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Managing airline disasters: the role of consumer safety perceptions and sense-making

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Abstract

This article examines organizational crises caused by airline disasters. It presents results of an empirical study of 329 airline travelers, concerning their safety perceptions and responses to airline disasters. The concept of consumer "sense-making" is used as a way of understanding consumer responses to airline disasters. The issue of what impacts airline disasters have on airline companies and the flying public is also dealt with. From a managerial perspective, the article presents implications for organizations recovery responses, given that recovery from accidents is a function of consumer perceptions about the safety of flying with the carrier.

Keywords: Airline disaster recovery; Consumer airline safety perceptions & response; Crisis management

1. Introduction

Organizationally based technological disasters have become a strategic problem for companies. Disasters caused by industrial accidents, transportation accidents, environmental pollution incidents, product harm, and occupational diseases, trigger sustained crises for companies they originate in. These crises cause extensive damage to human life and the natural environment. They inflict large financial or reputational losses on companies, and may even threaten their very survival.

Examples of such crises include, the Exxon Valdez oil spill, the Union Carbide pesticide plant accident in Bhopal, the nuclear accidents at Three Mile Island and Chernobyl, and the numerous airline disasters that have taken large tolls on human life. We have relatively poor understanding of the causes and consequences of these crises. The few studies that exist focus heavily on examining the complex causes of crises (Perrow, 1984; Shrivastava et al., 1988; Shrivastava, 1993). Although research has addressed issues of preventing and managing these disasters (Mitroff and Pauchant, 1991; Reilly, 1987; Shrivastava, 1987; Van Duin, 1993), crisis recovery constitutes a critical but least examined element of crisis management.

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This paper examines crisis recovery in the context of airline services and accidents. These accidents can cause a large number of passenger fatalities and injuries. They cause extensive financial losses and damage the reputation of airline companies. News of accidents and near-misses also have an impact on airline customers. Airlines perceived as being unsafe, lose market share and suffer long-term decline (Mowen, 1990).

2. Literature review on crisis/disaster recovery

Much of the existing disaster recovery literature developed in the context of natural disasters. Sociologists have for long been interested in how communities, organizations and individuals respond to natural disasters like floods, earthquakes, hurricanes, etc. Recovery from these disasters results primarily from the activities of emergency medical services, federal and state emergency management agencies, policy departments, the Coast Guard and other civil defense organizations. The main focus of disaster recovery and the majority of resources for it are devoted to the emergency management phase. Long-term recovery is often assimilated into the normal economic, social, and political systems.

Three problems are salient in disaster recovery. These involve the communications process, the exercise of authority, and the development of coordination. Communicating with the media, the public, affected victims,

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government and corporate organizations, and other stakeholders, is complex and burdensome (Turner and Stephenson, 1994; Public Management, 1997). It places tremendous strains on routine communications networks which often breakdown during disasters. Loss of higher echelon personnel due to over-work and conflicts over allocation of authority cause difficulty in exercise of authority. The lack of consensus among organizations involved in disaster recovery hampers coordination of tasks. Sociological research examines recovery from the point of view of victims. It is very helpful in understanding how to mitigate damages in the immediate aftermath of disasters (Drabek, 1986; Quarantelli, 1988).

Psychologists have been examining how disasters create stress and trauma in victims and organizational members. Traumatic events have both short- and long-term psychological effects. These include feelings of numbness, denial avoidance of places or things, phobias, social withdrawals, inability to concentrate, and difficulty in connecting with others. The unprepared psyche attempts to master traumatic events by rapidly alternating between these confusing feelings. In the long term, these reactions cause people to "wall off" experiences and suffer post traumatic decline (Doepel, 1991; Rosen and Fields, 1988; Van der Kolk, 1987).

Recovery from post-traumatic stress disorders (PTSD) can be facilitated with professional help and support groups. Success of recovery depends on presence of a supportive environment in which the trauma can be acknowledged and examined. Open and psychologically safe communications are essential for traumatized persons to explore their feelings and to integrate their experiences into the larger context of their lives (Raphael and Middleton, 1987).

Workplace disasters traumatize not only victims, but also employees. Dealing with post-crisis trauma in the work force is essential for preventing demoralization, employee turnover, work flow disruptions and absenteeism following a crisis. In the organizational context, numerous traumatized workers may be part of a group, department, or business unit. Their close proximity and mutual interactions can exacerbate psychological injury. Organizational recovery from crisis depends on ameliorating the stressed workers and normalizing work conditions (Doepel, 1991; Powell, 1991). However, ethical issues concerning proactive crisis management are raised (Kernisky, 1997).

