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Organisational Crisis- Preparedness: The Importance of Learning from Failures

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Organisational crises are relatively low-probability, high-impact situations that threaten the competitiveness and viability of an organisation. As such, a key managerial challenge is to design and implement an organisational system that is capable of coping with these traumatic events. The results of this study indicate that learning from failures is an important facilitator of preparedness for both present and prospective crises. Although crisis experience and an industry's technological risk were not significantly related to crisis-preparedness, high-performing organisations reported higher levels of crisis-preparedness. We discuss how these findings may help managers to prepare their organisations more effectively for crisis situations.

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'Good people are good because they have come to wisdom through failure. We get very little wisdom from success, you know.' William Saroyan

Introduction

A steady flow of natural disasters throughout the world, together with the threat of viral pandemics, underscores how poorly prepared organisations are in the wake of crises. But although such catastrophes threaten the viability of organisations, it is more common for them to face crises that arise from organisational and market dynamics than from natural forces. After all, natural disasters such as earthquakes are acts of nature, over which humans have no control.¹

An organisational crisis is a low-probability, high-impact event that threatens the organisation's survival and is characterised by ambiguity of cause, effect and means of resolution, as well as by a belief that decisions must be made swiftly.² Yet although events that precipitate crises are

unexpected and their implications are ambiguous, organisational leaders are still expected to cultivate systems that are able to detect early warning signals, halt the development of emergent problems, contain them if their development cannot be halted, and then to focus on bouncing back from the ensuing performance difficulties.³

Crisis events are often critical turning points in a business's life. Whether such crises emerge from poor strategic positioning, managerial inertia and organisational stagnation⁴ or, taking a population ecology perspective, from a chance misfit between a particular type of organisation and its broader environment, such situations suddenly shine the spotlight on any major problem in the design and activities of an organisational system. To have and maintain an advantageous position in a complex and high-velocity environment, the top management team (TMT) needs to build up a repertoire of responses that will ensure the organisation's viability under all plausible circumstances. For example, a TMT is expected to ensure effective management of the relationship with the organisational stakeholders in times of growth and stability, but also during periods of decline and crisis. TMTs are intoned to be on the lookout for potentially disruptive events that could undermine key organisational processes. Such events include, for example, unexpected technical failures, or an unlikely but realistic convergence of disturbing phenomena such as a disruption in the supply chain network or rapidly escalating employee turnover. The need for attention to these areas often only emerges in times of crisis, when it is too late to start developing a viable crisis management system. Nevertheless, stakeholders expect the business to be prepared for adverse situations in a way that will enable an effective response.

Crisis situations suddenly shine the spotlight on any major problem in the design and activities of an organisational system

Starbuck et al.'s review of past organisational crisis events led them to paint a negative picture. Many of the organisations they surveyed were ill-prepared for critical situations, and most responded in ways that made these crisis events worse.⁵ While it is not possible to anticipate all problems and events in advance,⁶ evidence also shows that most business disasters occur because executives are caught out by foreseeable events.⁷ Organisations are thus often faced with substantial costs that could have been avoided or at least significantly reduced had these businesses been better prepared to manage the ensuing disruption. Understanding, coping with, and preventing avoidable crises are therefore important challenges for researchers and practitioners alike.⁸ For example, advances in technology often require radical changes in organisational design and leadership practices, and implementing these needed changes can trigger crisis situations.

Evidence shows that most business disasters occur because executives are caught out by foreseeable events

Although coping with such crises is crucial for the survival of an organisation, there is little research investigating how its culture may influence its responsiveness to crisis events. What makes a business particularly prone to a crisis event, or prepared for one, is an important subject of enquiry in organisation and management science.⁹ Regardless of the type of crisis, businesses need to instill active awareness and vigilance in their workforce so that potential crisis triggers can be recognised and brought to the attention of leaders. This may require unlearning modes of thought and action that may have served members well in the past but which constrain new behaviours more fitting to preparation against crises and crisis management.¹⁰

The literature on organisational crisis has burgeoned in recent years, but as yet there is no comprehensive model addressing the question of how businesses prepare for crises or why they behave the way they do. Such knowledge would contribute to crisis-preparedness, and would also help identify the processes that make organisations more proactive in adopting crisis prevention programs and crisis resolution policies and procedures. The study presented here aims to address this gap by exploring how salient failures can help employees unlearn previously appropriate behaviours,¹¹ in order to enhance organisational crisis-preparedness. We present a quantitative study of how behaviour learnt (or unlearnt) from failures helps organisations to be better prepared for crisis events.

Theoretical background and research hypotheses

Defining a crisis

An organisational crisis is a disruption that undermines participants' basic assumptions about the system within which they work. For a situation to be a crisis, it must meet two conditions. First, as proposed by Mitroff, the entire system needs to be disturbed in such a way that not only are operations fundamentally disrupted, but managers' and other employees' basic assumptions are challenged.¹² Secondly, there must be a serious threat to the very survival of the organisation. It is in an extraordinary situation involving the following potential risks: (1) further escalation of disruption within the business, (2) further deterioration due to related follow-ups by the media and/or the authorities, (3) interference in its regular affairs, (4) damage to the image of both the organisation and its managers/owners, and (5) damage to its productivity.¹³

Regester states that while a crisis is a serious threat to an organisation's survival, more than anything else it is an opportunity to rebuild a competitive reputation that will enable the organisation to meet the challenges of its missions. Similarly, Weitzel and Jonsson note that an organisational crisis creates a choice between reorientation and rehabilitation, or a turning point for bad or for good.¹⁴ Drawing on this literature, this study starts from the premise that an organisational crisis is a critical turning point that has the potential to dissolve or positively transform the business as a whole. We examine the importance of learning from experience in smaller-scale failure (pre-crisis) situations, where participants can identify faulty assumptions and when necessary unlearn the behaviours deriving from these assumptions, instead incorporating more appropriate behaviour patterns that can make the organisation less vulnerable to future crises.

