed.

While this hapless merchant was perhaps the most visible case of simply being overwhelmed, many of the people we interviewed had no idea of how they might have protected themselves against the disaster and all the subsequent ramifications that affected them.

THEME 3: THE CONTINUING NIGHTMARE–A 360-DEGREE DISASTER FOR THE INDIVIDUAL

A substantial number of the people we talked with described long-term emotional and psychological effects precipitated by the disaster they experienced. When we asked one business owner about recovery from a disaster that devastated the area years earlier, she responded by showing us a picture of her daughter who had been killed by the storm. Though her business was recovering from the effect of the disaster, her personal disaster continues.

A couple whose business was severely damaged by a natural hazard event is still finding shards on their business property, which serve as reminders of the traumatic episode they experienced three years earlier. This couple's business is on the way to recovery; however, recovery from their personal, emotional disasters may take considerably longer. The husband was diagnosed with and treated for clinical depression. The symptoms that led to this diagnosis were very likely precipitated by the disaster event. Three years after the event he continues to recover. Recounting the experience and the recovery process they endured brought tears to their eyes as we listened to their continuing nightmare more than three years after the disaster.

In another case, the manager of a nonprofit organization found her mother ashen, staring, and generally non-communicative for several months after the disaster. Some business owners sought medical treatment, others may have benefited if they had received treatment.

A woman who owned a successful home based business, told us how the disaster destroyed her business also had a profound emotional impact on her and the members of her family. She lost a successful business to the disaster and her marriage to its traumatic effect.

Another business owner was able to reopen his business before the competition because the steel building in which his business was located incurred very little structural damage from the flood. The cleaning-up, fixing up, replacing damaged equipment, finding the money and loans to pay the bills, took months. During this time, his employees, which included his son-in-law, found work elsewhere and left the area. He had little help, few customers, equipment to repair or replace, no money, and an emotionally stranded family.

Though he was back in business, there was no business. Each day he sat at his desk planning the repairs and purchases he could not afford and waiting for customers who could not pay for his services.

One store we visited was up and running within a few months of the disaster. Three years after the disaster he had more than a hundred thousand dollars in inventory and few customers. The disaster and its aftermath have changed his customers' buying habits. Competition has increased. He had to cut back on his sales staff and his wife took over booking and administrative responsibilities. They are living on revenue generated by their accounts receivable. He knows the receivables will run out. "Then what do we do?" he asked.

The day-to-day nightmare continues long after the immediate trauma and devastation related to the disaster subsides. Pam owned and operated a specialty retail shop in a small, but very attractive strip mall. The earthquake shattered windows, destroyed display cabinets and inventory, and created a substantial mess. Her shop did not have structural damage, but some others in the mall did and their shops were red-tagged.

Immediately after the earthquake, Pam saw to it that her children and husband were unharmed and that their home sustained little damage. She then made her way to the shop and, with her employees, set up shop outside the storefront and began cleaning up the mess.

In the weeks that followed, business was terrible. The mall was more than half empty, with a combination of red-tagged units and owners who were unwilling or unable to return. Mall traffic was abysmally low.

The mall owner had refinanced just before the defense spending cutbacks that created a localized recession and a subsequent drop in property values hit the Valley. Even before the earthquake, the mall owner had negative equity in the property. When the earthquake damaged the mall, the owner hung on for a while, promising quick repairs and a return to the *status quo ex an ante*, but, within a year, the owner walked away from the mall and it reverted to the mortgage holder, a large insurance company in the East.

The new owners did not act quickly to repair the mall. Indeed, they did not act at all, the mall remained more than half empty, and Pam's business remained abysmal. Pam remained locked into the mall because of her lease. Had her property been damaged more heavily, she could have left, but her lease did not provide an out for her when other units in the mall were uninhabitable.

The stress of the continuing struggle began to show at home in the relationship between Pam and her husband. Within two years of the earthquake, the post-event stress resulted in, or, at the very least, contributed substantially to their divorce. Pam lost her dream house because of the divorce and moved, with her children, to an apartment. During this time, she tried desperately to find a new place to do business where there was more customer traffic and a chance to get her business back to the pre-earthquake levels. She planned, then, to walk away from the lease at the as yet unrepaired mall. Unfortunately, she did not have a credit rating; since all her previous business had been done under her husband's financial statement and credit rating, so she was unable to lease new space.

"It's a continuing, never-ending nightmare," she said of the earthquake. "It just never goes away."

We visited Pam's shop each of four years following the earthquake. In our last visit, her shop was gone and so was she. One of the few remaining shopkeepers in the mall reported that Pam had become very bitter and hard to get along with and that, finally, she had gone out of business. The shopkeeper had no idea of what happened to her subsequently. For Pam, the emotional toll of the events following the earthquake went far beyond the question of business recovery.

Pam was one of many people we talked with or heard about who were emotionally harmed in the wake of a natural disaster. Some of our informants were medically treated for anxiety and depression. Others, untreated, displayed symptoms suggestive of posttraumatic stress syndrome. These are not just stories of dashed hopes and dreams.

They are accounts of personal responses to overwhelming events that these people were a part of and are victims of long after the physical disaster event occurred.

One of the people we talked with in Florida described the earthquake as a 360-degree disaster. "It was all around us," he said. "It affected everything." Many of our respondents suffered a 360-degree disaster. The disaster affected their business and livelihood, their home, their family, and almost every moment of every day for months and even years.

THEME 4: SELF-IMPOSED LIMITS

Following disasters, people often made choices in the absence of perceived alternatives. Many failed to see that they had alternatives available to them; in so doing, they limited themselves and their potential response to the disaster. A very few people changed products or services to adapt their business to the post-disaster circumstances. A few people closed their old business and started a new business, though the product or service of the new business was, in all cases, similar to the previous business.

The owner of a brake and transmission repair shop shifted his business to servicing race cars when no one came for new brakes following the disaster. He is one of the few people who refocused his "product" two weeks after the disaster. In 2000, he told us he is doing five times the business he was doing before the earthquake with one-fifth the number of employees.

After Hurricane Andrew, a South Florida mortgage lender dissolved a business that had grown to three offices over the previous ten years. Two years after the hurricane, with a partner, he was able to open a new mortgage business at two locations. He told us it was the only thing he knew how to do.

Some of the people we talked with thought about not reopening their business after the disaster, but many had trouble envisioning an alternative way to make a living. Others found themselves responding to pressure from others: business owners, community leaders, or family members. During and following the 1998 Floods in Montezuma, Georgia, the town's business people met to discuss courses of action. Overcoming adversity and reestablishing Montezuma's downtown business district became themes of these meetings. Working to restore Montezuma's businesses became a collaborative goal, which made some business owners feel they were obligated to reopen their business. Several of the people we talked with had serious second thoughts about the business decisions they made, in part, as a result of the meetings they attended.

A few owners who did not reopen after a disaster made sound business decisions. Other owners who did not reopen their businesses were faced with special circumstance, for example: about to retire anyway, the family came undone, it was a retirement business, the suppliers made demands, or they were unable to find acceptable financing.

A jewelry shop did not reopen after the 1999 Tarboro River floods because the owner had been considering retirement for some time. The flood was the event that pushed his decision to retirement.

The owner of a sporting goods store, also flooded by the Tarboro River, had several reasons for not reopening. He could not get rid of the unpleasant protein odor from the wet animal feed he stocked before the flood. Also, he had already retired twice, owned part of another business, and was unwilling to put up his house and farm as collateral for the SBA loan he needed to re-establish the sporting goods store. He decided not to reopen what had been a very successful business before the flood.

An auto dealer with locations on both sides of the Red River closed the flooded site after the 1997 flood. The decision to not reopen the flooded location was encouraged by the automobile manufacturing firm. They wanted him to "put all his cars under one roof."

Immediately after a disaster, most owners do not dwell on whether or not they should keep their business open. The issue they are concerned with is "How do I finance my business recovery?" For people who suffered damage to their business and their home, getting the business up and running again was a priority. They could fix their home later.

THEME 5: IMPRUDENT USE OF FINANCIAL RESOURCES

Business recovery was financed with savings, loans, grants, insurance proceeds, the sale of holdings, and even, in one case, lottery winnings. Few grants are available for business owners, and SBA loans must be fully collateralized. Several people we talked with "maxed out" their own and their relatives' credit cards. Others used their life savings to finance their business recovery.

Often financing through government grants, interest free loans, and low interest loans are tied to special conditions. Most often, the owner is not allowed to relocate the business outside the municipality under the terms of the loan or grant. Repayment schedules for low interest and interest free loans were usually demanding, sometimes unrealistic in light of the disaster's impact on the entire community. More than one owner we talked with found that relocating their business was essential to recovery, but relocation was contrary to the provisions of their loan from the municipality.

People who rushed to reopen their business after a disaster often found themselves short of customers and faced with the resulting cash flow squeeze. People who were deliberate about re-establishing their business sometimes found their customers' buying habits had changed. This also resulted in a cash flow squeeze. In either case, there is an overwhelming temptation to hang on until things get back to normal. In the meantime, savings and loan proceeds dwindle, frustration and anxiety mount, and hope becomes despair.

After the Northridge earthquake, an established florist was back in business a day or so after the earthquake. But she was the only shop open in the strip mall. She sat for a year, without customers and without other open shops in the little shopping center, watching other shops in the mall prepare to reopen after their structural damage was repaired. By the time the rest of the mall was up and running she had run out of both patience and money. She closed her business. She should not have reopened in that location. She depended primarily on traffic generated by the larger "magnet" stores in the mall; her shop was not a destination. By not thinking through the source of her sales and by not thinking about her alternatives, she wasted a year's time, lost a year's income, and lost her assets.