A comprehensive crisis management plan can be very instrumental in organizational recovery. Such a plan must include emergency management, psychological counseling, relief and rehabilitation of victims, stakeholder communications, conflict resolution, and business recovery (Shrivastava and Mitroff, 1987; Fisher and Briggs, 1989; Mitroff and Pauchant, 1991; Siomkos, 1989; Kelley et al., 1993; Shrivastava and Siomkos, 1993; Siomkos and Kurzbard, 1994).

Organizational recovery from crises is a more complicated issue than reflected in the above review of sociological and psychological research. Organizational scholars have described the evolution of crises in terms of several distinct phases (Smith, 1990; Shrivastava, 1987; Turner, 1976). These include:

(a) *Crisis preconditions*: Actual crises are proceeded by a period of frequent failures. Organizations experience resource shortages and cost cutting pressures. There is a lack of planning and surveillance over safety issues. During this period unsafe practices may be tolerated, setting up preconditions for major accidents.
(b) *Triggering event*: This is the event that triggers a crisis. It could take the form of an industrial accident, an environmental pollution incident, a mechanical failure, product injury or occupational disease, among others. It marks the onset of a crisis. It is the defining event which is often associated with major damages to human life and the natural environment.
(c) *Crisis expansion*: This phase follows the triggering event and spreads the impacts of the crisis to related domains. The impact may expand from being primarily medical and environmental, to including economic, social, political, cultural, and symbolic implications. The crisis expands to engulf other organizations, institutions and individuals. Primary damages escalate, and secondary impacts of the crisis emerge in this phase. The crisis expands both over time and geographical space. In this phase, emergency management procedures are implemented to mitigate the expanding effects of the crisis.
(d) *Crisis resolution*: Crisis resolution refers to the phase in which crisis stakeholders re-establish normal conditions. This involves restructuring of organizations, organizational improvements, regulatory changes, cleanup, and compensation, relief and rehabilitation of victims. Conflicts arising from the crisis reach resolution during this phase. Organizational recovery also deals with regaining the confidence and trust of organizational stakeholders.

The literature on organizational recovery from disasters is scant, particularly in the area of airline disasters. The US government instituted the Federal Aviation Administration (FAA) as the agency that oversees airline safety. FAA studies have focused largely on understanding causes of accident, and developing means for preventing them (e.g., Perrow, 1984).

There are few studies that focus on organizational recovery from airline disasters. Those that do are descriptive case studies of emergency management in the wake of accidents. Charles and Settle (1991) found that successful handling of major airlines accident emergencies required multi-agency planning. Emergency committees serve not only as a planning function, but also allow emergency managers to get acquainted with each other and form personal bonds. These bonds are critical in coordinating inter-organizational efforts.

Surely lacking from the literature are conceptual and empirical studies of crisis recovery processes in airline disasters. We know little about what constitutes recovery in airline accidents. What impacts do airline disasters have, on airline companies and the flying public? How do customers make sense of disasters and respond to them? This study presents one possible perspective at these questions.

There are many perspectives from which airline disaster recovery may be done. These include the perspectives of victims of accidents, airline companies, emergency management organizations, flying public at risk, and government regulatory agencies. Each perspective focuses on different issues, variables and questions.

For business researchers an issue of interest is the recovery of airline companies from accidents. This recovery depends on consumer perceptions about the safety of flying with the carrier. Consumer reactions to airline accidents have received little research attention. Yet they are central to understanding organizational recovery processes.

3. Airline disaster recovery

Studies of airline disaster recovery management efforts have appeared in the relevant literature. Specifically, management studies were published about USAir's September 1994 crash (Donoho, 1994; McCarthy and Quintanilla, 1994), ValuJet's May 1996 crash (Greising, 1996) and TWA's July 1996 crash (Chandler, 1996; Fenelle, 1996).

Airlines prepare themselves for coping with crises that emerge due to service failures or other (e.g., crash) accidents. The need for airline crisis management is publicly acknowledged by Gulf Air (Vandyk, 1996), while several US and Swedish airlines have developed methods to deal with negative critical incidents and crises (Bejou et al., 1996). The establishment of programs by airlines to identify and correct a broad range of potential transportation hazards in a formal manner is imperative (Clark and McGinn, 1997). For example, several years ago, Singapore Airlines developed a comprehensive program of crisis planning and management (Shapiro, 1992). Disasters are handled at the Crisis Management Centre at Singapore's Changhi Airport.