An organisational crisis creates a choice between reorientation and rehabilitation, or a turning point for bad or for good

Conceptualising crisis-preparedness

Perrow argues that organisational systems are complex and imperfect and thus are prone to crisis events.¹⁵ All organisational systems are imperfect, and the more complex the business, the more prone it is to crisis events. Hence, systems should be designed in a way that enables effective management of crisis situations deriving from these failures. Crisis management refers to a series of on-going, interrelated assessments of the various events and forces that can pose a major threat to a company's main products, services, manufacturing processes, employees, environment, or communities. According to Mitroff, this consists of the design and implementation of key plans, procedures and mechanisms to prepare for crises, detect and contain them when they arise, and later lead the organisation to full recovery and enable it to learn from the experience.

Effective crisis management involves two key phases. In response to an existing trigger event, effective crisis management entails, first, individual and organisational readjustment of basic assumptions, and second, management of the behavioural and emotional responses which help to facilitate organisational recovery and readjustment. One example is Texaco's management of

the public release of secret tapes that revealed incidents of racist remarks by certain executives in a racial discrimination case. The company was ultimately perceived as responding to the problem, but more strikingly the CEO (Peter Bijur) used the incident to develop systems that reinforced more favourable ethical principles. This was done in a manner that was embraced by the broader workforce. Similar examples of businesses leveraging effective crisis management to institutionalise reforms abound in the literature.¹⁶

Some have the potential to cope better with crisis events than others. Crisis-prepared organisations, according to Weick and Sutcliffe, exhibit a different mindset from those that are crisis-prone. Crisis-prepared organisations conduct ongoing analyses of their operations and management structures and proactively monitor potential difficulties. Crisis-prone organisations tend to overlook or ignore warning signals. As noted by Mitroff and Alpaslan, crisis-prepared organisations invest heavily in prevention and risk management activities, whereas more crisis-prone businesses invest in crisis readiness only to the extent that it is cost-effective in the short-term. A longitudinal study of Fortune 500 companies conducted by the University of Southern California's Center for Crisis Management found that 95 per cent were completely unprepared.¹⁷

Only a handful of studies have sought to directly determine what differentiates crisis-prepared from crisis-prone organisations.¹⁸ This study aims to contribute to this literature by testing a plausible source of variance in crisis-preparedness — the willingness and capacity to learn from failures. In what follows we discuss the processes undertaken by crisis-prepared organisations, the concept of learning from failures, and the relationship between these behaviour patterns and crisis-preparedness.

The process of crisis-preparedness

In developing a conceptual model of the crisis management process, Pearson and Clair argued that leaders' perceptions of risk are a critical indicator of crisis-preparedness. When leaders' perceptions of risk are characterised by ambivalence or disregard for crisis preparation, the organisation is unlikely to adopt organisational crisis management practices. Conversely, when leaders demonstrate concern about the risk of future crises, an organisation is likely to foster crisis management programmes. Institutionalised practices and industry regulations further influence the likelihood that leaders' perceptions of risks will result in crisis preparedness activities.

When its leaders demonstrate concern about the risk of future crises, an organisation is likely to foster crisis management programmes

Sources of effective and ineffective crisis-preparedness

Crisis management, which *inter alia* involves crisis-preparedness programs, is both generic and complex. It covers activities rooted in organisational structure, culture and policies. But what processes enable an organisation to manage a crisis effectively, or conversely impede management? In his influential work, Perrow argued that sophisticated technologies sprout crises because their high complexity makes them susceptible to breakdowns. But technological breakdowns that may result in lethal accidents, are only one of various potential sources of organisational crisis. According to Mitroff,¹⁹ organisational culture is 'one of the main determinants of how it (the organisation) will respond to a crisis; which crises, if any, it will place in its crisis portfolio; and how it will cope with "early warning signals".'

In their study, Watkins and Bazerman²⁰ found that businesses failed to anticipate predictable surprises because of three types of vulnerabilities — psychological, organisational, and political. *Psychological vulnerabilities* are cognitive defects that leave individuals blind to approaching threats. For example, managers can fall into the trap of giving too much weight to evidence that supports their preconceptions and discounting evidence that is inconsistent with their beliefs. *Organisational vulnerabilities* refer to barriers within companies that impede communication and dilute accountability. Companies often consist of many units that access and filter information, thus providing

incomplete information to TMTs, making it harder for them to understand the overall picture. In addition, such complex organisational structures disperse perceived responsibility for crisis-preparedness. *Political vulnerabilities* stem from systemic flaws in decision-making processes. Positive group dynamics, such as collaborative practices and knowledge sharing, are critical for a TMT to make adroit strategic choices. Carmeli and Schaubroeck observed that behaviourally integrated TMTs were able to make higher quality strategic decisions and avoid situations of decline.²¹

There is a widespread belief that no business can prepare itself for every type of crisis. In fact, many people view crises as unavoidable disasters. However, research indicates that many crises are to a large extent predictable. But given that many crises are not likely to be readily predictable, it is more critical for organisations to understand how to build a mechanism that enables effective crisis management. We propose that unlearning behaviour patterns that are not suitable for the organisation is a key to adapting responses to existing crises and to preventing future ones. Next, we briefly discuss these forms of unlearning and their implications for crisis-preparedness, and then we derive testable hypotheses from our arguments.

Learning from failures and crisis-preparedness

According to some researchers, crises emerge as a result of a combination of relatively minor failures and dysfunctions across various organisational subsystems. Turner argued that when these signalling events are unnoticed, poorly communicated or misunderstood, they tend to accumulate to a level at which disasters are triggered.²² Drawing on this observation, we suggest that many crisis situations could be prevented or would not result in major damage if adverse events prompted participants to learn new behaviours. Edmondson and Moingeon refer to organisational learning as the extent to which members of a particular business actively use data to guide behaviour in order to advance the business's adaptability. Through this mechanism the organisation learns, understands and responds to changing environmental conditions. Similarly, Fiol and Lyles note that an 'alignment [with the environment] implies that the organisation must have the potential to learn, unlearn, or relearn based on its past behaviours.'²³ Unlearning is critical because the habits and beliefs that were previously thought to be useful may now be detrimental. While it is important to identify new behaviour patterns deriving from the learning that occurs following failures, in order to establish such new behaviour patterns, other previously learned behaviours need to be 'unlearned'.

