

Chapter 2

Organizations Under Siege: Innovative Adaptive Behaviors in Work Organizations

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Abstract By examining the actual behavior of both managers and employees in work organizations during a crisis, we were able to better understand conditions facilitating an organization's ability to maintain operational continuity. Building on theories of organizational and disaster behavior, a working model was developed and tested from evidence acquired from work organizations that were subjected to massive Katyusha rocket bombardment of Northern Israel in 2006. The results support the notion that organizational response to a disaster includes a social process of innovative behavioral adaptation to changing and threatening conditions. Based on both perceived and actual financial performance levels during the crisis, we discerned that on the one hand, the organization's managers react within the administrative constraints of their organizations according to their perception of its performance. The day-to-day operations, however, are maintained as employees' adapt their own behavior to the changing demands of the situation. The analysis further shows that although plans, drills and emergency regulations are important for performance behaviors during the emergency, it was employees' innovative adaptive behaviors that contributed to maintaining actual organizational performance. These adaptive work behaviors depended on a series of social process predictors such as the levels of emergent and prosocial behaviors as well as the densities of social networks at the workplace. The findings both support and focus on the role that external organizational disruption can have on innovative organizational adaptation and change.

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2.1 Introduction

Social responses to disasters have been portrayed in terms of behaviors that emerge from groups during a crisis; being variously described in terms of innovation [1], situational adaptation [2], and evolving into disaster subcultures [3]. For the most part, such studies have focused on individuals, groups and agencies within the larger community [4, 5]. Sparse attention had been given to these same phenomena within work organizations with even less attention on actual behaviors [6, 7]. Like communities, work organizations represent structured social phenomenon embedded in society. And like communities, organizational continuity during disasters is critical for societal maintenance [8]. Therefore, we would expect similar types of social response behaviors in organizations. This, however, may not be the case as work organizations are far more constrained than communities in terms of their administrative and social structures. Our aim here will therefore be to explore if similar responses are indeed found within work organizations and if these responses have an impact on the continuity, maintenance and viability of such organizations.

Until now, efforts at explaining organizational continuity continue to be dominated by its crises management roots, including integrating strategic management with crises management [9]. This approach is reinforced by practitioners and governed by an international inventory of “standards and guidelines” (for example, [10–12]). As such, the literature is biased toward business aspects of organizational continuity, providing numerous “what to do” lists and specific case studies. Unfortunately, there are few confirmatory studies that such ‘standards’ are effective in maintaining continuity of operations. In a broad sense, the process of organizational continuity within work organizations remains an anomaly. This is troubling because of the practical implications that research can bring about to enhance or dampen an organization’s ability to maintain operation of continuity.

To better understand this phenomenon, we will take the view describing community responses during disasters, namely that continuity also involves a social process of innovative adaptation. This means actual organizational behaviors that emerge during emergencies contribute toward the maintenance and continuity of operations. This strategy, we argue, provides two major benefits: it provides a framework for an interdisciplinary approach cementing organizational and disaster behaviors into a coherent framework and it contributes to organizational theory by focusing on ways innovative adaptation occurs during the sudden onset of environmental disruptions.

2.1.1 *Unusual Events*

Several approaches have been put forward that link macro-level organizational and disaster behaviors, all based on the notion that organizing and adapting is the prime set of behaviors associated with group survival [13]. The two general systematic approaches, contingency theory [14, 15] and ecological theory [16], emphasize the important, or even critical need in organizations for structural flexibility so as to fit the demands of a changing environment that may threaten an organization's operational maintenance. As organizations do not exist in a vacuum, they tend to adapt to environmental changes, such as disruptive disasters or emergencies, as a way to assure their survival. Therefore, any irregular event in the organization's internal or external environments such as a crises or full blown disaster might cause a disruption to the routine operations. As a consequence, actions are taken by members of these organizations to bring about changes in goal designation through operational means to achieve the original objectives.

The implication is that the reaction of an organization and its members to a disaster as a non-routine socially based event [17] may well be nontraditional, out of the ordinary and based on adaptation to the short-term challenging demands of the new environment. For example, work organizations may temporarily move operations, or have reciprocal agreements with other companies or supply chain alternatives. Typically, those involved in research related to organizational crisis management have put emphasis on short term changes in structural characteristics such as realigning organizational communication networks [18–20], organizational flexibility in the decision making process [21], improvisation [22, 23] and coordination and task integration [24]. In addition, some have argued that increasing organizational resilience during emergencies can be attained by enhancing an organizations social capital and networks thereby improving the ability to exchange information and foster the achievement of shared goals [25].