A crucial issue in assessing disaster recovery is how consumers react and respond to airline accidents. Consumer responses to accidents are a complex phenomenon because of the nature of air travel and the complexity of accident causes. Airline travel is a means to an end. People do it as part of their work or vacation routine. Safety and accident issues do not elicit systematic consideration by air travelers. Most travelers trust the system to be safe enough to continue to do air travel. Even those who doubt the safety of the system often have no alternative but to accept it.

Causes of airline accidents are complex. They include multiple simultaneous and interacting failures. Failures include pilot errors, design errors, faulty maintenance procedures, weather conditions, runway conditions, air traffic control system failures, etc. (Smith, 1992; Perrow, 1984).

For these reasons, consumer responses to airline disasters get formed in impressionistic ways. We use the concept of "sense-making" as a way of understanding consumer responses to airline disasters (Gephart et al., 1990; Weick, 1979,1990).

Fig. 1 depicts a conceptual model for understanding consumer responses. The traveling public makes sense of airline accidents based on their personal flying experiences. Most experienced flyers tend to be more confident and less fearful of accidents. Frequent flyers also are bound to travel schedules where there may be no alternative to flying. They cognitively adjust to the need for flying by overlooking any safety doubts they may have. Disaster sense making is also influenced by the public's trust in safety capability of airlines and government safety infrastructure. Perception of a particular airline's safety plays an important role in interpretation of accidents and their consequences. Safety data on airlines is now routinely compiled and shared with the public by government agencies. A good safety record gives travelers more confidence in the airlines ability to avoid mistakes that lead to disasters. Similarly, the extent of trust that travelers have in the FAA and the air traffic control system, is an important determinant of how they assess the overall safety of air travel. These institutions serve as the safety infrastructure for air travel. Because of the technological complexity of air traffic control, most travelers have little understanding of this infrastructure. They tend to trust regulators and airline companies in doing what is needed to keep air travel safe.

This sense making process is acutely focused on specific accidents. Consumer responses are therefore likely to occur

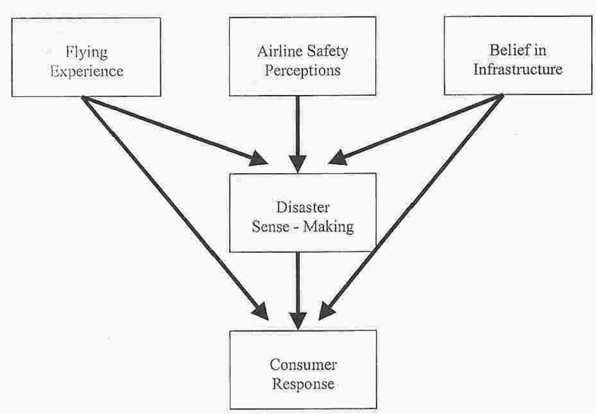

Fig. 1. Consumer response to airline disasters: a perceptual model.

in the weeks following major accidents. It leads travelers to make choices about their use of particular airlines.

4. Hypotheses

The following three general hypotheses were tested:

(1) Consumer response of avoiding airlines involved in disasters will be negatively related to: (a) airline safety perceptions, (b) flying experience, (c) involvement with flying matters, and (d) belief in infrastructure.
(2) Airline safety perceptions will have a greater effect on consumer response of avoiding airlines involved in disasters, over flying experience and belief in infrastructure.
(3) The explanatory variables (i.e., airline safety perceptions, flying experience, belief in infrastructure) affect consumer response independently from each other, while consumer sense-making is a mediating variable.

5. Research methodology

Three-hundred twenty-nine (329) travelers were interviewed by means of a structured telephone questionnaire. The sample was selected randomly with the use of telephone directories and random number generation techniques, in Long Island, New York. The interviews lasted for about two months in which period no major airline disasters occurred that would possibly bias consumer responses to questionnaire items. Each interview lasted for a maximum of 5 min.

The aim of the questionnaire was to capture consumer feedback on six areas of interest: consumer responses to airline disasters, consumer sense-making process, airline safety perceptions, flying experience and consumer involvement with flying matters, belief in infrastructure, and traveler demographic attributes for classification purposes. Consumer response was coded as trivial when the respondent reported that airline accidents had no effect on his behavior, as moderate when the consumer would think twice about a first booking on the airline that he recalls featuring a crash, and as severe when the consumer would either swear off the airline involved in a crash, or fly less than before, or even give up flying altogether. Table 1, presents the questionnaire items as well as the interactions among the variables in the hierarchical log-linear model studied.