Many crisis situations could be prevented or would not result in major damage, if adverse events prompted participants to learn new behaviours

According to Argyris and Schön, learning involves the detection and correction of error. This process can take two forms: *single-loop learning* and *double-loop learning*.²⁴ An error-and-correction process reflects *single-loop learning* when detecting and correcting an error permits the business to carry on its present policies or achieve its present objectives. Single-loop learning is like a thermostat that determines when it is too hot or too cold and turns the heat off or on accordingly. The thermostat can perform this task because it can receive information (i.e., the temperature of the room) and take corrective action. An error-and-correction process is *double-loop learning* when the detection and correction of the error involve modifying the business's underlying norms, policies and objectives. Considering the example of a thermostat, double-loop learning would occur if the apparatus addressed the causes of the temperature variations, such as a lack of insulation. A major pitfall of organisations is that they often detect and correct errors (*single-loop learning*) but do not look into the root causes of these errors or identify the new behaviours needed to prevent reoccurrences.

Relatively few studies have investigated the relationship between learning from failures and organisational outcomes.²⁵ Tucker and Edmondson examined how nurses responded to failures.²⁶ Their study observed two generally distinct responses: first- and second-order problem-solving behaviour. *First-order problem-solving behaviour* is a response to a given failure that only ensures the continuity of the operation or service without addressing the causes of the failure. Thus first-order problem-solving behaviour reflects single-loop learning. *Second-order problem-solving behaviour* is a response that not only corrects the immediate failure in order to ensure the continuity of the operation or the provision of a service, but also addresses the failure in a wider sense by either correcting its causes or alerting others to its occurrence. This reflects a double-loop learning process. Tucker and Edmondson found that second-order problem-solving behaviour was rare: nurses responded to failures with second-order problem-solving behaviour in only 4 per cent of the observed cases. Thus, despite a growing body of literature that stresses the importance of learning from failures as an essential ingredient for organisational innovation, adaptation, reliability and success, many organisations apparently fail to implement this advice and are therefore in peril of crisis.

Double-loop learning from failures and second-order problem-solving behaviours are important, not just for resolving current difficulties, but also for taking advantage of new opportunities. This study addresses this gap by testing how second-order problem-solving behaviour is associated with crisis-preparedness. Many crises emerge and evolve because system failures interact to generate a crisis situation. These failures could be addressed far more easily if second-order problem-solving behaviour were employed. For example, the catastrophe at the Union Carbide facility in Bhopal might appear to be the result of high-risk technologies, but according to Mitroff and Alpaslan it was more a case of a 'normal system-overload and malfunction problem.' At the time of the accident, Union Carbide's plant in Bhopal had a positive reputation for its safety system. Nevertheless, after the crisis, investigators realised that plant managers and employees had not learned new behaviours based on their experiences from previous failures. The possible consequences of locating the plant near a major railway station and a densely populated centre were not predicted or taken into consideration. Additionally, no thought was given to the nature of triggering events. Anticipating the consequences of such a breakdown would likely have led the decision makers to set up appropriate emergency procedures, which could have significantly reduced the damage to human life, the environment, the community and Union Carbide itself.²⁷

In many respects, the future of an organisation is embodied in the historical events it experiences.²⁸ Strategy researchers have documented the effects of managerial choices on the evolution of organisational context and performance. Hence, examining an organisation's history is important for its sustainability. Organisational histories invariably contain failures, and these events are critical for enabling the evolutionary process of the organisation.²⁹ As Mitroff and Alpaslan note, the crisis-prepared suffer fewer crises, recover faster, and are more profitable than the cost conscious, crisis-prone businesses.³⁰ This is the basis for the following hypothesis:

Organisational histories invariably contain failures, and these events are critical for enabling the evolutionary process of the organisation

Hypothesis 1. Learning from failures (a second-order problem-solving behaviour) is positively associated with crisis-preparedness.

Learning behaviour from failures is important for the creation of a crisis-prepared organisation, but other factors should also be considered. First, crises occur across a wide spectrum of sectors (public, not-for-profit, and for-profit). Though no industry is invulnerable to crisis events, industries differ in the extent to which their technological context makes them prone to such events. Insofar as many of these technological vulnerabilities are known and recognised, leaders in technologically risky industries are likely to invest more of their time and effort into inculcating the importance of crisis-preparedness into the company's culture. Organisations operating in high-risk

technology industries should be more vigilant about potential crisis events, and thus they may proactively develop plans to handle potential crisis situations. As noted by Weick and Sutcliffe, 'high-reliability organisations are distinctive precisely because they let fewer unexpected events blow up into crises.' Hence, it is likely that companies that operate in industries where there are high technological risks will be better prepared for crisis situations.

Second, organisations that have already experienced crisis events may also be more vigilant in detecting the problems likely to precipitate them, and protecting against potential crises. Businesses may be expected to learn from their own experiences and establish new ways to prepare more effectively for future crisis events. Crisis-prepared organisations pay considerable attention to ways in which crises may be prevented or contained effectively.³¹ Evidence provided by Weick and Sutcliffe indicates that those that are preoccupied with failures have a higher capacity to manage the unexpected because they encourage the reporting of errors and 'view any failure, no matter how small, as a window on the system as a whole'. We therefore examined both the technological risk of the industries in which the businesses operate, and their crisis experiences that might precipitate learning, as determinants of crisis-preparedness.

Hypothesis 2. Industry technological risk and crisis experience will be positively associated with crisis-preparedness.

Method

Participants and data collection

The data were collected using snowball sampling methodology, a proven technique for obtaining data across a relatively large variety of industries.³² Thirty senior managers taking part in an executive training program at a university in Israel were asked to identify organisations from various industries with at least 20 employees. Each manager was asked to identify about five organisations that had distinct characteristics. Beside this, no special instructions were given. All the managers in fact selected businesses to which they had access and some knowledge of operations. This method produced a target research population of 217 companies operating in various industries, including agriculture, chemicals, food, paper, printing, electronics, software, communications, textiles and pharmaceuticals. About 75.5 per cent are privately held companies. Thirty-five per cent operate in low-tech industries, 40 per cent in mid-tech industries and the others are in high-tech industries.