Many of the businesses in downtown Montezuma, Georgia were up and running soon after the 1998 flood. However, infrastructure and road work limited easy access to downtown businesses for months. By the time the work was finished and easy access was re-established, many people had already settled into new buying habits. Though the change in buying habits started before the flood, the disaster and its aftermath appears to have greatly hastened the process.

THEME 6: NOT SEEING WHAT IS HAPPENING TO THE CUSTOMER BASE; CHANGING COMMUNITIES FOLLOWING DISASTERS

Those who see interrelated phenomena as systems are not surprised when communities change following a natural hazard event of consequence. Any major perturbation to an existing set of relationships is very likely to effect permanent changes in those relationships. In the case of business recovery, those changing relationships are particularly important.

We saw changes in communities as a recurring theme across states and across disasters as we interviewed those who run small organizations and others knowledgeable about the communities. There were demographic changes, with some groups moving out from the affected area and other groups moving in. Population density was sometimes redistributed within a jurisdiction, depending on buyout programs or massive destruction of residences. The demographic changes contributed to changed locational relationships. These were exacerbated by post-event decisions about private and public choices about what and where to rebuild.

We saw post-event community changes everywhere we went. They were particularly visible in South Florida, Northridge, and Princeville. Homestead, Florida and its neighboring communities changed forever following Hurricane Andrew; the City is still there, but it is an entirely different place from what it was before the Hurricane struck almost a decade ago. Northridge had significant demographic changes, even though the physical artifact looks much as it did before the earthquake. Princeville, the virtually all African-American municipality on the Tar River, was essentially wiped out. Many of the

people who lived there are gone forever. Much of the town is still deserted and many of the flooded out homes still remain, windowless, overgrown, and deserted.

It is difficult to overstate the significance of community changes for small businesses whose customers are drawn exclusively or primarily from affected areas. It is also difficult to overstate how seldom small business persons understand the implications of those changes for their businesses and respond accordingly.

In Montezuma, changing consumer buying habits were accelerated by the flood and the circumstances that followed. Shoppers have been, increasingly, driving to big name chain and discount stores in larger neighboring towns for their major purposes and for clothing and groceries. Customer buying habits are subject to change anytime. It is an ongoing process, but developing trends are punctuated, often accelerated, by disaster events. Business owners understand that there may be significant changes in buying habits; however, they seldom factor this knowledge into their disaster recovery decision-making processes.

The population exodus that began in the Northridge area with the reduction in federal aerospace expenditures before the 1994 earthquake was exacerbated by the earthquake as people left behind their damaged homes and the prospect of future earthquakes. As damaged housing was repaired or rebuilt, many of the people who moved into the area were of Korean and Mexican or Latin American ancestry. Neighborhood demographics were changing significantly, yet business owners rarely anticipated the impact these changes would have on their customer base nor did they do much to adapt their business operation to the changed demographics.

In Homestead, Florida, after Hurricane Andrew finalized the Homestead Air Base closing, most of the middle class military retirees left the area. As military retirees, services offered at the Homestead Air Force Base were available to them. After the base closed, there were no compelling reasons for most of the retirees to stay in the area, so they left South Florida. They were replaced by an influx of low and moderate income groups, primarily members of minority groups, who moved in from Miami and other communities in Dade and southern Broward Counties. Small business owners used the demographic changes to explain their situation eight years after the hurricane, but only one or two business people we talked with reported making significant changes to their business operation in response to the changed demographics.

In Princeville, North Carolina everyone was evacuated. A year later, fewer than half of the pre-flood residents had returned. Business owners whose customer base primarily comprised Princeville's residents have been slow to re-establish their businesses. A taxi cab company, a small grocery store, a truck stop restaurant, and an auto repair shop were among the first businesses to reopen after the 1999 flood. These business owners hope former residents will rebuild in Princeville.

A funeral home was rebuilt and about to reopen its Princeville facility about ten months after the flood. However, this business owner had two other funeral homes, neither

of which was damaged, in nearby towns. His business was never entirely closed. Three other businesses, which were up and running relied on customers from outside the Princeville area, few of whom were affected by the flood. A year after the flood, several business owners were still not sure they would reopen their businesses.

In Los Alamos, New Mexico, after the May 2000 fire forced the entire town to be evacuated, local business owners saw more and more people dining, shopping, and living in Santa Fe and even Albuquerque. This trend began before the 200 or so buildings (400 homes) were destroyed by fire. Work schedules at the Los Alamos National Laboratory had changed in the last several years, enabling employees to complete their work week in four days and making it easier to go shopping away from Las Alamos. Moreover, the Laboratory had added a large cafeteria on site, making it much more convenient to eat lunch at the plant instead of in downtown Los Alamos. The fire aggravated an already changing (diminishing) customer base. In this case, business owners are aware of their diminishing customer base. Some owners have adapted their products and services to the changing business environment, but most are still worried about the future of their business.

THEME 7: ASSUMING THINGS WILL GET "BACK TO NORMAL"

The implicit premise of nearly every business owner who reopened (or attempted to reopen) his or her business after a natural disaster was things would "return to normal" before long. Even opportunists looking for a short-term windfall at the expense of disaster victims (and we also interviewed a few of them) expected things to get back to normal fairly quickly.

In case after case, the hope or confidence that things would soon get back to normal belies the reality of the post-disaster dynamics. A few of the people we talked with had lived through previous disasters. Their experience may have prepared them better cope with the recovery process, but they still expected everything to get back to normal.

Virtually every business owner we listened to was driven by the belief that some "normal" condition is not only possible, but will be realized. In search of normalcy, people drew down life savings, acquired debt, and "maxed out" credit cards. It seems that once the assumption that "things will get back to normal" becomes a goal, choices are constrained, and limits are self-imposed.

While almost everyone thought they could "go home again," in every community we visited, return to what existed before the event – return to the *status quo ex ante*– became an unrealizable quest. Simply restoring utilities and roads and repairing and reconstructing buildings did not "bring things back to normal." People had moved away, buying habits changed, lives were altered, new people moved in, and patterns and relationships were altered forever. The systems and subsystems that comprise the community and the businesses' environment had changed forever.

THEME 8: THE SPECIAL CASE OF RETIREMENT-AGED PEOPLE

Age is one of the variables that affects how individual business owners deal with a disaster. Age does not forecast success or failure in attempting to bring a business back after a disaster, but it does influence the way owners approach recovery and respond during recovery.

At some point, for people who experience a natural disaster, the disaster becomes personal. The sense of personal disaster is often conditioned by proximity, losses, damage, and injury. However, the full sense of personal disaster is often unrealized until a business owner considers retirement. The results of a natural disaster can significantly influence business and retirement decisions long after the disaster event. This phenomenon does not seem to be specifically related to the nature of a disaster. It appears to be conditioned by economic and demographic changes in communities subsequent to a natural disaster, along with the state of individual business recovery.

Small business owners often consider the equity in their business as their retirement nest egg. That equity is realized by selling the business or taking a draw from the business, which is solely managed by a family member, an employee, or a lessee. With many small businesses, there are few employees capable of or trained to manage the business. Fewer and fewer children appear to have the skills or interest to take over their parent's business. Under these circumstances, the owner sees selling the business as the only way to recover equity and retire with some level of security. We listened to several business owners whose retirement has become impractical or postponed due largely to the direct and indirect effects of a natural disaster.

For small business owners, walking away from the business they have owned and operated is difficult under any circumstance, but as the owner approaches normal retirement age it becomes especially difficult if the owner cannot recover a reasonable part of the financial equity invested in his business. After the January 1994 earthquake, the Northridge, California area demographics changed significantly with related changes in customer buying patterns, customers' preferences, and competition. These and other effects not related to the earthquake resulted in changes to retirement plans and dreams.

Allen, the Fish Market Owner

Allen, one small business owner we talked with, had been in business for more than 25 years selling gourmet sea foods when the 1994 earthquake hit Northridge. Allen's specialty shop was shaken hard by the earthquake. Refrigerators and freezers toppled, spilling expensive food on the floor. The electricity was out long enough for the frozen foods to thaw. He lost almost all of his merchandise after the quake due to the lack of refrigeration and spillage. His inventory and equipment loses exceeded $50,000. He was closed for three weeks after the earthquake. Allen was not insured against earthquakes.

Following cleanup, Allen dug deeply into his savings to buy new equipment and to stock it with high quality inventory. But, only a few of Allen's regular customers came by

in the weeks that followed. Many had moved away. Close to retirement age, they had had enough with the layoffs at the defense plants, declining property values, and, finally, the earthquake. They moved away, many to Nevada where there is no income tax and where there are fewer earthquakes. Those who stayed in the area found themselves short of discretionary cash. If their home had been damaged and they were insured, the high deductible meant they had less money for special foods. If they were not insured, they had even less for extras.

After he reopened, business was very weak. Allen felt locked in. His lease in the small shopping center kept him from thinking seriously about just shutting down his shop. He reasoned he would have to hold out until the lease was up several years after the earthquake had dealt him such a savage blow. And he would keep on losing money. His business remained marginal and he survived by tapping his savings and retirement funds.

The last time we saw Allen, the lease had come due and, true to his word, he was closing the shop forever. He had, originally, hoped to sell it as a thriving business to fund the retirement he and his wife had looked forward to. But that didn't happen. When we visited in January 1996, Allen told us:

> I haven't said this to anyone yet. I haven't even told my wife. This is the last year. When the lease ends this year, I'm calling it quits. I can't believe that after 25 years here, I have nothing. I'll go into the fast food business maybe. I'll be 62. All our savings are gone. But there's Social Security.