This pattern of response to disasters from both contingency and crisis management perspectives are expected to drive organizations to immediately adjust and adapt to the abrupt changes in the environment as a means to ensure operational continuity. However, repeated business collapse due to disasters, even among well established firms, [26], suggests that this may not be the case. Even with “pre-planning” for such emergencies, there is no consistent perception of what preparedness entails [27] and usually an underestimation of victims' ability to cope with disaster and the extent of expected disruption [28]. All these perspectives touch on organizational characteristics, but only rarely include those that are inherently associated with employee behavior within the organization. This raises an issue that perhaps can be resolved by examining more closely the concept of organization continuity and its antecedents.

2.1.2 Organizational Continuity

The present thrust of organizational continuity, especially with its emphasis on “business”, reflects a Taylor like perspective of work organizations as rational administrative structures which can be easily manipulated; a perspective that frames continuity as a system engineering exercise rather than a social process. The present definition defines “business continuity” as “business specific plans and actions that enable an organization to respond to a crisis event in a manner such that business functions, sub-functions and processes are recovered and resumed according to a predetermined plan based upon their criteria to the economic viability of the business” ([29], p. 8) The “what to do list” differs by agency source. For example, the most common acronym is COOP sometimes defined as ‘Continuity of Operations’ [11, 30] or ‘Continuity of Operations Planning’ [31]. In general, the emphasis in all is on functions, operations, facilities, equipment and records, mentioning managerial leadership as an integral part of making the plan work. It assumes that intervention by following a ‘do list’ will assure continuity of operations. This perspective of organizational continuity leaves a lot to be desired as it fails to provide us with an understanding of what this construct represents in terms of organizational survival. It also assumes that organizational continuity is the end product of purposeful intervention rather than an integral part of the adaptation and operation maintenance that takes place during disasters and emergencies within organizations. It should also be stressed that guidance documents (“checklists”) are primarily employed as criteria for judging the output of continuity plans, and do not provide explanations regarding the process by which such plans are effective in enhancing organizational continuity. A typical example of this, as previously noted, is the FEMA guide for business and home safety [32].

What we contend is that organization continuity (OC) is not only the outcome of a work organization’s members coping with an emergency, but rather is a social process within the organization leading to operational maintenance and resilience. In this framework, OC is a social construct composed of multiple facets. As organizations are social units, we also suggest that social factors and processes inherent in disaster situations found to affect, for example, other types of organizations such as communities, may also be appropriate as guidelines in understanding the continuation of operation in work organizations. The literature on emergencies and disasters includes such factors as emergent behavior [33, 34], preparedness [35, 36], pro-social behaviors such as mutual help and volunteering [4, 37], social networks and information flow [13]. All are basic behaviors displayed in a broad range of emergency and disaster situations and can potentially be utilized in understanding the process of organizational continuity.

2.1.3 Disasters and Work Organizations

Most of the conceptual and empirical studies of work organizations’ ability to maintain operational viability under threat and disaster have focused on work

organizations' characteristics such as size, age, and ownership as determinants for increasing chances of survival [7, 26, 38]. Other studies have been conducted in terms of crisis management; mainly focusing on managerial decision making processes [21] and/or communication networks [18–20]. Not surprisingly, the majority of studies linking disasters and organizations have centered on the major public sector service agencies dealing with disaster management, primarily in the hope of increasing their effectiveness [36, 39]. This emphasis has, it seems, diverted attention from investigating innovative adaptive processes in a wide range of private and public organizations that have, or are undergoing the effects of disasters. In addition, the small numbers of studies that have looked at work organizations continuity have relied primarily on a post-disaster examination of (small) business that survived (Gordon and Richardson [40] in [7]). To overcome this gap, given the critical importance of resilient economic-based organizations in contrast to the sparse evidence enabling such resilience, it becomes incumbent upon us to explore disaster related behaviors during crisis situations. In addition, by being able to reasonably predict such behaviors, preparedness actions can be intelligently initiated leading to minimizing loss of life and financial costs.

The basis for such behaviors is the ability to overcome and mitigate the consequences of disasters and is mainly rooted in the collective emergent behavior of those affected [41]. This includes behaviors found both inside and outside the work organization. Overall there is strong empirical evidence that resilience and recovery is predominantly accomplished through group social processes primarily within the family and community [41, 42]. This can be seen, for example, in household and community preparedness behaviors [35], emergence of disaster subcultures [3] and the spontaneous appearance of prosocial helping “emergent groups” in disasters [42]. In addition, it can also be seen in the broad range of adaptation behaviors of individuals and family units to prolonged terrorism [36], increased workplace comradeship and helping behavior among employees in crises [43], and improvisation of inter-organizational coordination [44].

Underlying adaptive disaster behaviors such as improvisation lays an assumption that this type of disaster behavior is developed through a particular type of organizational culture (or climate) that enhances better individual adaptive behaviors.

Taken together, these fundamental disaster-related behaviors are also likely to be found in an organizational framework as they reflect social behaviors that are universal in character. What can be expected is that the structural framework of organizations will have an impact on how such disaster behaviors will be acted upon.