6. Analysis and findings

Table 1
Questionnaire items and interactions studied

Questionnaire items[a]
- Business/pleasure traveler
- Times fly annually
- Member of frequent flyer program
- Rate airline safety (1–5/ very unsafe – very safe)
- Remember year or details of any crash within last 5 years
- Year last airplane crash you remember
- Remember name of airline had the crash
- Remember what investigators said cause of crash was
- Have personally flown that airline
- In what way influenced by knowledge of the crash (swear off/thin twice/fly less/give up flying/no effect)
- What are most airline crashes caused by (pilot error/mechanic error/weather conditions/air-traffic controllers)
- Believe FAA always tell public the truth (1–5/definitely no — def nitely yes)
- FAA should make... (more / fewer regulations / no change)
- Are you a subscriber to any travel magazines
- Do you usually read the travel section of Sunday paper
- Who makes selection of airline (self/family/company/travel agent)
- Demographics (marital status/age/education/income)

Interactions among the variables in the model[b]
- (Consumer response) × (airline safety perceptions)
- (Consumer response) × (involvement with traveling matters)
- (Consumer response) × (purpose of traveling) × (belief in infrastru ture)
- (Airline safety perceptions) × (involvement with traveling matters) (purpose of traveling) × (belief in infrastructure)

[a] Response categories in parentheses.
[b] Hierarchical log-linear model.

on a crash, while only 10% would take some drast action, such as swear off the airline involved (3%), fly les (6%), or even give up flying altogether (1%). Finally, 25% would think twice before booking on this airline.

Of the respondents, 21% mentioned business as th purpose of their air traveling and 79% pleasure. From the total sample, 80% travel fewer than 5 times annuall and only 2% travel more than 26 times a year, with th remaining 18% of the respondents traveling betwee 6 and 25 times; 83% of those who fly more than 6 time annually, are members of a frequent flyer program (16% of total cases). Of the interviewees, 64% consider flyin safer than other modes of transportation, while 22% rated flying as safe as other modes of transportation an 24% rated flying as less safe than other modes.

In terms of recall, 95% of the respondents remembe the year or some details of some crash within the la 5 years; 71% of the subjects remember the name of th airline that had the crash and 58% remember the caus of the crash according to the investigators; 23% hav flown that airline. For 52% of the subjects, most airlin crashes are caused by mechanical error, while 20% blamed the pilot, in contrast with the 18% who a of the business traveler (chi-square test of independence)

ers — compared with ers — are likely to:	Significance level (strength of assonation) (%)
equently	99.9
lucated	99.9
avel agent or company ir airline instead of it personally	99.9
	99.0
volved with flying matters	97.5
ely or not at all l by airline crashes	97.5

only 21% believe in the sincerity of the FAA; the respondents do not think that the FAA hange the current state of the regulations to improve safety; finally, 14% ask for more ns.

subjects, 82% were not subscribers to any kind magazine, while 52% of them read the travel the Sunday newspaper. For 53% of the sub- selection of the airline is made either by them- by a member of their family. Finally, 37% of the eave this responsibility to their travel agent, to their company which makes the selection travel arrangements.

, illuminates the profile of the business traveler. rved significance level has been derived from the e test of independence for the given degrees of The higher the level of confidence, the higher of the association. Business travelers are older, ore advanced education and a higher income sure travelers. They also fly more frequently, are ormed about traveling matters by reading the tion in the Sunday newspaper, and let their or travel agent select the airline. Moreover, e the pilot or the mechanical equipment — not er or the traffic controllers — as the potential the airline crash. Although they have flown an hich suffered a crash, they are not affected in avior with respect to the airline by this fact. In eople who consider airplanes a safer mode of travel, are those who travel frequently, keep in touch with traveling issues and are not influenced by knowledge of a crash.

The chi-square test of independence was used in testing the hypotheses mentioned earlier. Table 3 summarizes the results obtained regarding consumer response. The observed significance level indicates the probability that the variables are not independent and constitutes a measure of the strength of the association. The table also includes Cramer's V statistic which is a transformation of chi-square for the given degrees of freedom, and Kendall's Tau B which provides a sign indicating positive or negative concordance between consumer response and the explanatory variables.