A two-step research design was employed. First, a questionnaire was pre-tested by 30 senior managers for clarity and construct validity. After some minor refinements to the survey, two separately structured questionnaires were administered to the CEO of each company and another organisational member who held an executive vice-president position. The surveys were administered separately and directly to each participant. Data on the following topics were collected from the questionnaire administered to CEOs: learning from failures, perceived organisational performance, organisational size and age, and the industry technological risk. From the questionnaire completed by the senior executive vice-presidents, we collected data about the organisation's crisis-preparedness. This procedure was aimed to reduce common method errors associated with collecting data from only one source.

In a cover letter, we made two commitments to encourage the businesses to participate. We guaranteed respondents complete anonymity, and we promised to send them the results and conclusions of the study. Out of the 217 organisations that were asked to participate in this study, we received 106 usable (able to be matched) responses from both the CEO and a senior executive vice-president of the organisation. This represented a response rate of 48.8 per cent. Participant businesses did not differ from non-participants in terms of number of employees ($t = 1.10$, $p > 0.10$). The average organisational size (in terms of number of employees) was 358, with a standard deviation of 948, and the average organisational age was 26.89 years, with a standard deviation

of 26.31. The average age of the senior managers (i.e., the respondents) was 41.6 years and their average tenure in their current executive position was 6.05 years. Eighty-nine per cent of the senior managers held an academic degree.

Dependent variables

Crisis-preparedness. This measure was developed based on our review of extensive literature on crisis management. Crisis-preparedness refers to the extent to which the organisation is prepared to cope with immediate and future crisis situations. We measured two dimensions of crisis-preparedness: present and prospective. *Present crisis-preparedness* of the organisation was defined as its ability to manage an immediate crisis. Sample items are: 'We are prepared for different types of crises,' and 'We have good knowledge regarding the different phases of organisational crises.' *Prospective crisis-preparedness* of the organisation was defined as its ability to cope with a crisis in the distant future. Sample items are: 'We would know how to diagnose the causes of a crisis,' and 'We would know what resources and the quantity to allocate in order to successfully cope with a crisis.'

Crisis-preparedness refers to the extent to which the organisation is prepared to cope with immediate and future crisis situations

Following pre-testing with the senior executives enrolled in the university training course that dealt with the subject of crisis and crisis management, we constructed a 10-item scale. All items are shown in Table 2. The organisations' vice-presidents were asked to rate the crisis-preparedness of their organisation on a five-point scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). Results of an exploratory factor analysis using direct oblimin rotation showed that the 10 items loaded onto two factors. One factor, *present crisis-preparedness*, had an eigenvalue of 5.24 and explained 52.43 per cent of the variability. The second factor, *prospective crisis-preparedness*, had an eigenvalue of 1.24 and explained an additional 12 per cent of the variability. Together these two factors explained 64.43 per cent of the variance. Cronbach's alpha for these present and prospective crisis-preparedness measures were 0.87 and 0.84, respectively.

Independent variables

Learning behaviours from failures. This measure refers to second-order problem-solving. To capture learning of a second-order problem-solving type from failures, we used the five-item measure employed by Carmeli based on work by Tucker and Edmondson.³³ Sample items are: 'When an employee makes a mistake, her co-members in the workplace talk to her not for the purpose of blaming, but rather for the value of learning,' and 'When employees make a mistake, they inform the relevant manager to enable others to learn from it.' The CEOs were asked to evaluate learning behaviours from failures within their company (i.e., organisational learning from failures). Responses were on a five-point scale ranging from 1 = strongly disagree to 5 = strongly agree. Results of an exploratory factor analysis, using direct oblimin rotation (see Table 1), showed that all five items loaded onto one factor with an eigenvalue of 2.73. This factor explained 54.58 per cent of the items' variability. Cronbach's alpha for this measure was 0.79.

Control variables

Perceived organisational performance. There is a widespread belief that high-performance organisations are less vulnerable to crisis events. High-performing organisations are also believed to be more crisis-prepared than low-performance organisations because performance level may be seen to reflect on the acumen of the management team. However, crisis events can also descend upon organisations with relatively high-performance records. Thus, it is important to examine to

Table 1. Results of factor analysis for perceived organisational performance and learning behaviours from failures*

	Factor loading
<i>Perceived organisational performance</i>	
Indicators of the factor organisational performance (alpha = 0.87)	
Growth in revenues	0.74
Net profit	0.89
Return on assets	0.90
Return on equity	0.91
Market share	0.63
Eigenvalue = 3.50; cumulative variance explained = 69.97%	
<i>Learning behaviours from failures</i>	
Indicators of the factor learning behaviours from failures (alpha = 0.79)	
When a problem concerning a lack of required resources for completing a task is raised, our employees provide an immediate solution, but also inform the management and the relevant department about the problem	0.60
When an employee makes a mistake, her co-members in the workplace talk to her, not for the purpose of blaming her, but rather for the value of learning	0.80
When employees make a mistake, they inform the relevant manager to enable others to learn from it	0.63
A question such as 'why do we do the things in such and such a way' is fully appreciated in our organisation	0.81
In our organisation, employees are encouraged to ask questions such as 'is there a better way to produce the product or provide the service'	0.83
Eigenvalue = 2.73; variance explained = 54.58%	

* As reported by the organisation's CEO.

what extent high-performance organisations are also ones that are more crisis-prepared. The measure of organisational performance is based on findings from previous studies where measures of perceived organisational performance correlated positively (with a moderate to strong relationship) with objective measures of organisational performance.³⁴ In this study we used five items that reflected economic performance (a sample item is: 'return on assets'). The CEOs were asked to compare their organisational performance over the past three years to that of other businesses in the same field. The measures were assessed on a Likert scale ranging from 1 = worse to 4 = much better. Results of an exploratory factor analysis, using direct oblimin rotation, showed that all five items loaded onto one factor with an eigenvalue of 3.50, explaining 69.97 per cent of the items' variability (see Table 1). Cronbach's alpha for this measure was 0.87.