2.1.4 Behavior in Organizations During Disasters

As both managers and employees are inextricably bound within an organization, both are also involved in emergent behaviors that arise during a disaster. Research in the field of collective coping responses to stressors at work, for example, found

that mutual help [45], increasing communication [46], reduced status differences [47], task-related communication and integration among employees [48] were the main behavioral collective mechanisms to external and internal pressures on the organization. Drawn primarily from contingency theory, we also note innovative adaptive behaviors as a response to disasters or emergencies that are based on factors outside the organization that might have an effect on the individual's behavior within her/his work place. Adaptive disaster behavior, however, cannot be expected to appear during routine periods of organizational activity as they are directed at survival during life threatening emergencies. We already know that family, community and social networks have a strong influence on an individual's behavior, especially in emergencies and under circumstances of uncertainty. These include information diffusion, social norms and risk perception [13, 36]. Therefore, employees might experience role conflict as a result of two conflicting obligations: on one hand, employees are subject to the organizations' administrative decisions, and behave according to their job commitment, professional status and the organizational culture. On the other hand, as social networks members (e.g., family, community, team mates), they are influenced by social pressures calling upon them to avoid the danger and not to go to work, sometimes with feelings of fear and anxiety. For example, the role conflict of family responsibilities in contrast to work commitments.

From a managerial perspective, the ability to implement rapid changes and adjust to a new environment due to a crises will differ from organization to organization, according to its market position [26], centralization of decision making process, the ability to transfer information quickly [49], organization's size and age [50], and previous experience with disruption [51]. These different managerial-administrative characteristics, especially in the way they are implemented, may have a positive or negative effect on the informal social processes in the organization, and consequently impacting the organization's ability to survive and recover. What is not clear, however, is the impact of managerial decisions during a crisis on the actual disaster behaviors of employees.

2.2 Working Model

To better understand the process of organizational continuity during disasters, we developed a working model (See Fig. 2.1). It focuses on employees' and different ranked managers' actual behavior as well as the organizational and administrative components in this process. Both encompass a broad range of activities and operations during a disaster within an organizational setting. As for the employees, we examined behavioral variables such as adaptive behavior, social networks and pro-social behavior found to enhance resilience in various social settings in past researches [2, 13]. In addition, as employees behavior is embedded in an organizational setting, we related to a managerial or administrative framework within which employees could act. These included both managerial and employee

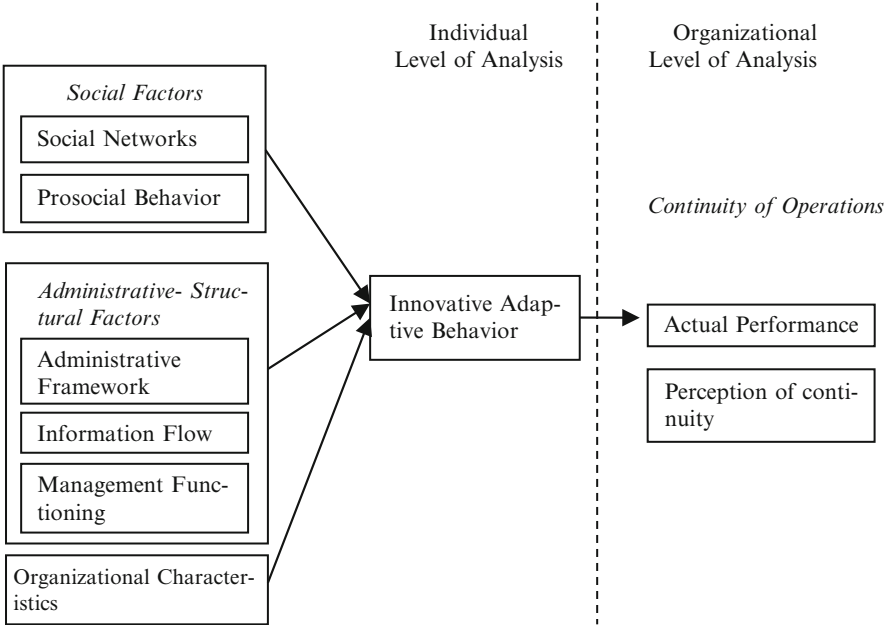


Fig. 2.1 Theoretical research model

responses to the crisis, such as information flow, and perception of management functioning. As our model suggests, an organization’s operational continuity will be achieved through a combination of both managerial and employee actions. Common “business continuity” planning guides emphasize an organizational-administrative perspective as the key to maintaining operational continuity in response to an uncertainty and/or crisis. We, however, argue that a more broad process, based on social and administrative factors arises within work organizations during a crisis situation which is a critical determinant for operational continuation and resilience.

