

Chapter 2

Coping with Uncertainty: Towards an Institutional Sensemaking Model

2.1 Introduction

In order to understand the strategies adopted by crisis managers to cope with uncertainty in crises, this chapter offers an inventory of relevant research insights and results from social psychology, organization theory, political science, public administration and crisis management literature. Unfortunately, the existing crisis management literature leaves much of the territory unexplored. Consequently, this chapter sets out to identify factors in a range of rather disparate theories to develop an understanding of why crisis managers select different strategies to cope with uncertainty in crises.

Dealing with uncertainty poses an important and often inescapable challenge for crisis managers. If we ask why crisis managers adopt different strategies to cope with uncertainty in crises, we must first differentiate between types of uncertainty. Crisis managers do come across different kinds of uncertainties in crisis sensemaking. Different dimensions to categorize uncertainties are elaborated in Sect. 2.2. Then, we will review theories that explain why crisis managers adopt different strategies to cope with similar types of uncertainty. The review is divided into three analytical levels. The micro individual level which captures individual cognition and critical choices is described in Sects. 2.3 and 2.4 deals with the meso-organizational level, which analyzes organizational dynamics in strategy selection and Sect. 2.5 describes the macro system level, which analyzes environments and institutions. For an overview of the different factors explained in this chapter, see Fig. 2.1. After reviewing factors from the different analytical levels, we will present a theoretical framework integrating sensemaking theory and institutional theory, which provides a comprehensive answer to the research question of this book in the final section.

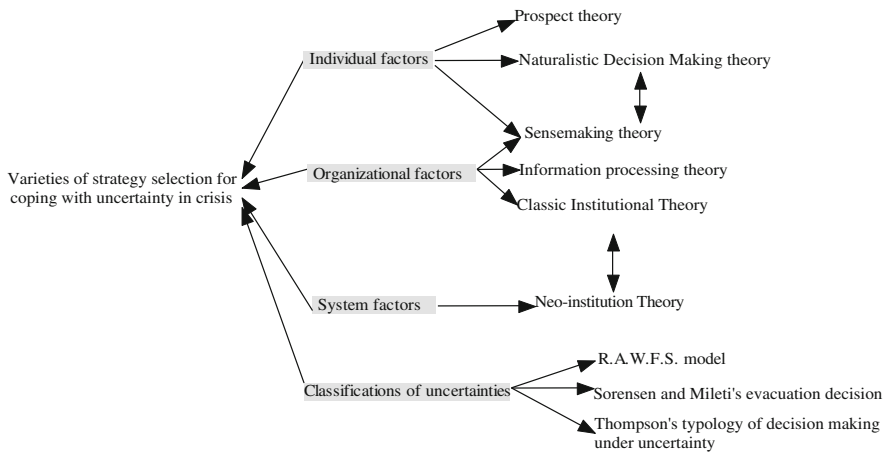


Fig. 2.1 An inventory of different theories reviewed in this chapter

2.2 Causes of Diversity in Strategy Selection: Different Types of Uncertainties

Decision makers are believed to behave differently when they face different kinds of uncertainty (Thompson 1967; Duncan 1972, 1973; Lipshitz and Strauss 1997). The classification of uncertainty must be discussed to uncover how different kinds of uncertainties lead to the selection of different strategies. Students of naturalistic decision making theory, organization theory and disaster management suggest several classifications, which have been matched with different coping strategies (Thompson 1967; Cohen et al. 1993).

Before embarking on a theoretical discussion, it is necessary to point out that this section does not address statistical-oriented estimates of uncertainty. Although uncertainty statistics do appear frequently in risk-related research, a probability oriented strategy selection does not function well in a disaster or crisis context. Disasters and crises are characterized as having a low probability but high consequences or stakes for crisis managers (Camerer and Kunreuther 1989). Each crisis is unique in its causes, development and consequences, for which a statistical base does not exist.¹ Therefore, the utility-probability functions of risk research are less useful in crisis and disaster management. Past cases, such as the 9/11 terrorist attacks² (Hutter and Power 2005), demonstrate that calculation-based risk analysis cannot map out uncertainty imposed by potential disasters.