Industry technological risk. Consistent with Perrow's work, according to which complex technologies make organisations more vulnerable to crisis situations, we constructed a measure that reflects the technological risk in an industry. This measure of technological risk does not refer to the risk that a new technology may not take hold, but rather the extent to which failures of dominant technologies in the industry are likely and could have significant consequences for businesses. Respondents were asked to rate the industry on a three-point scale: low (1), mid (2) and high (3).

Organisational size. This measure was included to control for variations in the size of the businesses in the sample, size being represented by the number of employees. We used the natural log of size to compensate for skewedness in the raw measure.

Organisational age. Age was defined and measured as the number of years since the establishment of the organisation.

Table 2. Results of factor analysis for crisis preparedness*

Crisis preparedness	Factor loading	
<i>Indicators of the factor present crisis-preparedness (alpha = 0.87)</i>		
We are prepared for different types of crises	0.76	0.06
Our preparation scope to cope with a crisis is good	0.92	−0.09
We know which types of crisis we will be able to cope with without severe damage	0.72	0.00
We have good knowledge regarding the different phases of organisational crises	0.79	0.06
We know what to do at every possible phase of an organisational crisis	0.71	0.17
In a crisis situation, we know whether it is right to be reactive or proactive	0.45	0.40
Eigenvalue = 5.24; variance explained = 52.43%		
<i>Indicators of the factor prospective crisis-preparedness (alpha = 0.84)</i>		
We would know how to diagnose the causes of a crisis	−0.09	0.82
We would know what resources and quantities to allocate in order to successfully cope with a crisis	0.32	0.59
We would know how to detect and manage the needs and expectations of the key constituents (stakeholders) in the crisis	0.02	0.86
We would know how to diagnose changes in the needs of the constituents (stakeholders) in the crisis	0.01	0.82
Eigenvalue = 1.20; variance explained = 12.00%		
Overall (cumulative) variance explained = 64.43%		

* As reported by the organisation's vice-president.

Crisis experience. This was a dichotomous measure used to assess whether the organisation had encountered a crisis in the past that was defined as a major event that threatened its survival. The respondents were asked: 'did this organisation encounter a crisis situation that threatened its survival?' (1 = yes, 0 = no).

Results

Table 3 shows the means, standard deviations and correlations for all the research variables. No indication of multi-collinearity was found, as the inter-correlations among the predictors (controls and the independent variable) did not exceed the value of 0.30. To test the research hypotheses, we ran two hierarchical regression analyses, one for present crisis-preparedness as the dependent variable and the other with prospective crisis-preparedness as the dependent variable. In each hierarchical regression analysis, organisational age, organisational size and industry technological risk were entered in the first step. Crisis experience was entered in the second step, followed by perceived organisational performance. In the fourth step, we entered the focal variable of learning behaviour from failures.

The results of the hierarchical regression analyses, by which we assessed Hypothesis 1 and Hypothesis 2, are shown in Tables 4 and 5. The results support Hypothesis 1, which predicted that learning from failures (second-order problem-solving behaviour) would be positively related to crisis-preparedness. A positive relationship was found between learning from failures and both present crisis-preparedness ($\beta = 0.32$, $p < 0.001$; see Table 4, Model 4) and prospective crisis-preparedness ($\beta = 0.31$, $p < 0.001$; see Table 5, Model 4).

The results do not support Hypothesis 2, which predicted that both industry technological risk and crisis experience would be positively associated with crisis-preparedness. Interestingly, we found that the association between perceived organisational performance and both present crisis-preparedness ($\beta = 0.22$, $p < 0.05$; see Table 4, Models 3 and 4) and prospective crisis-preparedness ($\beta = 0.26$,

Table 3. Means, standard deviations (sd), and correlations

Variable	Mean	sd	1	2	3	4	5	6	7	8
1 Organisational age	26.89	26.31	1							
2 Organisational size (LN)	358.38	948.39	0.28**	1						
3 Industry's technological risk	1.93	0.77	-0.21*	-0.02	1					
4 Crisis experience	—	—	-0.06	-0.01	-0.07	1				
5 Perceived organisational performance	3.53	0.58	-0.07	-0.16	-0.23*	0.13	1			
6 Learning behaviour from failures	2.53	0.61	0.02	0.04	0.12	0.01	0.23*	1		
7 Present crisis-preparedness	3.27	0.51	0.13	0.07	-0.03	0.15	0.34**	0.28**	1	
8 Prospective crisis-preparedness	3.48	0.50	0.07	-0.10	-0.07	0.17	0.36**	0.31**	0.66***	1

n = 106, two-tailed test. **p* < 0.05, ***p* < 0.01, ****p* < 0.001.

p < 0.01; see Table 5, Models 3 and 4) remained positive and significant. However, when learning behaviour from failures was included in the equation, these effects were substantially attenuated.

In addition, we tested the relative impact of learning from failures (second-order problem-solving behaviour) on crisis-preparedness after the effects of industry technological risk, crisis experience and organisational performance were included in the equation. Learning behaviour from failures explained an additional 9 per cent ($\Delta R^2 = 0.09$, $\Delta F = 11.21$, *p* < 0.001, see Table 4) of the variance in present crisis-preparedness, and an additional 8 per cent of the variability of prospective crisis-preparedness ($\Delta R^2 = 0.089$, $\Delta F = 11.09$, *p* < 0.001; see Table 5).