Other factors, not directly related to the earthquake, contributed to his loss of customers; however, the dramatic effect of the earthquake, related loses, and concerted recovery efforts masked the effects of a recession and a changing economy.

Allen was 59 years old when the earthquake hit. For many people, fifty-nine years old
is too young to retire. On the other hand, 59 years old was too old to start a new career outside the fast food industry. Stepping away from a business that had provided a good living for most of 25 years was not easy, especially after a major part of his equity in the business was lost. Unfortunately, Allen financed his attempt at recovery with his savings and retirement fund.

Allen's business demise took four years. We attribute his closing to the earthquake and to the economic and demographic effects it has had on the neighborhood and Allen's customers. In retrospect, Allen might have made better choices, but he was constrained by his view of a return to normalcy.

Brad, the Wallpaper Guy

Brad was 72 years old when we talked with him in June 2000. He owned and operated two wallpaper stores at the time of the Northridge earthquake. One store experienced structural damage from the earthquake and water damage from the sprinkler

system that was triggered by the earthquake. The other store was not in the area affected by the earthquake.

In the weeks before the earthquake, Brad had been offered a lease in a strip mall several miles from the location that was damaged. Immediately after the earthquake Brad accepted the recent lease offer. Within hours of the earthquake, he rented a truck and with a crew of five people moved from his damaged store to the new location, despite the fact that his lease on the damaged store did not provide for voiding the lease under those circumstances.

In 1998, Brad opened his third store at the rebuilt site of the damage store he had hastily moved from four years earlier. He had a "store" in storage (samples, shelves, and display racks), making it relatively easy for him to open a store. But, a major reason he decided to open a third store was an attempt to increase his cash flow and draw on a wider customer base. With rents going up and ongoing SBA loan payments, the new store has been more a struggle than an asset.

He would have been retired by now if it had not been for the earthquake. For more than two years he was involved in bringing a suit against his insurance company for water damage caused by the fire sprinkler system, but the suit went nowhere. If he had received a settlement covering the water damages, he may have retired then. If he could find a buyer for his business, he would retire, but the wallpaper business is changing.

The demographic changes after the earthquake prompted Brad to tell us, "You are no longer selling to a community." He also told us that the earthquake created redecorating opportunities because people had "free" money. A lot of people redecorated which "ate into future sales." "Look at the decorating cycle–three to five years? Five to eight years?"

Though the area population, housing sales, and new housing starts are increasing significantly, the wallpaper business is becoming stagnant. Brad attributed this to alternative wall coverings touted by Martha Stewart and Ralph Lauren. "They have their names on paint cans." The builders supply stores "give wallpaper away." These and other demographic and economic factors have resulted in the closing of several of Brad's competitors. Even with fewer direct competitors and more efficient business practices, he will probably never come close to enjoying his pre-earthquake success. He will probably not fully recover his earthquake-related losses in the foreseeable future. He will probably not find a buyer for his business and it is unlikely he will ever fully recover his equity. Yet, if the 1994 earthquake had never occurred, Brad would very likely be retired.

Charlie, the Dry Cleaner

For 17 years, Charlie has owned a dry cleaning and laundry business at the same location in Northridge California. (He has been in business since 1954.) Six years after the earthquake he is 70 years old and is working six days a week. He would have been retired by now if it had not been for the earthquake.

Charlie's business took little damage from the earthquake. His machines are bolted to the concrete floor and he has steel poles across the building below the ceiling to support equipment. He did have broken windows and things were strewn about, but that is all the physical damage he incurred. When we first talked with Charlie, in 1996, his business was still off 25 percent from pre-earthquake receipts and he felt the recovery was a long way off. He relies on a local neighborhood market and the local neighborhood was still quite empty in1996.

Some of the things that happened since then were unexpected. As the neighborhood recovered, the population increased and the demographics changed significantly. His competition went from three to eight other dry cleaners within one-half mile of his establishment in less than four years. More and more casual business dress codes are a cultural phenomenon, not related to the earthquake, which has made a major impact on his dry-cleaning business. Even with these circumstances, his business makes a small to moderate profit and he draws a salary.

Charlie was one year from paying off his home mortgage when the earthquake hit. As a result of the earthquake-related damage to his home he ended up taking out a second mortgage on his home to repair the damage. This new debt, along with a dry-cleaning business he could not sell at a reasonable price, kept Charlie from retiring earlier. He knows several other people in the same boat. They cannot retire because their retirement is tied up in their business equity.

When we visited Charlie in June 2000, he had just finished negotiating a small business loan through the State to buy a new, state-of-the-art dry-cleaning machine. It took four months of paperwork to qualify for the loan, but Charlie felt he had to do something to make his business more competitive. The new machine will also add to the value of his business.

Charlie said he will retire in "one, no more than two years." He is hoping the state-of-the-art dry-cleaning machine and the related 5.25 percent loan will make his business attractive to potential buyers. He is hoping he will get at least some of the equity out of his business which he had planned to use for his and his wife's retirement.

What Allen, Brad, and Charlie and Tens of Thousands of Other Small Business Owners Have in Common

Allen, Brad, and Charlie shared the 1994 Northridge earthquake experience; they each owned a well-established, successful businesses in the Northridge area prior to the earthquake, and they would all very likely be enjoying retirement right now if the Northridge earthquake had not occurred.

One thing these three business owners share with tens of thousands of other small business owners is the fact that a substantial part of their retirement nest egg is invested as equity in their businesses. The liquidity of these "investments" is always problematic, but

after a significant disaster event, asset conversion at full value becomes difficult at best. Without the equity, retirement becomes an uncertain option.

One of the owners financed recovery, in part, with a loan, one used his lifetime savings, and the other took out a loan six years after the disaster and invested it in his business to make it more attractive to potential buyers. They all ended up investing considerable cash, time, and effort. In each case, the primary objective was to add value to the business in an effort to recover equity for retirement.

Alice and Donald, the "Clothing" Store Owners

The business Alice and Donald are running was established in a small southern community by Donald's Grandpa in 1887. The original store was two doors down from its present location. In 1912, Donald's Grandpa built the building they now occupy with wood cut in the sawmill he also owned. Until 1937 they sold furniture on the second floor. Since then it has been pretty much a clothing store.

Half a decade ago, the entire business district was flooded. Donald was 77 when we visited him. Alice is several years younger. With the help of a young woman, Alice keeps the store open four days a week. Donald stops by in the afternoon.

When the flood hit, they were able to save some of their inventory by moving it to the second floor, but they ended up dry-cleaning 300 men's suits and selling them for $50 each. They washed up shoes and sold them for 20 percent of their pre-flood price. Much of the inventory is dated. The plaster on the walls was damaged by the water and had to be removed so now the walls are all brick except for the back wall which was put up because they did not have enough inventory to fill the original floor space.

At one time, their community was a commercial center for the rural area surrounding it, but, even before the flood, the town's economy was declining. The town's economy continues to decline though the decline was slowed to some extent by the innovative actions local government and business people took to counteract the effects of the flood. This is not much comfort to Alice and Donald whose retirement nest egg is tied up in a partially occupied, flood damaged building (built in 1912), a considerable inventory ($100,000 to $200,000), and a customer base that has all but disappeared. The flood exacerbated an already deteriorating situation for Alice and Donald. Yet, for Donald, it is extremely difficult to walk away from a flood damaged, failing business that was established by his grandpa and has been in his family for more than one hundred years.

Elliott and His Medical Equipment Store

Alice and Donald were not the only people we talked with that were influenced in some way by family ties. In another Southern city, Elliott the owner of a medical equipment and supply store told us "my daddy and grand daddy would roll over in their graves if I declared bankruptcy." The flood destroyed Elliott's original store and the mall in which it was located. He took everything he could salvage from the original store and

five employees (he employed ten people before the flood) and started over in a strip mall located near a hospital, a pharmacy, and a health care facility.

The equipment he inventories is expensive. To cover the costs of his inventory he took out a rather large loan. Elliott is in his fifties. It is unlikely he will have the loan paid off before he retires, regardless of his age when he retires. His current monthly expenses exceed his revenues by $10,000 to $20,000 each month. His business is picking up, he has had to hire two more people, and his cash flow is slowly improving, but he has a long way to go to break even. His flood related loses and recovery loan payback will very likely delay Elliott's retirement or perhaps find his daddy changing positions in his grave.

Elliott does have a few things working in his favor. He is in a growing industry, with demand increasing and the demographics of the area have remained relatively stable, but his eventual retirement has become complicated because the river flooded.

Fergus' and His Son Gerald's Restaurant

Fergus owns and operates a successful restaurant business with his son Gerald in North Carolina. The original restaurant site was inside a bend in the river at the water's edge. During the flood, water nearly reached the roof of the building. The building and everything in it were lost. Yet, in just over four months, Fergus and Gerald had opened their restaurant under the same name at a new location. They had lost everything but the restaurant name and were back in business sooner than the local chain and fast food restaurants.

Two Flooded Jewelry Stores

In Tarboro (on the Tar River, about a 20 to 30 minute downstream from Rocky Mount), downtown businesses experienced flood damage ranging from hardly any to a lot. A few businesses were open for business within days of the flood, though they had few customers–the police would not allow people downtown for five days. Harold, who owned a downtown jewelry store was very close to retirement age when the 1999 flood hit Tarboro. Harold never reopened his business. He chose to retire.