¹See Boin et al. (2005: 4–7) regarding the uniqueness of crises.

²Before September 11, the possibility of aircraft flying into the twin towers in New York was known to the designer of the building (Hutter and Power 2005).

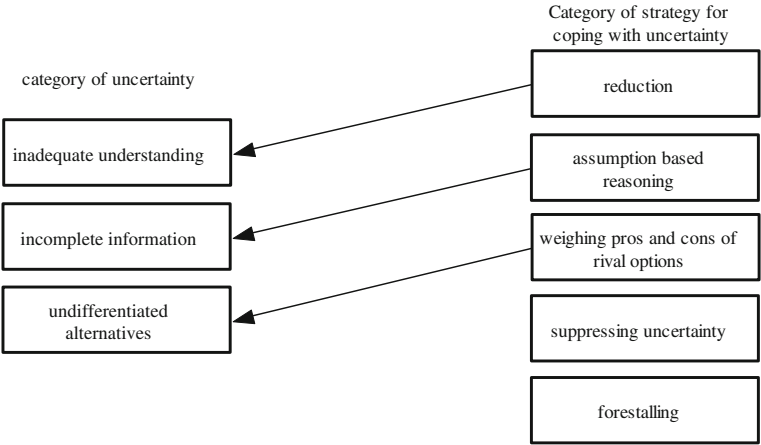


Fig. 2.2 R.A.W.F.S. heuristic for coping with uncertainty

This section mainly discusses two classifications used in crisis and disaster management research that address this specific type of low-probability and high-cost situation: the so-called R.A.W.F.S. heuristic³ and Mileti’s classification of uncertainty in evacuation decision. However, neither provides a direct answer to why crisis managers adopt different strategies to cope with uncertainty in crises. Nevertheless, these two classifications do provide cornerstones to conceptualize uncertainty in crises.

The R.A.W.F.S. heuristic was developed to conceptualize uncertainty and match appropriate tactics (Cohen et al. 1993). As shown in Fig. 2.2, the R.A.W.F.S. heuristic distinguishes three types of uncertainty that crisis managers encounter: (1) *inadequate understanding*, (2) *incomplete information*, and (3) *undifferentiated alternatives*. Strategies for coping with uncertainty are classified as: information reduction (for instance, collecting additional information, seeking advice, relying on Standard Operational Procedures), assumption-based reasoning (filling the information gap with assumptions even when new evidence is in conflict with current assumptions or the situation does not match previous experience), weighing pros and cons of rival options (choosing among alternatives in terms of potential gains and losses), suppressing uncertainty (ignoring uncertainty, acting on the basis of intuition, taking a gamble), and forestalling (improving readiness, avoiding irreversible action, preempting) (Lipshitz and Strauss 1997).

In coping with these different types of uncertainties, decision makers have their preferences for specific tactics (Cohen et al. 1993). Actors primarily adopt the *reduction* tactic to cope with inadequate understanding. Crises are characterized as

³These initials refer to five words and phrases: Reduction, Assumption-based reasoning, Weighing pros and cons, Forestalling, and Suppressing uncertainty, which is a model developed by students from naturalistic decision making theory.

demanding urgent decisions, which do not allow making clear every piece of vague information. As a consequence, simplifying vague information becomes indispensable in a crisis (Hermann 1979). Assumption-based reasoning is the primary strategy to cope with incomplete information. Crisis managers are most likely to weigh pros and cons in order to cope with the third type of uncertainty, i.e. contradictory alternatives. These matches between different kinds of uncertainty and primary strategies selected have been substantiated by empirical research on emergency operations. For example, Lipshitz and Strauss (1997) analyzed 102 self-reports of decision making by officers who were studying at the Israel Defense Forces Command & General Staff College, and Lipshitz et al. (2007) also studied senior station officers of the Melbourne Fire and Emergency Service Board based on the data collected by a head-mounted video camera.