To support this argument, we divided the actions being carried out during a disaster into two main groups: social factors and administrative-structural factors. The first includes the actual behavior of employees and managers, through social networks and prosocial behavior. The second refers to distinct organizational-administrative actions and perceptions by organizations’ members of actions that enable, in a work-organization setting, the appropriate behavioral adjustment to new crisis situations. Included are also the socio-demographic work related characteristics of the employees that provide an insight into how such background profiles can affect disaster related decisions. By combining these elements, we anchor the members’ response directly to a social process carried out by managers and employees within the framework of the organization. In this way, we contend that organizations exhibiting an enhanced set of such social processes will perform better in times of disasters.

Maintaining levels of performance that can contribute to the ability of an organization to continue its operations, however, can alternatively be measured in terms of actual financial levels of performance or, as studies have suggested, be measured in terms of perceptions of performance [52, 53]. The theoretical working model provides an opportunity to examine both these measures. In addition, we have taken into account the possibility that the emergence of such disaster related social processes within organizations may not appear immediately but evolve over time. From the working model several propositions can be drawn. These can be generalized as follows: (H1) At the individual level of analysis, of all the potential explanatory factors, innovative adaptive behavior derives from social rather than administrative factors. (H2) At the organizational level of analysis, organizations under a concrete threat of a disaster will be characterized by strong social behaviors in contrast to administrative variables. (H3) Innovative adaptive behavior will predict continuity of operations (in means of actual performance) during disaster significantly more than administrative variables.

2.3 Strategy

In this research we focus on conceptualizing organizational continuity as an internal organizational social process that increases chances for maintaining operational continuity after a disaster. To understand this social process, we employed a field study to examine the actual behavior of employees and managers in different sector organizations who were in operation prior to, during and after the Second Lebanon War that occurred in northern Israel during July-August 2006. During 33 days of war, more than 3,600 Katyusha missiles were fired on northern Israeli civilian targets, disrupting civilian life in that area with lost revenues estimated at 1.4 billion dollars. Approximately one-third of the northern population left their homes for safer areas with warning alarms of immanent missile impact averaging three times per day in most urban and suburban areas.

To develop and test the concept of organizational continuity as a social process we extended the literature in crisis management that focus on managerial decision to include employees disaster related behaviors. To do so we made use of two sources of data: (a) weekly data from the employees and managers about their actual behavior before, during and after the missile bombardment; collected by a structured questionnaire given directly to employees and managers and (b) objective business data about performance (e.g., before, during and after the war sales, production levels, attendance, cash flow, etc.). By dividing the data into stages, 3 months before the war, at the beginning of the war, later on during the war as well as financial data 2 months after the war, we were better able to examine patterns of organizational learning, decision making and adaptation to the changing demands of the environment.

2.4 Methods

2.4.1 Data Sources

The core data set was based on purposeful sampling of private and public sector organizations from manufacturing, retail service providers to public institutions. Of the 40 organizations originally approached just after the missile bombardment ceased, 24 agreed to allow us to question employees and managers. However, we had a final sample of 17 organizations that had provided us with all information, including performance data. All the organizations were in full operation before the war and were all located in areas under bombardment. We randomly sampled 50 % of the employees in each of the companies. The overall response rate was 20 % with the final sample composed of 421 individual responses. A basic explanation for this response rate may lie in the fact that we surveyed only those who worked during the war days, and who could assess the organizational operation. The business organizations surveyed included seven branches of a nation-wide retailer services firm, located in city centers and shopping malls. Also included were four factories manufacturing medical equipment, steel, textile and chemicals. All these factories export their products and employed 70–250 workers. In addition, the public/governmental organizations included an academic educational center and an institution for disabled and mentally challenged adults. Finally, we surveyed various service-sector organizations, including a large service garage located in the heart of an industrial zone, sports center, cellular-phone firm, and a logistics service company. The data was collected 2 weeks after the war had officially ended (cease-fire was declared). However, the situation was still insecure and volatile. Although life got back slowly to normal, the emergency situation was still in place.

Before randomly distributing the anonymous questionnaires to employees and managers, a pilot study assessed the robustness of the measures. Little in the way of prior scales or measures were available for replication leading us to devise measures based primarily on theoretical variables proposed in the working model that could potentially contribute to our understanding of processes involved in organizational continuity. The initial result of the field survey reveals that respondents reported either direct-hits, near misses or missiles falling nearby. Nearly half stated that work routine remained as it had been prior to the Katyusha attacks. About a third reported that the work routine had been to a large extent been maintained while the remainder described a definite reduction in operational capacity.