Table 4. Results of hierarchical regression analysis: the relationship between learning behaviour from failures and present crisis-preparedness

	Present crisis-preparedness			
	Model 1 β (t)	Model 2 β (t)	Model 3 β (t)	Model 4 β (t)
<i>Step 1</i>				
Organisational age	0.11 (1.12)	0.13 (1.28)	0.12 (1.22)	0.11 (1.18)
Organisational size	0.04 (0.41)	0.04 (0.37)	0.03 (0.28)	0.08 (0.87)
Industry's technological risk	-0.01 (-0.05)	0.01 (0.10)	-0.03 (0.31)	-0.10 (-1.06)
<i>Step 2</i>				
Crisis experience		0.17 (1.79)	0.16 (1.77)	0.11 (1.31)
<i>Step 3</i>				
Perceived organisational performance			0.28 (3.08**)	0.22 (2.37*)
<i>Step 4</i>				
Learning behaviour from failures				0.32 (3.35***)
ΔR^2		0.03	0.08	0.09
<i>F</i> for ΔR^2		3.20	9.49**	11.21***
Overall R^2	0.02	0.05	0.13	0.22
Overall <i>F</i> for R^2	0.65	1.29	3.02*	4.64***

n = 106. **p* < 0.05, ***p* < 0.01, ****p* < 0.001.

Table 5. Results of hierarchical regression analysis: the relationship between learning behaviour from failures and prospective crisis-preparedness

	Prospective crisis-preparedness			
	Model 1 β (t)	Model 2 β (t)	Model 3 β (t)	Model 4 β (t)
<i>Step 1</i>				
Organisational age	0.10 (0.95)	0.11 (1.12)	0.10 (1.03)	0.09 (0.97)
Organisational size	-0.13 (-1.28)	-0.13 (-1.33)	-0.14 (-1.50)	-0.09 (-0.96)
Industry's technological risk	-0.05 (-0.55)	-0.04 (-0.39)	-0.08 (-0.88)	-0.15 (-1.65)
<i>Step 2</i>				
Crisis experience		0.18 (1.85)	0.17 (1.88)	0.13 (1.49)
<i>Step 3</i>				
Perceived organisational performance			0.32 (3.49***)	0.26 (2.84**)
<i>Step 4</i>				
Learning behaviour from failures				0.31 (0.33***)
ΔR^2		0.03	0.10	0.08
F for ΔR^2		3.41	12.23***	11.09***
Overall R^2	0.03	0.06	0.16	0.24
Overall F for R^2	0.86	1.52	3.79**	5.33***

$n = 106$. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Discussion and conclusion

Summary and contributions

In today's world, a sword of Damocles hangs over businesses: the knowledge that a dreaded crisis, having serious organisational and non-organisational implications, may strike at any moment. Scholarly and practitioner discussion of crisis management has focused on ways to prevent, prepare for and cope with crisis situations. Research on crisis management has largely dealt with case studies. Observations derived from such analyses suggest that learning is a critical component of crisis management. However, research has not fully addressed the importance of an organisational structure and culture that emphasises learning from failures as a key mechanism by which organisations can proactively observe and prepare for potential crisis events.³⁵

This study extends previous research suggesting that managers could be better prepared for future crises by facilitating employees' unlearning of behaviours that were previously effective but which are no longer viable in light of the evidence from failure events. This requires building a culture of learning from failures (second-order problem-solving behaviour) that provides new responses and discards old ones, seeking not only to correct the immediate failure so as to ensure the continuity of the operation or the provision of a service, but also to address the causes of the problem, by either correcting these causes or alerting others to the fact that the failure occurred.³⁶ Indeed, such processes offer potential for managers to learn through practice (i.e., 'learning-through-practice') which extends beyond single and double loop learning and *deutero* learning. This in turn enables them to cope with hazards such as inertia, escalation, myopia and overlooked early warning signals.³⁷ We found a positive association between learning behaviour from failures and present and prospective crisis-preparedness, indicating that businesses that adopt second-order problem-solving behaviour are more proactively involved in preparations for a relatively wide spectrum of crisis events.

Managers could be better prepared for future crises by facilitating employees' unlearning of behaviours that are no longer viable in light of the evidence from failure events

In light of the emphasis on learning from success stories in the literature, the present study takes a different tack and argues that the process of learning from failures is critical to an organisation's crisis-preparedness. Our approach implies that organisational contexts in which there is a high level of tolerance toward failures and psychological safety³⁸ better facilitate the anticipation and reduction of the likelihood of an accident that could trigger a crisis event. A culture of learning from failures is more vigilant and maintains an attentive system that enhances the company's ability to detect warning signals and address them properly. As a result it reduces the chances of an accident resulting in a trigger event and enables the company to better cope with an unpredictable crisis situation. Organisations that learn from failures preserve the capability to identify weak signals that that may be significant, and respond proactively to these signals. They pay constant attention to processes, details and interdependencies. A lack of attention is likely to result in a breakdown such as in the case of Barings Bank, where one trader brought down the oldest merchant banking company in England.

The anecdotal and case study analyses that characterise research on organisational crisis have provided some profound insights, but these approaches also have limitations, especially in terms of their ability to enable replications, extensions and generalisations. By contrast, this company-level study attempted to identify robust concepts that would assist in the closer scrutiny of an organisation's crisis-preparedness. Drawing on a review of the literature on crisis management, we developed a two-dimensional measure of crisis-preparedness that can be used and extended in future research. Such studies could measure the level of crisis-preparedness of businesses and identify key new predictors that have yet to be examined quantitatively, such as variables pertaining to organisation culture, work design and the TMT's composition and processes.

Organisations that had previously experienced a crisis event tended to report a higher level of preparedness than those that had not experienced such a situation. However, there was only a marginally positive relationship between crisis experience and crisis-preparedness. But after entering both perceived organisational performance and learning behaviours from failures into the regression equation, the effect of crisis experience was substantially attenuated. In addition, we found a positive association between perceived organisational performance and crisis-preparedness. This suggests that the dynamics of crisis preparations may have positive implications for the performance of a business. These dynamics affect its performance and, in turn, are affected by performance.