Fig. 2 depicts the model as obtained through the empirical results. A hierarchical log-linear model was used to assess the interactions among the variables in the empirical model. This analytical technique was used in order to uncover complex relationships among variables in a multi-way crosstabulation. This is similar to the multiple regression since all variables are considered independent, while the dependent variable is the number of cases in each cell. The main feature of the method is that it estimates all the simple and interaction effects among the variables. As long as the initial integrity of the model has not been deteriorated, the specific interaction effect is eliminated. The interactions which were left in the final model explain most of its initial goodness-of-fit. The most significant interactions which capture most of the initial integrity of the model are presented in Table 1 above. A goodness-of-fit test similar to the Pearson chi-square was estimated; i.e., likelihood-ratio $y' = 46.33$ (d.f. $= 54$, $p = 76.20\%$). The value of the P for the specific chi-square value and degrees of freedom is quite high and indicates that the final model fits the initial data well. The fact that there were no standardized residuals above 1.96, the critical value of F (at the 95% significance level), indicated that the final model was adequate.

The above significant interactions may account for some of the differences between the conceptual model presented in Fig. 1 and the slightly more complicated empirically generated model in Fig. 2.

A hierarchical log-linear analysis was conducted only for those traveling for pleasure, suggesting a less complicated model (Fig. 3) which is closer to the model depicted

ts of consumer response (chi-square test of independence)

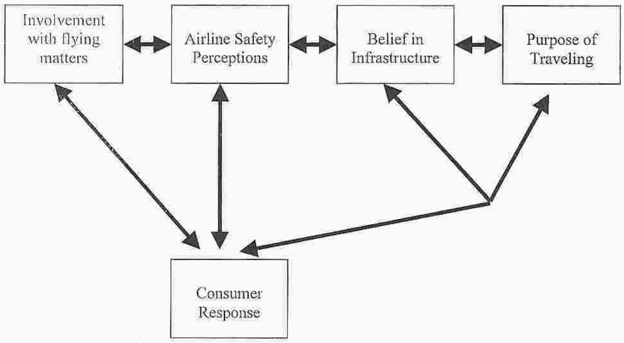

Fig. 2. Consumer response to airline disasters: an empirical model.

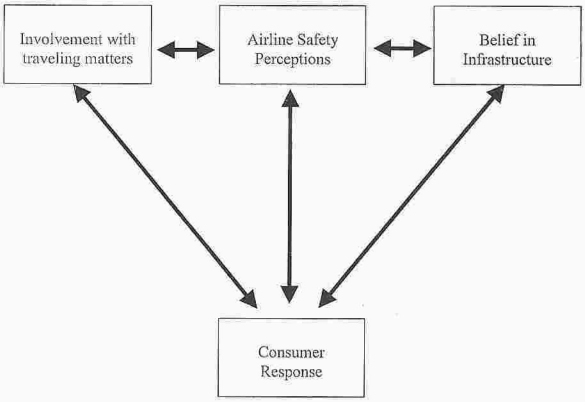

Fig. 3. Consumer response to airline disasters: an empirical model for the case of pleasure travelers.

in Fig. 1. Fig. 3 indicates that for pleasure travelers there is no association between airline safety perceptions and belief in infrastructure (likelihood ratio chi-square = 38, d.f. = 34, $p = 29.20\%$, no standardized residuals > |1.96|).

7. Discussion and conclusions

The traveling public makes sense of airline disasters primarily based on its involvement with flying matters, its perception of flying safety and its belief in the infrastructure. Airline safety perceptions were found to be the strongest determinants of consumer response. The greater travelers rate airline safety as opposed to other modes of transportation, the less drastic their response to an airline disaster is.

Consumer response depends also significantly on the purpose of flying. Business travelers who are more involved with flying matters and fly more frequently, are generally less influenced by airline crashes in their decision to fly with the airline that had the accident. Belief in infrastructure is also a determinant of consumer response, though its relative influence is somewhat weaker than the influence of safety perceptions and consumer involvement with flying matters. Travelers who generally have faith in the FAA, respond more positively to airline crashes.

Approximately one out of every three travelers in the sample would take some radical or moderate measure against airlines for which a traveler recalls that they had a crash. Most of the consumers whose behavior is affected, do not need to fly systematically. When flying however, they fly for pleasure. Most of them are skeptical towards the government regulatory agencies and infrastructure and consequently they press for more regulations. These are people who do not trust the airlines as safe due to their low involvement with flying matters and their low flying frequency. Another reason why frequent flyers, especially business people, are not influenced by crash incidents is that they do not probably have another choice but to acknowledge and accept the probability of a potential accident, since most of them have already flown with the company that they recalled having a crash.