Of the 421 employees that were sampled, there were slightly more women than men (57 % vs. 43 %). The average age of the employees was 41.8 (S.D = 11.49 years), 70 % were married and 70 % defined themselves as religiously secular. About 30 % (28 %) stated their income as average or above average (26.5 %) with 20 % below average (19.7 %). Most of the employees live near their workplace, close to 80 % (78 %) mentioned that commuting time ranged between a minute to half an hour. It is important to point here out that we surveyed three

factories in three different “Kibbutz’s” (the Israeli cooperative settlements) and in these cases most of the employees live in the Kibbutz itself.

2.4.2 *Measures*

2.4.2.1 **Dependent Variable**

Continuity of Operations

Continuity of Operations was measured on the basis of performance through two factors: (1) “actual performance”: objective data based primarily on financial and production performance prior to, during and after the bombardment; and (2) “perception of continuity”: the managers and employees’ self perceptions of the extent to which the organization had managed to maintain its routine before, during and after the missile attack.

Actual Performance Measure

In order to compare performance levels of the varied work organizations, we chose to contrast pre-war with during (and shortly after) performance levels. For example, in manufacturing organizations we used actual data received from finance managers at each factory regarding the number of units produced during the war in contrast to pre-war levels. For service businesses and public organizations we used self reported data on the “readiness” to provide services measured in terms of time that passed until the customer was served in comparison to the pre-war period. This measure for service continuity reflected our concern that decreases in income may imply low customer flow but not necessarily reflect adapting to the situation. We therefore contrasted employees and managers readiness to provide service rather than sales itself as a means of reflecting the organization’s efforts to achieve normal standards in non-routine times. Therefore, on the basis of these comparative measures we propose the following formula that provides the (percentage) degree of change over the war period compared with periods of routine operations. In short, “Performance” measured the decrease in income during the war compared to pre-war levels of performance.

$$P(t) = 100 - \left(\frac{WA}{BW} \right) * 100 \quad (2.1)$$

where: P(t) is Time Specific Decreases in Performance during war Contrasted to pre-war performance levels; 100 is Standardized pre-war performance level; WA is War Average Rates based on time specific performance rates (beginning + during war); BW is Pre-war performance rate.

2.4.2.2 Perception of Continuity

We used the variable “Perception of continuity” to evaluate organizational continuity as perceived by the employees and managers. Numerous social-psychological studies [52, 53] have looked at perception in an effort to explain organizational behavior. Building on this, we asked employees and managers about the extent to which the organization had managed to maintain its routine. This included the following four questions (answers ranging from “1” = “do not agree” to “4” = “I completely agree”): “to what extent do you agree with the following sentences:” “the routine was kept as much as possible”, “my team achieved its weekly goals”, “the situation caused disruption to my work routine”, “there was a feeling of uncertainty regarding what I have to do”, The Cronbach’s Alpha index for these items is 0.68.

2.4.2.3 Independent Variables

Innovative Adaptive Behavior

Innovative Adaptive Behavior was measured by a series of questions regarding the non-routine disaster behavior that was carried out by employees during the bombardment. Referred to as “emergent phenomena” [41], such behaviors occur during a disaster and emergency with individuals and organizations replacing their traditional behaviors, structures and functions with new ones. Other researchers noted ‘creativity’ and improvisation to be the main and important characteristic of human behavior during crises [44]. Building on these notions, we employed the term “innovative adaptive behavior” to describe the appearance of new behaviors and activities that could be best described as adaptive, innovative, creative actions. Therefore, we expect that during disasters or emergencies, organizations, as with other kinds of social units, will experience the emergence of new behaviors that will enable organizational continuity of operations. This variable is composed as a sum of answers to a series of questions. Among these questions are (on a Likert scale ranging from 4 = to a very large extent, to 1 = to very small extent): “I took extra responsibilities in contrast to previous regular times”; “I worked overtime without being asked (more than in my usual shift)”; Cronbach’s Alpha for this variable is 0.77.

Social Networks

Social Networks have been found to be particularly important in explaining a varied number of disaster behaviors at the community [36, 54] and individual levels [55]. While we will focus on the structural characteristics of network interaction, other facets are also involved such as norms, culture, symbols and values. It is for this reason we sought out social ties and networks among the employees that would partially reflect the broad band of such ties before, during and after the missile

attack. The variable measure is a sum of the respondents' agreement on a Likert type scale (4 = to a very large extent, to 1 = to very small extent). Items included: "Social ties among team mates were strong before the war" and "It was important for me to consult with colleagues what to do when the alarm begins"; Cronbach's Alpha score for these items is: 0.79.