It is clear that different types of uncertainties require different strategies in crises. However, this conclusion was based on studies of operational crisis managers, whereas this book aims to explain the selection of strategies to cope with uncertainty at the organizational level, including both operational-level and senior managers. Also, the RAWFS model does not provide clear ideas to conceptualize uncertainty.

The evacuation decision model created by Sorensen and Mileti highlights uncertainty in the decision process and provides another classification based on studies of emergency warning and evacuation decision processes in the face of natural hazards and man-made disasters (Mileti et al. 1985; Sorensen and Mileti 1987). Their research classified uncertainty into *interpretation*, *communication*, *perceived impacts*, and *exogenous influences* in the organizational warning process (Sorensen and Mileti 1987). This empirical research aimed to identify uncertainty in evacuation decisions; however, the authors did not study strategies to cope with these uncertainties. In the twenty years after Mileti and Sorensen's landmark work in disaster research, this topic has not been explored further by disaster and crisis research communities. The evacuation decision model provides a process oriented classification of evacuation decisions based on crisis managers' perception. But Mileti and Sorensen do not address the variety of strategies to cope with different uncertainties nor any direct relationships between uncertainties and strategy selection.

Broadening our perspective to a more general organization context, Thompson's (1967) typology of decision making in his classic *Organizations in Action: Social Science Bases of Administrative Theory* provides inspiration to answer the research questions of this book. A central theme of Thompson's book is coping with uncertainty in complex organizations. He introduces the concept "environmental uncertainty", which later became an important theme of organizational studies. Environmental uncertainty refers to the general impact of the organizational environment on organizations.

Thompson categorizes uncertainty based on two dimensions: preferences regarding possible outcomes and beliefs about cause-effect relations (see Table 2.1). Each type of uncertainty is matched with a different decision-making strategy (in Thompson's own words, decision style). Thompson identifies

Table 2.1 Thompson’s (1967) categorization for the process of decision making

		Preferences regarding possible outcomes	
		Certainty	Uncertainty
Beliefs about cause-effect relations	Certainty	Computational strategy	Compromise strategy
	Uncertainty	Judgment strategy	Inspirational strategy

computational strategy, compromise strategy, judgment strategy and inspiration strategy. A computational strategy fits best when both the cause and preference for outcomes are unambiguous. When the preference for outcomes is clear but the cause/effect relationship is unclear, judgment strategy will be adopted; when the preference for outcomes is uncertain but the cause-effect relationship is clear, a compromise strategy is called for. When neither the preference for the outcomes nor the cause-effect relationship is certain, decision makers will adopt an inspirational strategy.

The typology offers a hypothetical answer to the research question.

- (1) As the magnitude of uncertainty increases, different strategies will be selected. The variation ranges from a strategy based on rational calculation to a more flexible and intuition based strategy;
- (2) Thompson identifies two dimensions of classifying uncertainty which might result in different strategies of coping with uncertainty: beliefs about cause-effect relationships and preferences regarding possible outcomes. It seems the dimension of preferences regarding possible outcomes is at odds with the concept of uncertainty. Preferences regarding possible outcomes presupposes a trade-off between different outcomes, which excludes situations in which the outcomes are uncertain. For instance, decision makers might encounter a situation with no clue on what alternative outcomes could be, in which case there is no question of preference. However, in the present research context, this dimension is adjusted to the perception of future outcomes.

However, Thompson’s point of view to reduce the impact of environmental influence (which is usually a time-consuming process), makes less sense when explaining strategy selection under uncertainty in crises (normally in an urgent situation or a short time span).

This section explains how types of uncertainty make a difference in strategy selection. However, the theories reviewed here do not explain why individuals or organizations select certain strategies. The next section introduces a set of theories that help to explain this point. These theories will be organized at three analytical levels: the micro-level of psychology, the meso- or organizational level and the macro- or system-level.