A block West of Harold's empty store is another jewelry store. Irwin, the owner and operator, has been in business on this same block for 42 years. Irwin's store was closed for three weeks. The flood damaged his building, display cases, and some inventory; but he is back in business. His retail business is slow, but his repair business is thriving. It draws customers from as far as Rocky Mount. When we talked with Irwin, he did not dwell on retirement, but during our conversation several customers asked to talk with his daughter who was at lunch. It appears that Harold repairs clocks and watches and his daughter runs the business.

Beth's Restaurant

In Tarboro, a few blocks from Irwin's jewelry store is Beth's restaurant. Beth and her husband ran the restaurant for many years before the flood hit in 1999. She was widowed at the time of the flood and was pretty much on her own when, one day, she found her business under five feet of water. With a loan from the Small Business Administration, interest free loans from the state, and donations administered by the Chamber of Commerce, Beth reopened her restaurant at the same location in January 2001. Beth told us business is 50 to 60 percent better now than it was before the flood. Though Beth could have retired, she reopened the business because of her daughter who works with her in the restaurant.

Claudia's Health Food Store

When Hurricane Andrew hit South Florida (August 24, 1992) Claudia and Jeffery owned and operated two health food stores: one in Homestead, the other in the upper Keys. Neither store was significantly damaged, but the shopping center that the Homestead store was in was severely damaged. When Jeffery retired from the Air Force, he settled in Homestead. He had been stationed at Homestead Air Force Base earlier in his career. After the Hurricane, the Department of Defense closed Homestead Air Force base, which eliminated the related retirement benefits available at the base.

When we visited Claudia's Health Food we found their daughter, Dolores, running the business. Her parents still own the two stores, but they left the area and currently live in Tennessee. They essentially retired a second time, leaving their daughter to manage the business. Eight years after the disaster she told us: "the good customers are still leaving or gone, though the customers at the Key Largo store are much more health conscious."

Any Disaster Event May or May Not Delay Retirement for Small Business Owners

In listening to small business owners and their children, the major issues related to retirement emerged in a variety of ways, often with complications. Owners generally wanted to recover losses and to realize the equity in their business for their retirement. Also, if they had children, they wanted to pass a profitable business on to the next generation. Bankruptcy was seldom considered an option for the people with whom we talked.

As it turned out, for most of the people we talked with, recovering losses and realizing the equity in their business is difficult. If the business is insured, the owner may avoid the long term obligations and risk associated with loans. One owner had an estimated $350,000 damage. He was happy when the insurance company promptly sent a settlement check in the amount of $250,000. In this case, the business ownership had passed from father to son. Retirement was still, to a great extent, dependent on a successful recovery, but the change of ownership offered the prospect of recouping equity while in retirement or semi-retirement.

Several of the people we talked with owned and operated businesses that had been in the family two, three, and even four generations. In these circumstances, recovering losses and equity, pride, concern for their children's welfare, tradition, and expectations on the part of both parents and the children all play a role in the transition between generations. Thus, in family businesses, disaster events often provided the impetuous for passing business management responsibilities and ownership to the next generation.

In the absence of children or children who are not interested in the "family" business, the only option many business owners feel they have is to postpone retirement and work until their business has recovered.

THEME 9: HELP FROM THE COMMUNITY, ONE ANOTHER, AND GOVERNMENT

Cleaning up following a natural disaster event is ugly work. Clearing mud, broken glass, parts of buildings, and downed vegetation is difficult, made all the worse when all that debris represents your memories, dreams, and aspirations. Following clean up comes repair and reconstruction, either in the same location or elsewhere. All this takes resources. For small business people and small not-for-profit organizations, resources are often scarce. This section reports on what we learned about the help given owners and operators of small organizations following natural hazard events.

Our interviews suggest that some degree of teamwork emerges during the activities associated with natural disaster recovery, regardless of the disaster types, its extent, or its location. We heard, often similar, stories of leaders emerging, compassion and charity, and hard work from residents and volunteers. We also observed that team work and cooperation seldom endured. They were often fleeting. The most purposeful teamwork often occurred during the disaster event and in the weeks immediately following it.

In the Northridge community, a local pharmacy provided free medication and disaster supplies to residents after the earthquake. In Montezuma, Georgia, a pharmacist had the foresight to move his prescription records and medications out of the flood's reach so they would be available to those in need while the town dried out.

In another community, a bar and restaurant opened its kitchen and provided free meals for people who had nowhere to eat. "The power was out and the stuff in the freezers was thawing. It made a lot more sense to give it to folks who needed it than to throw it out," the owner told us. More food was donated by people in the community whose freezers also contained thawing food and meals were served until the recovery process provided alternative sources of food and meals.

After the Tarboro river flooded, one store owner was offered a set of display cases after his plight was broadcast on television. The same television news story moved a person, who had recently retired from the same business in Maryland, to send a set of tools to replace those lost in the North Carolina flood. Individual initiatives were frequent,

consequential and noticed in each community we visited, but often individuals working together as part of groups and organizations contributed to the disaster relief and recovery process

In communities with colleges and community colleges, students, faculty, and staff often became involved in the cleanup. In some locals, college students and staffs also disseminated loan and recovery information. Following every disaster, individuals and organized groups of people showed up to help with cleanup and recovery. At several sites, bus loads of people came, sometimes from more than a thousand miles away, on weekends.

In Montezuma, Georgia, the Mennonite Community took a leadership role in helping local businesses rebuild their flood-damaged buildings. The Mennonite carpenters and crafts people asked ask only that those being helped get involved in the effort. The only cost was their participation.

People from Grand Forks, North Dakota, who had experienced extensive flooding two years earlier, shared their experiences with the people in Tarboro, North Carolina after the 1999 flood of the Tar river. Several months after the flood, the local museum staff and directors with the help of numerous individuals and three local corporate sponsors organized a story /drama project to help the community cope with the emotional effects of the disaster. They called on the expertise of a team from the Swamp Gravy Institute in Colquitt, Georgia to help them organize a storytelling event in which many townspeople participated.

In the communities we visited, bankers, Chambers of Commerce staffs, town and city officials, business owners, and many others assumed leadership roles, not always by choice, to help coordinate and direct various aspects of the recovery process. After a tornado devastated St. Peter, Minnesota and the local college, the college president set some challenging goals for recovery and rallied the faculty, staff, and students to do what was necessary to meet the goals. They also helped the people of St. Peter with their cleanup.

Team work and collaboration did not always end with positive results. In one of the flooded communities, business people met to discuss the merits of repairing and reopening their businesses. They decided overwhelmingly to rebuild and reopen their businesses. With very few exceptions, those with reservations went along with the many. Unfortunately for some, this ostensibly collaborative effort was not the best decision they could have made. The spirit and resolve associated with the presumed team approach to business decisions, voided the realization that it would be difficult or impossible for some of the damaged businesses to recover meaningfully. History, pride and, however subtle, group pressure led to choices that didn't work out.

Occasionally we found some level of cooperation between the public and private sectors, but it was short lived and usually associated with a specific (often financial) project or program. After the earthquake, a Northridge business owner put signs on

temporary fencing near a street stating that his business was open and giving directions on how to get around closed streets. Several weeks later he received a $300 bill from the local municipality for sign removal. The owner was livid. "Here I am, open and paying taxes in the middle of a disaster zone, and the city decides it has to hassle me. They suspend rules for some, but not for everyone." In one small town a business owner told us: "They want us to keep our businesses here, but no one from city hall has ever come by to see me."

In Montezuma, Georgia, downtown businesses were extensively damaged, while residential neighborhoods experienced selective damage. Town officials found themselves in a quandary of sort. Few disaster-related federal and state aid programs are available to benefit small businesses. The municipality worked hard to get aid and relief for downtown Montezuma and was relatively successful in doing so. Still, the traditional public sector–private sector distinction precluded any purposeful collaboration or teamwork.

We found that the life- and property-threatening immediacy of disasters make team work essential. We also found that time differentiates necessity and dilutes team work and collaboration. In the absence of a clear shared need cooperation and collaboration is problematic.

Federal government disaster relief programs are aimed at helping individuals and municipalities. They are not directed at helping self-employed business people and owners of small businesses. "Not only were we not eligible for any help from FEMA, but we weren't eligible for any assistance programs. As soon as they found out we owned our own business, they told us to go away," lamented one couple that had lost everything.

In some communities, U. S. Department of Housing and Urban Development block grants were used to help businesses. Sometimes the Community Development Block Grants provided money for revolving loan funds to small businesses. Other times those monies were used to pay the interest on loans. Sometimes, loans were forgiven over a time period provided the business owner kept the business open and in the municipality for some specified time period. The loans were typically small.

In a few communities, such as Grand Forks and Los Alamos, special legislation introduced by the State's Congressional delegation got passed, providing massive amounts of financial assistance, assistance far in excess of what would have been provided under any existing Federal or State disaster assistance legislation. In those cases, loans were much larger.

The U. S. Small Business Administration gives disaster loans to small businesses that qualify. Qualifying businesses must have reasonably good credit, but, if the business has assets and credit that exceed a threshold, the business is sent off to get a commercial loan. Loans are typically based on the pre-event business and tax returns of the firm. Alas, post-event business is seldom the same as pre-event business, often because of market changes as discussed above, and the loan, even at below-market interest rates, sometimes becomes an albatross around the owner's neck. Moreover, the SBA requires extensive collateralization of its loans. Some small business people are willing to risk their

businesses on a loan, but most are reluctant to wager the family home and all their other assets on an uncertain future.

CONCLUSIONS

Throughout our research, our respondents acted as though they had confidence in our collective ability to master natural forces and an abiding belief in the efficacy of the technological fix. They tended to greatly underestimate the likelihood that they will suffer severe adverse consequences from a natural hazard event, even though every one of them lives in an area that is particularly susceptible to one or more kinds of natural hazards.