The following observations relate to the differences between the conceptual and the empirically generated models:

(1) The association between consumer response and the other variables is two-fold. Not only does positive consumer involvement with traveling matters would most likely result in a minimal response towards the airline that is faced with a disaster, but also a minimal response to a crash would also lead to a positive involvement with airline matters.
(2) Purpose of traveling, the second most influential variable in the empirical model, does not appear in the conceptual model. Nevertheless, it seems that business travelers are generally not influenced by airline crashes, since they are involved with flying matters, while most of them have already flown with airlines which had an accident.
(3) None of the variables in the questionnaire that were designed to capture consumer sense-making process was found statistically significant either as mediating variables or as variables directly affecting consumer response. Frequency and purpose of traveling were found to be determinants in the consumer sense-making process.
(4) The interrelationship among the four determinant variables of consumer response is to be expected. It suggests that business travelers rate airline safety as safer than other modes of travel, are involved with airline matters, and believe in infrastructure.
(5) Belief in infrastructure and purpose of traveling are cooperatively related to consumer response, suggesting that only business travelers which have faith in infrastructure respond positively to airline crashes. Alternatively, only pleasure travelers that do not believe in infrastructure respond moderately or

drastically to airline crashes when they are to fly with a particular airline which they recall that it had a crash.

8. Strategic considerations and managerial implications

Recovery from a crisis is by itself a complex issue involving many stakeholders, such as consumers, the government, the public, the media, regulatory agencies and the organization itself. This study focused on the consumer responses to airline disasters.

The factors that influence consumers to patronize companies facing a crisis, include the company's reputation, credibility and consumer loyalty, the reaction of external stakeholders (e.g., media), the government and regulatory agencies, and the response of the company-in-crisis (Shrivastava and Siomkos, 1989,1993; Siomkos and Kurzbard, 1994).

Understanding of the consumer sense-making process and the factors which affect consumer response during or after an airline disaster, is critical not only because it contributes to the development of a general theory of industrial crises (accidents), but also because it addresses some hands-on considerations on the management of such disaster incidents by the airlines. All this is feasible through the consideration of the factors found to form consumer response in this study.

Hutchinson (1992) provides a broad framework for incorporating crisis issues in long-range planning. Establishing new missions, realigning the company's value system and culture, restructuring the company, modifying products, services, or processes, are some of the most important planning issues. A cooperative management strategy among airlines, e.g., pooling resources, would be a possible approach with respect to long-run consumer learning. Most of the consumers in the sample (89%) were able to recall an airline crash in the last three years, while only 3% could remember a crash beyond 3 years into the past.

This suggests that on the average, an airline crash occupies the consumer's memory for a maximum of three years. Given that observation, one can easily explain why typically the media — a major stakeholder in an industrial crisis — "milks" dramatic incidents, exposes the company-in-crisis and designates responsibilities for the disaster. For this reason, among others, the airline should be prepared for emergency conditions with a crisis management plan (a recovery program) and a crisis management team (CMT). Airlines should regularly monitor travelers' attitudes, since they are a "barometer" of effectiveness of an airline in dealing with a crash. Measuring attitudes before and after a crash would provide the airline with the appropriate variables that should be addressed in order to control consumer responses to the crisis.

Although the crisis handling strategy may depend o the specific situation, it needs to address the critic factors which were identified in the empirical analysi i.e., consumer skepticism towards airline safety star dards, consumer apprehension for the safety infrastruc ture, and low consumer involvement with flying matter

The crisis contingency strategy should focus on thos who do not travel systematically, since frequent traveler have already accepted the existence of a risk when flyin Issues that have to be addressed by such a plan incluc damage control, allocation of responsibilities for cris management related tasks, effective and accurate com munication with the multiple stakeholders involved, an rescue and emergency management (Shrivastava an Siomkos, 1989,1993).

Moreover, contingency planning for crises should ac dress an interesting argument, raised by Boeing, tha even if air travel becomes safer, in other words if th probability of any plane crashing declines, the absolut increase in flights implies that there will inevitably b more airplane accidents in total. Therefore, it is expecte that management of disasters in air transport will be a increasing problem even with safer travel.

In general, however, service failures or crises may rep resent positive opportunities for service retailers to estab lish long-term customer relationships (Kelley et al., 199 Hart et al., 1990). Responsibility, sincerity and concer may shift a crisis incident from being a potential organ izational disaster to an opportunity for improvement c corporate credibility and reputation in the long run.

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