Managerial implications

Crises pose critical managerial challenges because weak or inappropriate responses can destroy the organisation. This was the case for Remedia, Israel's leading infant nutrition company, which marketed a complete range of baby food. Its vitamin-deficient soy-based milk formula caused the death of a number of infants in Israel in 2003 and severe illness in scores of others. The management failed to build an effective early warning detection system and was unable to muster the responses needed to re-establish trust with consumers.³⁹

Research suggests that many of the businesses that experienced a crisis event were ill-prepared and that most responded in a way that made the crisis event worse.⁴⁰ Hence, managers need to design organisational systems that enable them to be better prepared for crisis events. As Edmondson noted, this is easier said than done. For example, failures and the inability to learn from them often derive from a tendency to escalate commitment to a practised course of action despite warning

signals.⁴¹ However, we believe an additional problem is that people often over-learn specifics from failures that may generate different (but potentially even more damaging) outcomes in the future, rather than learning broader principles. Specifically, negative outcomes make people over-sensitive to specific events that occurred in the past and which are unlikely to persist, and not attentive enough to potential emergent phenomena that do not fit neatly into any of their predefined conceptual categories. An analogy is the joke about generals who are busy preparing for the previous war.

people often over-learn specifics from failures that may generate different outcomes in the future, rather than learning broader principles

How can managers design and shape a well-prepared system to survive a crisis, move forward and thrive? Designing and enabling crisis-prepared businesses is a complex process because of the pervasive number of factors that can potentially impinge on their sustainability; moreover, the likelihood of occurrence of different events varies along with the marginal cost of protecting against them. Managers may often refrain from drawing attention to small-scale adverse events to better comply with the image of the prototypically optimistic, forward-thinking, effective leader. Perceived undue attention to potentially negative details may give observers the unflattering impression of a neurotic, defensive-thinking manager without leadership qualities. Yet when an event unexpectedly results in a potential crisis situation, leaders are often faulted for inattention or lack of foresight. More attention should thus be given to educating observers away from a 'have it both ways' attitude toward the role of leader agency (or lack thereof) in organisational crises. Perhaps rather than focusing exclusively on the training of individual managers, collective concern about adverse events should be encouraged along the lines of Weick and Roberts's 'collective mind',⁴² where accountability is both individual and collective.

The present study nevertheless shows that managers are crucial in shaping a context for employees to engage in learning from failures. Organisations that learn from failures identify warning signals and compare them against a broader library of past surprises. When such smaller signals are left unnoticed or poorly communicated, other warning signals are likely to follow, but these stronger signals are likely to arise well past the point at which prevention of the crisis is possible. By paying more careful attention to identifying weak early warning signals, businesses can change their patterns to help prevent impending crises. In addition, intelligent leaders recognise that by the time a strong pattern of signals arises it is too late to prevent the crisis and therefore expensive recovery strategies must begin, even if outcomes such as decline in performance have not yet arisen.

By paying more careful attention to identifying weak early warning signals, businesses can change their patterns to help prevent impending crises

In many organisations, seemingly small failures are seen as anomalous events that do not reflect the well-learned organisational context, dynamics and patterns that shape the mental models of managers in a given company. A case in point is the one that involved the Ford Motor Company and Bridgestone/Firestone. Various Ford vehicles, such as the Explorer sports utility vehicle (SUV), used Bridgestone/Firestone company tyres as original equipment across the globe. Failures in the tyres on the Ford's Explorer caused serious rollover crashes, contributing to over 120 deaths and many severe injuries to vehicle occupants in North and South America alone. Evidence indicates that the companies had received various failure signals as far back as 1996 when state agencies

in Arizona complained of frequent tread separations on Firestone tyres on Explorers. At the same time, problems were reported in Venezuela that required an upgrade of the tyres manufactured there. From 1997 to 2000, dealers and other agents in Middle Eastern, Asian and South American countries complained to Ford and Firestone about deaths and injuries suffered in Ford Explorers. Numerous Firestone documents revealed that as of 1997 the company could have been more attentive to property damage and injury claims, and there was substantial tyre performance data from warranty adjustments and customer claims for failing tyres. However, during this long period of time the company claimed there was no product problem. In fact, Ford's plan to notify customers and offer a replacement was not supported by Firestone, evidently because a recall would initiate a full investigation by the National Highway Traffic Safety Administration (NHTSA). As US Transportation Secretary Rodney Slater, said: 'the recall moves are too little too late... We should have been informed. Unfortunately we were not.' Both companies' lack of attention to many warning signals, as well as their limited communication of failure data to their own manufacturing units, eventually caused a loss of confidence in both companies, not because they were shown to be responsible for a product defect, which is common and not necessarily very damaging, but rather because they demonstrated such disregard for product quality issues. Learning from the initial failures could have made both companies more vigilant and competent in coping with an emerging tragedy. Because these companies were so reluctant to fully engage in learning from these failures, they turned a crisis of product quality into one in which consumers lost considerable confidence in the companies' management.

Managers should also pay attention to the need to balance short- and long-term organisational outcomes. Because crisis events are relatively infrequent situations, stakeholders, especially owners and investors, might not grasp the advantages of an investment in reliability-enhancing practices. Thus, balancing the competing demands of stakeholders regarding short- and long-term reliability outcomes is a key managerial challenge. One way to overcome this dilemma is to provide evidence, however small, regarding the importance of preparing the system to be prepared for a crisis situation. For example, when managers communicate effectively about how learning from failures helps improve organisational reliability, they can also explain how these practices foster competitiveness. One way is to identify examples in which a process that was initiated by learning from a failure enhanced product quality and reliability and thus supported the organisation's reputation for reliable and high-quality products or services. Another is to describe major catastrophes that have befallen other companies and to use these as a means to convince stakeholders of the need to prepare for the long term. It may be that such messages can psychologically prime stakeholders in 'mortality salience'. Research shows that reminding people of their own personal mortality has multiple psychological effects.⁴³ It remains to be seen whether making the mortality of an *organisation* salient makes employees, for example, feel more responsible for its health. Future research should address this question.