The lack of concern about the natural hazards to which they are subject typically resulted in being wholly or partially unprepared for the event when it happened. This unpreparedness extended to even the simplest precautions, including insurance. Tornado and hurricane victims were covered most often, and then only because wind coverage is a standard component of property and casualty insurance packages for home and business. Flood victims were sometimes covered, but usually inadequately. Earthquake victims were not covered in nine of ten cases we interviewed.

When respondents were given some lead time and adequate warnings (in the case of floods and hurricanes), they took action to protect company financial records and, to the extent that they had time, inventory. When events occur without warning, as in the case of earthquakes, tornadoes, and floods in which authorities denied the likelihood of overtopping or failing levees, no precautions were taken by the overwhelming majority of businesses.

Respondents also have, at least in the immediate aftermath of the disaster event, an irrational belief that things will get back to normal. Like other members of the community, they tend to perceive the natural disaster event as an anomaly in their routine, a variation that will go away as soon as things are put back the way they were. It seems, however, that disasters are not simply a bump in the road, but, rather, they seem to be watershed events that exacerbate trends and change systemic relations in the community irrevocably.

SECTION 6: CONCLUSIONS: PATTERNS OF RUIN AND RECOVERY; A MODEL OF POST-EVENT RESPONSE BY SMALL ORGANIZATIONS

RUIN AND RECOVERY: NOT A SIMPLE PROCESS

An over-simplified view of business failure following a natural hazard event is straightforward. It would have us believe that a flood, earthquake, or storm damages a building and, with it, a small business' assets and inventory. The firm then closes immediately because the event makes it difficult to get to the building, the power is out, employees are busy caring for their families, and so forth. Depending on the extent of damage and the owner's financial resources, including insurance proceeds, the firm either goes under or it reopens and the recovery begins. This over-simplified view of recovery is extremely misleading; if either businesses or governments were to employ it as an operating hypothesis, it would cause them to make poor judgments and pursue dysfunctional policies.

In this section, we look at what happened to a variety of small organizations, including both success stories and outright failures. We then outline a systems model at a conceptual level. The model is intended to describe what happens when small businesses and not-for-profit organizations collide with natural hazard events. The model needs additional development. This preliminary version describes a work in progress.

Firms That Survived and Recovered Quickly

Many small businesses and not-for-profit organizations survive the initial shock of the natural disaster and recover quickly. Here are some representative stories.

The wall coverings shop. The earthquake destroyed the full back wall of the shopping center and caved the ceiling in several adjoining shops. Rain pelted in through the large holes in the building and poured in through roof fractures. Merchandise spilled out the back into a muddy parking lot behind the mall. Two days after the shaking stopped, the owner/operator of the wall covering shop had stripped out all his wallpaper and wall coverings, the shelves and cabinets, and his equipment and displays. He had leased new space seven miles away on a busy street that was largely unaffected by the earthquake. Two days later he was back in business. "Getting up and running is very important. I didn't have time to wait around for him (the landlord)."

The owner/operator had walked away from his lease with two years left on it. His reasoning was simple. The lease did not include any references to what would happen were the building damaged in an earthquake, so he had no easy way out. But he had experience with the landlord and he judged he would be better off walking away from the lease and fighting a lawsuit, if there ever was one, than he would be staying and waiting for repairs. He was right. Three years later, the mall was still not repaired. Those

merchants who had leased space in the mall and who waited patiently for the landlord to make repairs waited in vain.

Sewing machines and painting supplies. Many of the businesses in downtown had not been doing well, especially since the natural hazard event. Other, larger towns with bigger shopping areas and bigger shops and, with the new expressway, were only a relatively short drive away. This enterprising merchant decided he was not in the sewing machine business; he was, instead, in the recreation and hobby business. So, he started conducting classes in how to do recreational stitching. He began to sell creative recreation. As business started to grow, he looked to see what else he could add to his line of goods and services to enhance the life style he was catering to. His choice was to add very high end appliances–dishwashers, clothes washers, and driers–to the inventory in his shop. The product line does not match up with sewing machines, except when one considers that they are part and parcel of what he is attempting to sell–products and services in tune with busy people who want to use the time they have for creative recreation. He sells them extra time and the creative outlets.

She bought the framing shop down the street just a couple of months before the disaster struck. After the disaster, she decided that she would begin to cater to the small, but growing art community in the town; she, too, had decided she was in the recreation service industry. From simple framing into painting lessons and supplies, she read the market and catered to it. Consequently, despite massive changes in the community, she is doing well and expects to be doing much better at this time next year.

Brakes and transmission repair. For the first two weeks following the disaster, no one came in for brake or transmission repairs. No one came in for the next four weeks. Tom used his free time to work on his two specialty racing cars. When no one came in the next week, he called some racers in a nearby state who had asked him, the previous year, to do some work on their cars. They brought cars to him and word got out. Soon Tom was working full time on racing cars from a three-state area. Three months later, he took down the sign that said he repaired brakes and transmissions. He had changed businesses. When we interviewed Tom a year after the disaster, we asked him what that event had meant to him. "It was a dream come true," he smiled. "I'm now doing what I always wanted to do." When we went back to visit him again several years after the disaster, he had a new building, several employees, and a booming business. He had adapted effectively to the changed environment.

Floor cleaning. Their building was almost on the epicenter of the earthquake, but took no damage. "A few things fell off the shelves," the owners reported. The building was designed by a structural engineer and the company had earthquake insurance. "Why," we asked, simply because we had encountered so few businesses so well prepared. "We had an SBA loan and they required both the engineered building and the insurance," the owners explained. "I didn't like it at the time." The owners did not, however, have earthquake insurance on their home, which was damaged extensively. "We thought the government would pay for it," they lamented.

"We were only out of business a few hours," they added. We asked whether their customers had received damage or were out of business. "Oh, a few," they answered, "but most of our customers are all over the Valley and some are in the (Los Angeles) basin, so most of them didn't have any problems."

It seemed clear that being in a building designed to protect against earthquakes, having an insurance backstop, and having your customers in diverse geographic areas is a formula for surviving an earthquake.

The optometrist. Following the earthquake, few people came in for eye examinations and new glasses. It seemed to the optometrist that, following an earthquake, people who are out of work or who need cash for repairs can put off new glasses for a few months. Dr. Fox decided he had better find out what happened to his patients, so he sent postcards to all of them. A very large proportion of the cards were returned; his patients had moved away.

Dr. Fox decided that, since much of his patient base no longer existed, his only hope for survival was to reestablish his practice in another location – a location that had escaped significant damage from the earthquake and, consequently, had less social and economic disruption. He moved several miles south and began over. In our last interview with him this year, he said business was still slow, but it takes a few years to establish a practice. He remains optimistic.

Metal plating. The earthquake spilled plating solution out from and across the tanks, contaminating solutions. The power was out and shipping was slowed. The company owner didn't need all of his employees for a couple of weeks, but he continued paying them until he did need them. When the utilities were back and the plant was cleaned up, everyone came back to work. The owner had called all his customers from across the southwest and said he would be a little late with his shipments. His product is difficult to replace and hard to substitute. Within a month, he was back up to speed and the business was as profitable as before. He had taken a financial hit, but he had the financial strength to weather the shutdown and survived nicely.

Some Organizations Struggle over Months and Years, but Do Not Survive

The design of our research made it possible for us to observe businesses and not-for-profit organizations weeks, months, a few years, and even a decade after the disaster struck. We talked with Hurricane Andrew victims nine years after the winds flattened a 27-mile wide swath, with Northridge Earthquake victims from five months to five years later, with flood victims one, two, and three years later, and with wildfire victims just months after the ashes settled. The experiences they related to us helped us understand how they responded over time, and how their businesses survived, morphed, or failed. Some of their more instructive stories are summarized here.

The custom cabinet shop. Things had been tough for the custom cabinet maker even before the earthquake. The defense industry recession had cut into his business; new construction was down, some people had decided to defer replacement cabinets, and

competition in the form of less expensive cabinets from mass producers and outlet stores was increasingly fierce. The earthquake drove a stake into the heart of the business.

The cabinet shop took a little damage, but not much. However, demand for new cabinets stopped almost immediately following the earthquake while the dust settled and the smoke cleared. Then, when rebuilding began, larger contractors from across California showed up to bid on the rebuilding jobs. Many of the smaller, local contractors missed out on the reconstruction because they were still reconstructing themselves, because they were unable to take on large jobs, or both. The cabinet shop fell into the third category. The company was weakened before the quake, further damaged by the quake, and then put under six months later when they could not compete effectively in the rebuilding.

The owners were in the shop the first time we went to visit. The second time, they were gone. It was as though they had just walked away from the business or been locked out by the bank – tools, materials, and a few cabinets littered the floor. The hand-scrawled sign of the door didn't say much except that they would not be back.

The small department store. The flood came largely without warning, even though the water had been rising steadily and the rain was still falling. The reason for the surprise is that virtually everyone in the community believed the Army Corps of Engineers when it said they were safe from flooding because of the levee. What the Corps had failed to tell the community is that the levee would only protect them from a flood from the main river channel. The heavy rains, however, caused tributary streams to flood, bringing the water from the protected side of the levy. Instead of protecting the town, the levy acted as a giant wall to hold the flood waters in the town. The Smiths' store was located centrally in the bowl that remained filled with flood waters for days until an enterprising public official, despite warnings from the Corps, punched a hole in the levy and allowed the town to drain.