Prosocial Behavior

Prosocial Behavior refers to the social response of the employees and managers, in terms of helping behavior, leadership, actions of empathy and mutual help. This variable reflects a social process being carried out by employees during the disaster, and is not particularly related to the work itself. This concept expands the idea of 'convergence' found in the disaster literature when individuals (usually volunteers) seek to improve conditions created by a disaster due to physical proximity or abilities to do so [37, 56]. In our case such prosocial helping behavior by employees focuses on what occurred when seeking shelter and emotional support from workmates at the workplace. Such convergence should increase when "official authorities" do not necessarily fill in the personal and emotive needs of their employees during such crises. Here, we also employed measures based on a sum of answers to six questions on a scale ranging from 4 = "to a very large extent" to 1 = "to a very small extent". Among the questions were: "I provided mental support for my mates who need it in the shelter" and "I helped mates to reach the shelter during the alarm". The Cronbach's Alpha score for these items is: 0.85.

Administrative Framework

As in any social unit, employees and managers, as social players, are subordinate to the organizations, constrained primarily by administrative directives and reward systems. Understanding these constraints might shed light on behaviors when operational continuity was severely disrupted. For this reason we asked employees about their expected work obligations. This included eight questions that inquired of employees if "the management allowed employees to be able to work part-time", "the management forgave absences", "the management provided a safe shelter", "management reacted with understanding to parents with children", "management moved employees to other sites (if possible)", "management let employees take part in decision making process", "management took care for employees welfare", and "management arranged transportation to the workplace and back home (if not exists usually)". All these questions were based on a four levels Likert-type scale ranging from 'I disagree with this notion' (=1) to 'I completely agree' (=4). The Cronbach's Alpha for these items is: 0.73.

Management Functioning

This variable measures how employees assessed the behavior of management in response to the changing situation. It includes three questions regarding if “the management made decisions quickly”, “management changed goals according to the changing conditions” and the degree to which “management worked as usual”. This variable was sum of the answers to these questions, where answers range from “I disagree with this notion”(=1) to “I completely agree”(=4), with a Cronbach’s Alpha of 0.76.

Organizational Characteristics

We chose two fundamental characteristics to differentiate the organizations on the basis of output, namely manufacturing and non-production type organizations. Production units were coded as “1”, and “non-production” (service, governmental and public organizations) was coded as “0”. In addition we examined each respondent’s work status level within the organization as a dummy variable. Here, managerial level employees (=“1”) included senior and junior levels shift managers, team leaders etc. while employees who did not define themselves as managers were coded as “0”.

Information Flow

An important possible explanatory variable in the organizational continuity process outlined in the Model includes how information was disseminated within the organization and its impact on disaster related behaviors. Both in organizational and disaster studies, information plays a vital role in how decisions are made and what behaviors can be expected [57]. Within organizations, information can flow vertically as well as horizontally; from management down or among employees. To capture these variables and assess its impact on adaptation within an organization’s maintenance of operations, we put forward three questions measuring the degree of information flow during the disaster. These included, among others (on the following scale (4 = to a very large extent, 3 = to a large extent, 2 = to some a extent, 1 = to very small extent)): “The management initiated informative talks to all employees about the situation”; “I quickly got information regarding the situation at work”; “My direct manager contacted me on a regular basis”. The answers were summed into this variable. Alpha Cronbach’s is 0.76.

Overall, Table 2.1 summarizes the descriptive statistics of the models’ variables.

Table 2.1 Descriptive statistics for main variables (at the individual level)

Max.	Min.	S.D	Mean	Variable
16	4	3.50	16.20	Perception of continuity
16	4	3.31	9.67	Innovative adaptive behavior
24	6	4.36	17.27	Prosocial Behavior
24	6	4.32	14.14	Social Networks
32	8	4.71	19.50	Administrative Framework
12	3	2.35	8.65	Management Functioning
12	3	2.44	8.25	Information Flow

2.5 Results

2.5.1 Individual Level Analysis

2.5.1.1 Innovative Adaptive Behavior

An initial correlation matrix clearly demonstrated how these separate items were highly and significantly inter-correlated, reflecting the complexity and number of social behaviors interacting within the organization during crises (See Table 2.2).

Given the suggestion in the disaster literature that adaptive behavior emerges during disasters and in crisis situations, we set about determining which of these organizationally based social behaviors could best predict the adaptive ability of employees. An initial linear regression model revealed (See Table 2.3) that social network densities significantly explained the emergence of innovative adaptive behaviors, reinforcing H1. This hypothesize stressed that innovative adaptive behavior will have social roots rather than administrative ones, and as the results show, dense social ties stand as the basis of innovative adaptive behavior In the second iteration we inserted into the model organizational oriented variables, finding that social networks remain robust predictors of innovative adaptive behavior. Furthermore, for production organizations, adaptation was significantly higher than for service organizations.

Linear regression predicting innovative adaptive behavior by social and organizational variables (at the individual level).