When managers communicate about how learning from failures helps improve organisational reliability, they can also explain how these practices foster competitiveness

Although beyond the scope of this study, our findings and arguments implicitly suggest that managers should develop and encourage two specific leadership behaviour patterns: learning leadership and crisis leadership. *Learning leadership* entails those leadership behaviours that foster and augment employees' willingness to learn from failure. *Crisis leadership* refers to behaviours that shape the system so as to enable effective crisis management. This consists of minimising potential risks prior to a triggering event and managing these risks through recovery and adaptation. Characteristics such as openness and role modeling are needed in both types of leadership. However,

there are specific characteristics that are more influential in one type of leadership behaviour than in the other. For example, to promote learning from failures a leader does not necessarily need to display charismatic leadership, but in a crisis situation charismatic leadership is often critical for the leader to restore trust and confidence in the company.

In a crisis situation, charismatic leadership is often critical for the leader to restore trust and confidence in the company

Finally, crises are often seen as devastating and traumatic events. However, these events can also be an opportunity to redesign and restructure a faulty system and turn it into a better one. One of the best-known examples is the case of Johnson & Johnson, which experienced a major crisis in 1982 when it was discovered that numerous bottles of its Extra-Strength Tylenol capsules had been laced with cyanide. By the end of the crisis, seven people had died. Reacting effectively to this crisis event involved an array of public and internal actions. The company provided relatively quick responses and showed sincere concern for its customers. For example, it used the media to promptly begin alerting people of the potential dangers of the product. The company dispatched scientists to determine the source of the tampering, ordered a massive recall of more than 31 million bottles at a cost of over \$100 million, and temporarily ceased all production of capsules and replaced them with more tamper-resistant caplets. At the beginning, the company stock fell. Its share in the non-prescription pain-reliever market declined from 35 per cent to only 8 per cent. However, the company used the crisis as an opportunity to embark on an aggressive campaign to rebuild the Tylenol brand. They had the product back on the shelves in a new triple-tamper-resistant package – the first of its kind – by the end of the year. This experience appeared to help the company cope with another crisis in 1986. Nowadays, Tylenol is one of the most popular non-prescription pain-reliever medicines, used in 70 per cent of U.S. households.

Another example is Bear Stearns, a company that recently had to cope with the near-collapse of two of the Bear Stearns Asset Management's hedge funds. Poor bets on bonds backed by sub-prime mortgages led to losses at the two funds and margin calls by rival banks, forcing the company to put up \$1.6 billion for a bailout. When Jeffrey Lane stepped in as the chief executive officer of Bear Stearns Asset Management, a wholly-owned subsidiary of Bear Stearns Companies Inc., he noted: 'We'll dig our way out and emerge stronger...none of us in this industry can get away unscathed forever. The great ones overcome the problems and move forward.'

Limitations and directions for future research

This study was exploratory in nature and thus its primary aim was to develop theory and provide an initial empirical assessment regarding the importance of learning from failures with regard to an organisation's crisis-preparedness. Though the notion of learning from failures has recently received increased attention⁴⁴ and we believe it is compelling, one should recognise that learning can take many forms, and obviously learning from successes is also important. In this paper, however, we attempt to shift the current emphasis on positive psychology in organisation science – which often translates into focusing on success stories – to learning from failures.

Furthermore, the exploratory nature of our study left many unanswered questions. For example, we know little of how a culture of learning from failures evolves, nor its implications for organisational processes and outcomes. The industrial diversity of our sample provides some basis for claims of generalisability. However, because we used a snowball sampling methodology and we learned that managers selected firms with which they had prior experience or some knowledge and accessibility, it is possible that there was a selection bias. Another limitation is that the research was cross-sectional in nature and thus we cannot confidently infer the direction of causality. A longitudinal, prospective study of actual crisis-preparedness, though desirable, is quite difficult. We were only able to analyse retrospective reports about how well a company prepared itself.

Retrospective reports depend not only on the qualities of participants' memories, but also on their avoidance of hindsight and egocentric biases. Egocentric bias involves construing one's own or one's organisation's actions in a more favourable light, in order to enhance or maintain self-image. Hindsight bias involves perceiving another's actions as being poorly motivated, given that one has learned the outcomes of those actions. For example, egocentric bias might lead a respondent to report that his organisation was better prepared for a crisis than it really was, because acknowledging one's own failures in oversight is difficult psychologically. Conversely, a respondent might engage in hindsight bias if he has less understanding of the organisation's crisis-preparedness before crisis events but more information about the effects of the crisis, thus leading him to believe that crisis preparation was poorly motivated or improperly managed. To some extent these concerns are mitigated by our use of two key informants to measure the variables. Moreover, hindsight and egocentric biases generally have non-systematic influences (unrelated to relevant study variables) on the means of the variables, rather than on the correlations being tested. Nevertheless, other response artifacts may result from our reliance on questionnaire data. Our evaluation of this problem using Harman's one-factor test revealed that when all items were subjected to factor analysis, a one-dominant factor did not emerge. Given that the magnitude of the correlations among the variables was low and that previous research argues in general that senior executives provide reliable information, the response biases were likely not severe enough to change our basic conclusions.

Retrospective reports depend not only on the qualities of participants' memories, but also on their avoidance of hindsight and egocentric biases

Finally, one may raise doubts regarding the reliability and accuracy of TMT members as suitable informants for assessing learning from failures that occur at lower levels such as the shop floor. Although one cannot entirely rule out the possibility that some senior executives did not have complete knowledge about every failure, research evidence provides consistent evidence that top executives are reliable sources of information and their unique position enables them to interact with others, and receive and process abundant diagnostic information.⁴⁵

Conclusion

Research on crisis management and learning from failures has important implications for organisational competitiveness and viability. The purpose of this study was to emphasise the importance of both learning from failures and crisis-preparedness by examining the link between these domains. While much of the literature is concerned with creating and sustaining competitive advantage, it has largely ignored the fact that crisis situations are a serious threat to the sustainability of an advantage. It is important for businesses to employ and structure learning behaviours from failures in order to respond more effectively to a crisis event.

Acknowledgements

We wish to thank Gershon Gilat, Faith Glasgow, Ravit Meitar, David Scott and Esther Singer for their helpful comments on earlier drafts of this paper. We also thank the Editor and two anonymous reviewers of this journal for their helpful comments and suggestions.

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