By the time the Smiths and their neighboring retailers were able to reopen their shops, their customers, almost none of whom had taken damage, found it easier to drive thirty minutes to the new discount stores by the Interstate Highway for their needs; they never came back. The little downtown district, on hard times before the flood, came into very difficult times following the flood. The Smiths can't sell their inventory. They can't sell their business. And nobody wants their building.

The Smiths continue to go into their store every day, but, each day, there are fewer customers. The business is all but defunct and, for all practical purposes, bankrupt, but, then what else are two elderly people going to do besides come in every day and hope for a miracle?

The furniture shop. The furniture store had been open for more than a century, and, for most of that time, it prospered. But times change and so do buying habits. When the flood destroyed almost $200,000 of uninsured inventory and a combination of cleanup and municipal repairs to infrastructure kept the store effectively closed for almost nine months, the few remaining customers, most of whom bought on credit secured by the furniture, stopped coming. They took their business elsewhere. For the past three years, business has

been terrible; it gets worse every day. The owners continue to keep the store open, but only because they don't know what else to do and they continue to collect on the money owed to them from sales before the flood essentially put them out of business for good.

This couple is almost at retirement age. It is extremely unlikely that they can sell the business and they can't make a living running it. They don't know what to do.

The specialty store. Before the flood, business was good, and Harvey, 61, had saved money and was looking forward to retirement. As he watched the flood waters edge up the wall in his store, toward 12 feet, he remembered how his insurance agent had told him, "I just couldn't sell you flood insurance. You don't need it. You're not in the flood plain."

A half million dollars in uninsured inventory was completed destroyed in a matter of hours. Harvey wrote a check for it from his savings. Then he took out a large SBA loan to move and to buy new inventory. Harvey needs $80,000 a month to break even. For the two years since the flood, he has averaged $60,000. The rest has come from his savings. His customers found someone else who would supply them with their needs and they haven't come back.

Harvey's savings are essentially gone. His dreams of retirement are shattered. He sits in his office looking at the wall.

The nursery. The flood came on hard. Some of the nursery's greenhouses were swept away; others were simply destroyed in place. All the spring bedding plants were gone, along with all prospect for a profitable year. "But," thought the owners, "We're insured against floods." Guess again. The insurance adjuster told them that the greenhouses were not insured because they were not buildings; they were agricultural structures. Despite appeals and pleas, they did not collect any money after paying premiums for years for what they were told was coverage.

While we talked with them, the husband and wife continued slowly arranging merchandise for their "going out of business" sale. They had exhausted their life savings to try to bring the business back, but could not overcome the loss of income for two consecutive years–the first year because the flood destroyed their product and the second year because they could not get the greenhouses rebuilt in time to plant for spring. This was now four years after the flood. They talked about how stressful it had been. His depression was clinical; he had been under psychiatric care for some time because of the stress and had, during that time, been on medication. Prior to the medication, he had developed suicidal tendencies.

Today, he works cleaning rest rooms in a local factory. She, too, has found work. The greenhouse business they spent a decade developing and nurturing is gone. And so are all their assets and all their hopes for a business of their own.

The art center. The little not-for-profit art center was undamaged. No clean up was required, but, the Center relies heavily on consignment fees earned from sales of art by

local and regional artists for its survival. After the event, people stopped coming in to buy things. No one expected business to flourish the first week after the event, but, certainly, a year later, one might expect business to be back at pre-event levels. But that has not happened.

The natural hazard event did affect a lot of people. It destroyed their homes, affected area employers, and raised questions about the economic viability of the town. People seem to have cut back on expenditures for the arts and their support for the local art center.

The center remains open and hopeful. The young director has instituted new fund-raising and community awareness activities to stimulate revenue from gifts and purchases. "It seems to be picking up a little," the director told us a year after the event, "but we aren't yet back to where we were before the event."

Summing up Patterns of Demise

Often, small businesses survive natural hazard events and, even with damage to structures and inventory, are back in business quickly and are as profitable after the event as before. Often they are not. But the firms rarely close forever in the few days following the earthquake, flood, hurricane, or tornado. Small business owners often hang on, trying to get the business generating a living again, pouring their savings in, and hoping for the best. At last, they run out of energy, assets, and hope, and the company dies, not with a bang, but a whimper.

For years following a natural hazard event, firms in and around the disaster zone are found distributed all along the spectrum from full recovery to complete failure. Some firms recover very quickly following the event. Other firms "morph" into something else and, in that new state, either fail or flourish. That is, individuals sometimes succeed in a new business even though their old business failed; they retained or recovered their assets and moved on.

Some businesses fail shortly after the event, some never recover fully and fail years later as a direct consequence of the event. Failure, when it does occur, takes many forms. It can manifest itself as minimal recovery; the business recovers to a level of minimal viability and hangs on, not doing well enough to be said to have recovered and not bad enough to be put to a merciful death. Some businesses fail and go through formal bankruptcy or have assets seized by the lending institutions and the door locked. Some owners just walk away and virtually disappear, surfacing in another business, perhaps in another town in another state.

Finally, there are those businesses we call the "dead business walking." These are the cases in which business owners continually put money into a failing business by draining their personal assets after the business assets are gone. The business shrinks in a slow death until nothing is left but a hollow shell. The owner/operator continues to come into the place of business, but only from force of habit or lack of anything else to do.

A CONCEPTUAL MODEL: SMALL ORGANIZATION RESPONSE TO NATURAL HAZARD EVENTS

No Simple Model Is Adequate to Describe The Quest For Viability

When we began the research project, we naively assumed we would be able to describe the unfolding of events from the initiation (the natural hazard event) through eventual failure or recovery of the business or not-for-profit organization. We had intended to employ standard fault-tree techniques to map the process. We were mistaken and the presumption of an appropriate model slowed our research.

The fault tree approach was designed and intended for relatively simple compound sets of events. It works best when applied to situations in which there are a number of chance events, each independent of the other, and when those chance events have binary outcomes (that is, some switch fails or does not fail). In our original formulation of the distinction between businesses that fail and those that survive and flourish, we had envisaged that we would be able to identify five or six chance events (specified as independent variables), track them through, and devise a fault tree that would enable us to predict, with some certainty, whether a business would fail or survive following a natural hazard event.

What we did not count on is our conclusion that the process through which organizations proceed following a natural disaster is interactive, iterative, and contextual. We had assumed that the chance events were largely outside the control of the individual owner/operator. To some extent, they are. But, in the larger context, they are not. Owner/operators confounded us. While some were passive victims of a hostile environment, others were proactive with respect to chance events, altering the probability distribution of outcomes, and affecting the likelihood that they would both survive and prosper.

As we continued to interview, to integrate, and to ponder the evidence, we concluded that a traditional fault tree simply would not work to model small business failure and survival following a disaster. We could never address the complex nuances and interrelationships in a simple model. We came to understand that a systems model was far more descriptive of the process and would be required to model small organizations' responses to natural hazard events. Consequently, we have abandoned the notion of a simple model and have begun to devise the basis for a more sophisticated, more descriptive model with even greater explanatory power.

The appropriate steps in building such a model are these. First, one develops a narrative describing the process. Second, one attempts to abstract the model into diagrammatic form. Next, one converts the narrative and diagrammatic processes into symbolic form. Finally, one attempts to calibrate the model against new data to ensure that it reflects real situations adequately.

Methodologically, we are well on the way to developing such a model. We have been successful in defining critical variables to survival or failure and in quantifying their significance in the process. What we have not been able to do is to isolate probability distributions about survival given combinations and permutations of the critical variables. It may be that we will not be able to do that. It may be that doing so is not necessary.

Nonetheless, the research that we have completed has brought us to a much more advanced understanding of what distinguishes organizations that survive from those that do not than even our most advanced conceptualization provided us before we began the work.

Initial Conditions: Extent of the Initial Impact on the Organization

The initial losses experienced by a small business or not-for-profit organization depend on four factors (Petak and Atkisson, 1982). The first of these is exposure. Exposure is the extent to which an organization's assets are subject to experiencing the effects of a natural hazard event. Organizations located in proximity to the Red River of the North are exposed to floods. Virtually any organization in the Los Angeles or San Francisco metropolitan areas is exposed to earthquake hazards. Few areas in the United States are free from exposure to natural hazards, but the probability of events varies dramatically among areas and, sometimes, dangerous areas are separated from relatively safe areas by a matter of only a few feet.

The second factor affecting the amount of initial losses to a natural hazard event is vulnerability. Vulnerability is the extent to which a building or other structure, equipment, and inventory are subject to damage from an event of a given size. The vulnerability of buildings to floods and earthquakes depends largely on structural design and construction. The vulnerability of contents to earthquakes depends on how well they are anchored or otherwise protected by techniques such as base isolation, which "disconnects" equipment or inventory from earthquake-induced motion.

The third factor affecting direct and immediate loss to the organization is the intensity and duration of the event. Flood damage depends on the depth of the water, the velocity of the water as it strikes the building, the extent to which flotsam is carried by the flood waters, and the duration of inundation. Earthquake intensity is measured in terms of the intensity and duration of shaking and the lateral acceleration of the energy as it passes through the earth on the structure. In natural hazards, one is concerned with magnitude, duration, and spatial effects. Spatial effects refer to the distribution of impact of the natural hazard event. A flood along the Tar River in North Carolina typically inundates a smaller geographic area than a flood along the Red River of the North, but, along the Tar, the inundation is deeper for most of the flooded area.