2.5.2 Organizational Level Analysis

Our next concern was to assess the degree that such behaviors affected the overall performance of the organization experiencing the month long bombardment. To do this we first tracked over time how, and if, the crises had in fact affected the performance of the sampled organizations. To do so we first traced factual based performance records based on sales, cash flow, production and budget on a weekly basis. We opted for a mix of actual outputs but transcribed them all into

Table 2.2 Correlation matrix of main variables (at the individual level)

	N	1	2	3	4	5	6	7
1. Innovative adaptive behavior	392	1						
2. Prosocial behavior	381	0.33**	1					
3. Social networks	383	0.35**	0.52**	1				
4. Administrative framework	382	0.21**	0.31**	0.32**	1			
5. Management functioning	393	0.14**	0.30**	0.20**	0.30**	1		
6. Information flow	394	0.23**	0.39**	0.33**	0.46**	0.50**	1	
7. Organizational type – service	421	−0.13	0.10	0.06	−0.15**	−0.00	−0.11*	1
8. Work level – managers	402	−0.00	−0.02	−0.00	−0.07	−0.10*	−0.08	0.02

** p < 0.01

* p < 0.05

Table 2.3 Linear regression predicting innovative adaptive behavior by social and organizational variables (at the individual level)

Variable	Model 1	Model 2
Social oriented variables:		
Social networks	0.245**	0.267**
Prosocial behavior	0.077	0.093
Information flow	0.066	0.00
Administrative framework	0.064	0.066
Management functioning	0.032	0.08

** p < 0.01

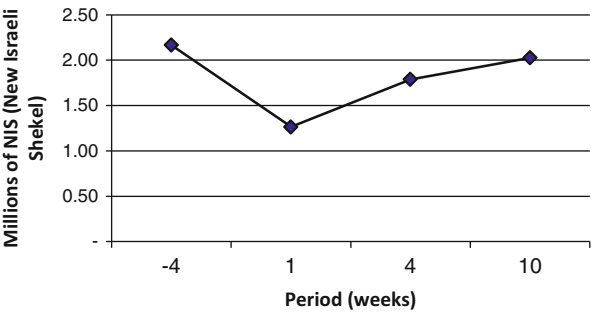


Fig. 2.2 Average sales rate of the sampled private (Organizations before, during and after missile attacks)

a single common denominator, namely revenues. As Fig. 2.2 shows, the initial start of the war led to a sharp dip in actual performance measured by objective output data during the first week followed by a slow but steady increase towards its end; but never-the-less reduced capacity performance after the war ended. These changes were found to be significant in a within-subjects repeated measures analysis (($F_{3,60} = 101.067$, $p < .0001$).

Table 2.4 Correlations among different variables (at the organizational level of analysis)

	N	1	2	3	4	5	6	7
1. Continuity of operation-performance	17	1						
2. Innovative adaptive behavior	17	0.56*	1					
3. Prosocial behavior	17	0.26	0.35	1				
4. Social networks	17	-0.33	0.08	0.45	1			
5. Administrative framework	17	-0.32	0.07	0.36	0.30	1		
6. Management functioning	17	0.27	-0.10	0.25	-0.52	0.10	1	
7. Information flow	17	-0.14	0.00	0.63**	0.33	0.55*	0.12	1
8. Perception of continuity	17	0.12	0.56*	-0.03	.10	-0.46	-0.33	0.00

*Correlated at 0.05 level
**Correlated at 0.01 level

The initial dampening of production and its steady increase suggested that some form of organizational change occurred in performance levels as the frequency of the bombardment did not abate during the entire war period. During this same period over a third of the Northern residents being bombarded left the area [58] depleting manpower resources and potentially affecting the maintenance of production and services. All this strongly suggests that after the initial “shock” of the disruption during the first week of the crisis, there began a process which led to changes within the organizational structure that affected continuity of operations. We thus contend that this resurgence in performance was due primarily to the emergence of adaptive organizational behaviors, a contention to be evaluated below.

To test this contention required a more detailed examination of social processes occurring within the organizations during a disaster. We therefore first examined the intercorrelations among the different research variables and also actual performance (See Table 2.4). The results showed a strong positive significant correlation between information flow and prosocial behavior ($r = 0.61$, $p < 0.01$). This suggests that in a concrete disaster, information flow and prosocial behavior work hand-in-hand. Information flow was also significantly and positively correlated to the administrative framework ($r = 0.55$, $p < 0.05$). Apparently, during the emergency information was shared between managers and employees regarding what is the expected behavior from the workers and what conditions (welfare, protection etc.) are provided by the management.

Furthermore, examining the two measures of continuity of operation, actual performance and perception of continuity intercorrelations with the research variables, has revealed interesting results. First, there was no significant correlation between actual performance and perception of continuity. This suggests, that at organizations where employees perceived the routine as continuing during the disaster, there is no evidence supporting actual continuation ($r = 0.12$, N.S.).