The fourth factor to consider is the amount of warning time the owner/operator has to prepare the event. There is, of course, always lead time if you know you are in a location subject to one or another kind of natural hazard. The prudent person takes precautions against the hazard, assuming he or she takes advantage of the warning. Assuming only minimal precautions have been taken before the event became apparent,

lead time makes a difference. There is essentially no lead time for several kinds of natural hazards, particularly earthquakes. However, there are often relatively short notice periods before one is struck by tornadoes, landslides, tsunami, or severe thunder storms. One often has some lead time with riverine and coastal flooding, wildfires, volcanic eruption, hurricane, and storm surge. Even a few hours of warning time provides the owner/operator with some opportunity to engage in last minute protection. He or she can remove inventory, equipment, and records. There may be an opportunity to sandbag, wet down roofs, and so forth.

Organizations that manifest high levels of exposure, have buildings and inventory that are exceptionally vulnerable to damage, are subject to extreme events, and have not taken preparations are extremely likely to have large losses from natural hazard events.

Surveying the Damage and Cleaning up

The first assessment. As soon as the owner or operator of a small business or not-for-profit organization is able to access the business site following the natural hazard event, he or she assesses the immediate losses. They look, first, to learn whether there were injuries to people important to them and whether there has been any loss of life. If there are injuries or death, other things are postponed until the more critical matters are dealt with, at least preliminarily.

The second assessment is property losses: losses to the building the organization occupies, to inventory, and to equipment. Even before the damage assessment is complete, cleanup begins, perhaps with simply picking up the first shard, broken board, or ruined display item, absent-mindedly, while surveying the mess. Cleanup is always difficult, sometimes depressing, and sometimes more than the owner/operator can handle.

Part of the initial scan seems always to include an examination of the immediate environmental support system. Owners check with news reports and utilities to learn the status of utilities, communication links, and other lifelines. They look, too, to learn the status of transportation systems, availability of Federal Express and other delivery services, and the extent to which they can get to their customers and their customers can get to them.

Almost everyone closes for a while. Almost all small firms close for at least a few hours immediately after they are struck by a natural hazard event. The reasons for that are straightforward. The owner and employees may, in fact, be home taking care of their families and neighbors or damage to their homes; sometimes, even the business comes second. Moreover, the earthquake, storm, or flood is likely to have disrupted essential utilities, including electricity, water, sewerage, gas, and telephone. Depending on the nature of the natural hazard event, one or more life lines could be out for a few hours or a few weeks.

Shipping services are likely to have been interrupted as well. Shipping is typically extremely important to small organizations with even average product turnover. Small businesses and not-for-profit organizations rely on firms like Federal Express and UPS to

get inventory and raw materials and to ship products to customers. They also use trucking companies. Depending on the nature of the damage, highways may be obstructed for hours, days, or weeks. Shipping services, however, are usually back in business very quickly, often before the electricity is back on.

Assessing how long they will be closed. Within a few hours or days of the event, small business owners and not-for-profit managers have a pretty good idea of whether they will be able to reopen shortly or whether reopening will be delayed for some time. Often, the building the business occupies is damaged, destroyed, or rendered uninhabitable by the event, at least for a while. Flooded buildings require drying, treatment to kill molds and fungi, and deodorizing. Plaster and wall coverings often must be removed and replaced to ensure public health and to remove odors. The building may be under water for several days. Earthquake damage to buildings may not be readily apparent. If damage is widespread, the building may be red-tagged or require substantial repair before it can be occupied. It takes insurance adjustors a while to get around to every building and, in the meantime, competent construction and repair crews become fully booked for extended periods, often delaying reopening.

When there is damage to structures from wind, water, or shaking, building contents are often damaged. In earthquakes, file cabinets fall over and their contents spill out. In Northridge, the earthquake cracked ceramic toilets and triggered fire sprinklers, causing flooding. A carpet shop in Northridge lost roll after roll of carpet to rain coming in through a damaged roof and to sprinklers that flooded a nonexistent fire for days.

When the flooding occurred where file cabinets had tipped, hard copy records were soaked and lost. Flood victims in North Carolina and Georgia told us that the first thing they grabbed as the water rose was the company computer; the PC held all the accounts payable and receivable information. Earthquake victims weren't as lucky; many lost data. Some firms lost other organizations' data. Second-hand information tells of a Wisconsin city that lost much of its financial data when a data processing firm in California took electronic damage during a quake.

Shaking topples storage shelves when simple precautions have not been taken to stabilize them. When the shelves hold computer components, expensive photographic equipment, chemicals, and other similar materials, the costs of shaking grow quickly. When the power goes out, refrigerators and freezers stop working, turning Ahi tuna into bait, restaurant food into garbage, and laboratory samples into useless specimens.

Initial clean up is almost always ugly and depressing. In Northridge, shop owners, when they got help, got it mostly from their immediate and extended families or from friends and employees. The people we talked to got very little help from building owners. But, sometimes, the disaster leads to genuine community support, at least during the clean up. In Montezuma, Georgia, for example, small business owners received extensive help from the Mennonite community. Mennonites came from all over the East Coast to work with the local Mennonite community in their efforts to clean up the mess when the waters receded from the small city's central business area. In St. Peter, Minnesota, hundreds of

people, including alumni, came from neighboring Mankato, Mankato State College, and across Minnesota.

Sometimes, however, the cleanup is more commercialized. Cleaning up broken glass, bricks, and rubble in East Grand Forks illustrates the point. There, and in other towns along the Red River of the North, caravans of disaster followers appeared from nowhere, set up camp along the river, and hired out as itinerant laborers to help with the cleanup. They lived in recreation vehicles, camper tops on pick-up trucks, and low-cost motels. And they knew each other from other disasters across the country.

The first critical decision. Right after the event, as soon as the owner or owners are able to make an initial assessment of their losses, a critical decision is made. A very few owners just turn and walk away. For them, the emotional impact of the loss is so great that they simply take their losses, and don't come back, leaving the residue for others to sort through. These people are the most difficult to find for subsequent interviews; mostly, we heard stories about them from other business people who stayed to clean up and to try to get their lives together. Those business owners who stay make an implicit decision to try to continue with the business. For them, cleanup continues, maybe with help from volunteers and maybe without.

Looking for Resources and Struggling to Reestablish a Cash Flow

Even as they are assessing damage, owners and operators ask, implicitly or explicitly, the next questions "How much of this loss is recoverable?" "Where will I get the money and inventory to reopen?" As the cleanup progresses, business owners begin to focus on the important task of trying to resume a cash flow from the business.

Reopening in temporary quarters. In areas where people saw the flood coming and were able to move inventory to higher ground before the flood destroyed it, shop keepers often opened up for business in vacant store fronts in malls, in vacant buildings where they could find them, and, in one extraordinary case, in a cleaned-up chicken coop. Inventory was dragged in, a cash register set up, ads placed and the business reopened.

Obtaining inventory. Obtaining inventory was often a problem when it could not be protected from the natural hazard event, especially for retailers. A woman in Northridge said her suppliers sent her additional inventory almost immediately and extended her credit beyond the normal 30 days without interest charges. A wallpaper retailer reported that his suppliers went out of their way to send him inventory – overruns and seconds – so he would have something to sell. In Homestead, following the hurricane, lumber and hardware wholesalers sent special truckload runs from north Dade County daily to ensure that small lumber yard and home improvement stores would have the materials people needed to put their homes back together. Suppliers were not always that friendly or helpful. Some continued to do business with the victim on exactly the same terms as before the flood, hurricane, or earthquake.

Most owners looked to see what they could salvage following the event. The owners of a small department store in the Southeast told us how they dry-cleaned hundreds of pounds of clothing to remove the area's ubiquitous red clay that had been deposited on the clothing by flood waters. They then sold the uninsured clothing inventory on the sidewalk at a cut rate. Another respondent took apart hundreds of generators for automobile and truck engines, cleaning, drying, and repairing them so they could be sold. Others scrubbed and cleaned the building and equipment, preferring that to scrapping display racks and shelves and merchandise.

The search for cash. Both cash flow and money for repairs or replacement are problems for many small business owners in the weeks following the quake, flood, tornado, or hurricane.

Small organizations are insured against losses. Almost all of them have standard property and casualty insurance for small businesses. Some had special insurance packages to cover them against floods, earthquakes, and other risks not typically included in standard property and insurance policies. A few had business interruption insurance. Those that were insured, sought to settle with their insurers. Prompt insurance payments, provided they are sufficient to cover losses, will provide an organization with the funds it needs to reopen. Sometimes, however, payments are not prompt. We interviewed organizations that, years after the event, were still attempting to settle with their insurer. Occasionally, payments are never made. One respondent was in litigation with his insurer several years after the earthquake, and ultimately lost. Another reported that her insurer declared bankruptcy and failed to provide any payment on her policy.

When insurance coverage does not exist or when payments are delayed, the quest for cash is often challenging. In Northridge, business owners told us how they used their personal Gold and Platinum credit cards to buy inventory, make repairs, and make payroll. Some owners, strapped for cash, asked their customers if they would please pay their accounts earlier than they normally would for shipments that had gone out before the earthquake. Many customers complied with the request, willing to help out their supplier in a time of need. In some cases, landlords voluntarily reduced lease payments following the earthquake, especially while repairs were being made to other units in the strip malls or to the business' premises.

Some of the small firms that were better off financially continued to pay salaries to all their employees even when their businesses were closed for several weeks following the earthquake. They knew the employees needed the money and they wanted to keep their workforce intact.

Firms that were not as well off financially, that did not get enough help from suppliers and customers, and that were faced with extensive losses to inventory and equipment faced tough choices. Most of those whose losses came from earthquake or flood were uninsured. To get the cash flow to resume, they needed a place to do business and they needed inventory.