In addition, perception of continuity was significantly correlated to innovative adaptive behavior, suggesting that higher levels of innovative adaptive behavior contributed to perception of continuation of routine. The results also show that

Table 2.5 Variables predicting continuity of operation (at the organizational level of analysis)

Variable	Model 1	Model 2
(Constant)	139.577	79.925
Administrative framework	−0.246	−0.344
Information flow	0.060	0.219
Innovative adaptive behavior		0.579*
Adjusted R ²	0.01	0.23

* $p < 0.05$

none of the variables, except for innovative adaptive behavior was significantly correlated to the level of actual performance. Here too, we see that organizations with high levels of innovative adaptive behavior were also more productive during the acute crisis period ($r = 0.56, p < 0.05$). These findings partially support H2 as we expected to find significant correlations between prosocial behavior and social networks reflecting ongoing social process within organizations during the crisis. This lukewarm support for H2 led us to examine in more detail social processes occurring within the organizations during a disaster.

Investigating this further, we employed regression models. Due to the relatively small number of participating organizations, we were constrained in the number of independent variables inserted into the regression (Table 2.5). Our intention here was to examine if “managerial” or “behavioral” variables would positively affect actual performance. We therefore ran a two-step linear regression. In the first model we regressed two “managerial” variables: administrative framework and information flow. In the second model we added innovative adaptive behavior. We used only innovative adaptive behavior, as we demonstrated earlier in the paper that this unique behavior has social roots, and therefore, it reflects the extent of the organizations’ ongoing social process, although it is measured as an individual behavior. The results in this first model showed no significant effect on performance. But when we added to the model, in a second step, innovative adaptive behavior, we found it to be significant. In this second model managerial decision making made within an administrative framework and information flow were insignificant in predicting actual performance as in the first model. Rather, innovative adaptive behavior, performed by employees and managers, was found to improve performance. Therefore, H3, arguing that organizational performance will be effected by innovative adaptive behavior was supported.

2.6 Summary and Conclusions

The ability of managers and employees to maintain organizational continuity during a major crisis is a litmus test of an organizations ability to survive and develop. How and what is involved in maintaining continuity of operations is, however, still stymied by the lack of interdisciplinary consensus of what constitutes the core social processes involved. We have argued that examining disaster behaviors found

in different social settings such as the family and community can be utilized in an organizational context and should provide a theoretical framework from which to better understand what constitutes organizational continuity and the role that managers and employees play in this process. To do so we developed a working model which views organizational continuity as consisting of a complex set of organizational social processes and focusing on disaster/emergency issues that would have a direct impact on organizational performance. In our view, the “bottom line” for maintaining continuity of operations should be measured in terms of a survival quotient based on actual financial performance. To this end we devised a research strategy that examined both employees and managers’ behavior in Israeli public and private sector organizations that had been subjected to a massive missile attack over a month that severely disrupted daily life.

As a first step, we focused on the performance levels of the sampled organizations over time. The results of objective performance data showed that the initial onset of the disaster disrupted performance, leading to a major decline in the first week of the missile attacks, followed by a continuous steady increase in performance during the remaining 3 weeks of the war. This recovery period suggests that, despite the continuing bombardment and depletion of manpower, something occurred that acted to fortify the organizations operational ability.

Employing the theoretical working model as a benchmark, we first examined the extent that disaster related behaviors occurred for managers and employees within their respective organizational framework. Not unsurprisingly, we noted a complex number of socially based organizational behaviors that were directly applicable to the crisis situation. These included innovative adaptive behaviors that acted to fill in gaps in disrupted service and production systems and significantly affected continuity of operation in terms of actual performance. In addition, social behaviors such as pro-social helping and support activities among workmates, an intensification of social network interactions among employees as well as greater sensitivity to the flow of information form the basis of innovative adaptive behaviors, which, in turn lead to improved organizational continuity during and after the emergency.

The implications of these results also provided substantive clues as to the mechanisms through which organizational change occurs. By viewing organizational continuity as part of a larger theoretical framework focusing on organizational change, crises, in its broadest sense, opens a window of opportunity to gain a better sense of how change takes place. From the extreme case we examined here of missile attacks to the less discerned processes initiated by “management” to make their organization more competitive in the market place, all exhibit organizational behaviors that in one form or another relate to differing levels of crises. All relate to minimally maintaining continuity of operations, be it is due to potential physical destruction or being under priced by competitors. In these cases, crisis forms a common base line that would likely affect change as the bottom line objective is to heighten continuity. In our case, internal social processes enhancing innovative adaptive behaviors and crisis focused managerial behavior made a significant contribution to explaining bottom line performance. Therefore, while the level of

the “crises” may differ, the organizations’ objective is to set in action both structural and group changes that imprint on the organizations ability to maintain or increase its performance and through this its continuity. Examining organizations that face major disruption to their continuity therefore provide a unique access to these processes.

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