Some could not get conventional loans because their businesses were marginal or, we suspect, in a few cases, because the business owner had under reported income for tax purposes. Some could not obtain SBA loans because they were ineligible. Others, however, received SBA loans at below market interest rates to help get their businesses re-established. Still others, however, were eligible for SBA loans, but chose not to take them. Small business people report that the SBA wants them to collateralize loans with their homes and other non-business assets. "That's a lot more risk than we would have to take with other lenders," they complained. "I'm willing to risk the business, but it's just too much to risk everything."

Many of the small business persons we talked with who had extensive uninsured losses dug deeply into their savings to buy new equipment and inventory and to tide themselves over as they attempted to get their business back up and running. Sometimes, that proved to be a fatal mistake. Other organizations with greater financial assets have liquid corporate assets from which to draw. If the losses are not too great, organizational savings may be sufficient. Those without significant assets drew on other sources. For many, the initial source of income was personal, nonbusiness savings. Often, those were retirement funds.

Finally, owners and operators of smaller organizations seek to borrow the resources they need to in their attempt to reopen. The owner/operator may choose to seek funds to borrow either before or after reaching for their savings. They seek to borrow money from a wide variety of sources. The organizations with better credit tend to go to conventional lenders, where funds can be made available in a few days or weeks. If there is sufficient time and the firm has a sufficiently good credit rating, it may seek funding from the Small Business Administration, even though those loans may take weeks or months. Occasionally, local government or a consortium of local government, not-for-profit organizations, and lending institutions come up with a program to provide subsidized loans to firms. Typically, this takes several weeks or months.

The smaller businesses and those with marginal credit ratings use bank lines of credit and business and personal credit cards. The money is available instantly, requires no time-consuming negotiations with lenders, and meets current needs. The interest rate is often high, but when it comes to either getting cash and keeping afloat or going under, one can easily rationalize high interest rates. Extended families are also sources of loans and many small business owners/operators go there as a last resort.

On rare occasion, an organization may receive gifts and grants. Sometimes, the extended family comes to the aid of the owner/operator. We found that to occur most often among relatively recent immigrant families of particular ethnicity: Armenians, Indians, and Middle Easterners. Suppliers sometimes gave gifts of new inventory to firms. Charities rarely give gifts to small business people, but are frequently willing to provide them to not-for-profit organizations.

Comparing the Resources Needed with Those Available: Another Decision

When the small business owner/operator is able to make a match between the resources needed and the resources available to reopen following the event, small businesses have a good chance to recover, other things being equal.

The tougher nut comes when the equation is not easily balanced. Some small businesses simply cannot come up with the resources needed to open the door. They usually attempt to bootstrap the operation with personal credit cards, cutting back on inventory, and attempting a minimal reopening. Sometimes, they cannot even manage that. The business is, *de facto*, bankrupt, and the owner/operator may just walk away.

Sometimes, the organization is able to reopen and do business, but, even as they are reopening, the search for additional resources may continue for weeks or months.

The fundamental question that owners and operators of not-for-profit organizations should ask and seldom do, is "What should we do now?" They almost always assume they should reopen the business and that, in a little while, they will resume life as it was before the event. For them, perhaps the most critical business question facing them goes unasked. They simply assume that, "We're going to do the same as we did before." The owners and operators usually assume that "things will get back to normal" in just a little while. A few of the owners and operators ask themselves "where should we reopen" or "when should we reopen," but most just assume they should reopen as soon as they can, in the same location, doing the same thing. Only a very few ask whether the old business will still make sense in the new environment.

The Quest For Viability

The typical expectation of those who experience a natural hazard event is that it is only a blip on the screen and that things will return to normal in fairly short order. But things do not return to normal if the event is of any significance. If the event is of any significance, systemic relationships change forever. Then the question, for many of the organizations that managed to reopen, is "What happened to my customers?"

The extent to which customers return to the business and clients to the nonprofit organization depends on several factors (See Sections 3 and 4). The first of these is the extent to which the customers were affected directly by the event. Of those that suffer direct impacts, some will have inadequate resources to return to the business as a customer. Others will leave the area. Organizations whose customers and clients are geographically dispersed have a larger share of customers return, other things being equal, than those who have most or all of their customers concentrated in areas that are damaged. The reasons are obvious: having one's customers distributed geographically reduces the likelihood that all of them will be affected adversely by the event.

Second, the more intense the competition is for customers on which the organization depends, the less likely the customers will be back if the organization is

closed for any significant length of time. If competition for those customers is intense, then the customers will be lured to other suppliers and develop new shopping habits while the victim remains closed. Closely related to the intensity of competition is the customer's need for the product. If the damaged supplier has an exclusive product that is needed badly by the customer, then there is a good probability that they will come back, even after the supplier is closed for some time.

If there is little loss to the organization's assets from the event, if the customers remain loyal until the organization is reopened, if the customers have adequate resources to buy the goods or services, and if the infrastructure is restored relatively quickly, then the organization should achieve viability quickly and relatively easily after the event. These, however, are a lot of "ifs."

On the other hand, if the organization experiences significant losses and the customer base is diminished, then the owner/operator is faced with new questions. All the owner/operators eventually come to ask themselves whether the current level of income in the new environment is covering costs. Sometimes, because they want so much for the business to become viable again, they delude themselves in their answers. "Business is coming back slowly. It doesn't cover costs yet, but . . ." Or, they confuse themselves by confounding cash flow with income, thinking they are making a living when, in fact, they are bleeding down organizational assets.

We even encountered presumably savvy business people who knew they were not making money, but who, for two or more years, operated at a continuing loss without seriously considering closing or changing the business. We think the reason they continue to delude themselves that things will get better is because, if they answered truthfully, they would not know what to do.

Our findings are not without precedent. Merry (1995) finds, as we do, that "order and regularity in the world give people a basic feeling of security, which is one of the primary needs of human beings." " Behavioral and social sciences are built on a model that regards all human systems as equilibrium seeking. Human systems have certain levels of functioning that they try to maintain (Merry, 1995)." Merry even identifies the way individuals and organizations respond when faced by uncertainty generated by basic change in their environment. The dominant behavioral response is "repeating former behavior over and over again (Merry, 1995)." More functional responses occur less likely. They include "varying behavior slightly and predictably, adapting new behaviors, transiting through a chaotic crisis, and transforming into a new more complex mode of functioning (Merry, 1995)."

The Time for Hard Choices

Following the event, the organization can achieve economic viability in either of two ways. First, the owner/operator can change his or her expectations about what constitutes economic viability: "We're drawing out about two-thirds of what the business did for us before the earthquake. I guess that's the way it's going to be." Second, business

can improve so that the organization meets or exceeds pre-event income expectations. If the organization does not meet expectations after reopening and being in business for some period of time – sometimes more than a year – then the owner/operator has to make some hard choices.

Sometimes the choice is to continue doing what they have been doing since they reopened. We talked with many owner/operators who were working at a "dead business walking." No customers, no sales, no income, no economic viability–just living off savings until something happened from the outside to end it. Some of these people perceived themselves as locked-in. No other options appear available – they don't know what else to do – so they just keep on doing the same thing. Many cling to the continued expectation that things will get back to normal, or maybe just better, even though all the evidence suggests differently. In such cases, if there is substantial organizational debt, the lender makes the choice for the entrepreneur, calling the loan, seizing property, and converting organizational assets into cash to apply against the loan. If the business is hanging on by a thread, however, able to make some payments on interest, the lender may allow the organization to continue operations. Not all bankers subscribe to the old banking axiom, "The sooner you break his nose, the sooner it heals."

If the business has suffered damage and the prospect of a speedy recovery is slim, or if the entrepreneur is simply too exhausted emotionally to try to bring the business back after the disaster, one option is to retire – especially if the business losses were insured. Some of our respondents took that option. A few just closed the business. Some sold it. Others tried to transfer the business to the kids. In those cases where the business provided a good income before the event, the adult children who were interested in the business took it over. Sometimes, however, the children had careers in different occupations and professions and were uninterested or unwilling to take on their parents' business.

If the entrepreneur is able to step outside the box, he or she can invent and consider new options for remaining viable. Sometimes that choice should be to shut down the existing business to stop the bleeding and, then, to look for some other business in which to put one's assets and energies. Sometimes, as in the case of the young man with the old brake and transmission shop, that is an easy transformation. He didn't even need new tools or new space. The same holds true for the mortgage broker we interviewed in Homestead. He had the skills and the tools; all he needed was a new space, a new telephone number, and a new business name.

A few of our respondents survived by changing the way they did business. They tried to devise a new marketing strategy to attract new customers, develop a new product or service to lure new customers, find a new location for similar kinds of customers, or some combination of the three. All of those people we interviewed had created viable new businesses.

Even if the owner/operator conceives of a new enterprise or a new way to market the old enterprise, he or she must be able to act on the new options, or it cannot bear fruit. Sometimes, they have insufficient financial resources to make the break. Sometimes, they

cannot make the break from the old arena into the new for psychological reasons. It would simply be too great a strain.

Survival or Demise

Whether an organization survives the natural hazard event and eventually becomes financially viable depends on a host of variables. Many of the variables are outside the control of the individual organization. Some are within the control of the organization. Foremost among these is the set of decisions the owner or manager makes following the hazard event. The story of each organization plays out over an extended time, often as in slow motion to the outside observer. One cannot predict accurately, in advance of a natural hazard event, whether a firm will fail or survive the event over the long haul. One can, however, given what we have learned from this research, estimate the probability of survival of a firm given a set of externally-determined events and a set of choices made by the organizational owner or manager.

The End

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