2.3 Causes of Diversity in Strategy Selection: Psychological Factors

At the micro- or psychological level, two theories provide helpful perspectives in answering the research question: prospect theory and Naturalistic Decision Making theory. Both theories highlight cognitive factors and individual experiences that might contribute to the selection of different strategies in a crisis.

2.3.1 *Coping with Uncertainty: Individual Cognition Matters*

Prospect theory was initially developed by psychologists Daniel Kahneman and Amos Tversky as a psychologically realistic alternative to expected utility theory (Kahneman and Tversky 1979; Kahneman et al. 1982; Einhorn 1986).⁴ Prospect theory looks at how people make choices between alternatives that involve potential risks or uncertainty. The research is predominantly based on laboratory experiments. The difference between conclusions drawn from laboratory experiments and their application to a crisis context may be significant. In the laboratory experiments, each choice is assigned a probability and an expected outcome, which is usually not realistic in a crisis. Crisis managers have no time to compare multiple choices, and may adopt the first available alternative to cope with impending threats. The cognitive mechanisms to deal with uncertainty that have been studied in laboratory experiments have been applied in economics (Kahneman and Tversky 2000)⁵ and international relations, especially international security research (McDermott 1998; Mercer 2005),⁶ which makes prospect theory a good starting point for our inquiry. Two aspects of this theory are relevant to the research question of this book.

Prospect theory suggests that different framings (as a gain or a loss) of potential outcomes of a decision can lead to different choices. Here, framing refers to the way the situation is described or presented (Tversky and Kahneman 1981). According to

⁴Expected utility theory suggests that decision makers select alternatives under uncertain conditions based on expected net utility, $\text{expected utility} = \sum \text{utility}[I] * \text{probability}[I]$.

⁵Kahneman shared the 2002 Nobel Prize in Economics with Tversky (who died in 1996) for their contributions to knowledge of human judgment under uncertainty in decision making.

⁶*Political psychology* journal published two special issues in 1992 and 2004 on prospect theory in political science. Political psychologists widely use prospect theory to explain decision maker's behavior in international crises or conflicts, and claim that decision makers "hate to lose even more than they love to win" in the face of uncertainty (Mercer 2005). McDermott (1998) examined how decision makers adopted risk taking strategies in loss situations and how they selected risk avoidance strategies when they could gain from the situation based on four foreign affairs crisis decisions: the 1956 Suez crisis, the 1960 U-2 crisis, the 1979 decision of admitting Shah, and the Iran hostage crisis from 1979 to 1981.

prospect theory, decision makers tend to make different choices when an option is framed as a gain or as a loss. Students of prospect theory often use Tversky and Kahneman's (1984: 343) classical *Asian Disease example* to explain this framing effect:

Suppose that

The United States is preparing for an unusual epidemic that has emerged in Asia, which is expected to affect 600 people. Here are two alternatives proposed with the exact estimates of the consequence:

- [1] If program A is adopted, 200 people of those 600 will be saved;
- [2] If program B is adopted, there is a probability of one third that all 600 people will be saved and there is a probability of two-thirds that no people will be saved.

Another way of framing the same question as follows:

- [1] If program a is adopted, 400 people will die;
- [2] If program b is adopted, there is a probability of one third that nobody will die and a two-thirds probability that 600 people will die.

This case demonstrates the second relevant aspect of prospect theory: the loss-aversion effect when making choices under uncertainty. When it comes to the first parallel options, both options produce the same expected consequence and are framed as gain situations. When most decision makers choose program A, it can be inferred that people tend to make risk-averse choices if the expected outcome is positive. By contrast, when most decision makers choose program b in the second parallel options, this indicates risk-seeking behavior in situations involving losses (Kahneman and Tversky 1979).

Research in the US indicates that crisis managers tend to avoid blame instead of claiming credit (Weaver 1986; Hood 2007).⁷ Political leaders tend to avoid negatives or failures because voters appreciate them less for their successes than they sanction them for their failure or disappointing performance (Kernell 1977; Lau 1985; Fiorina 1986; James and John 2006), even in natural disaster response (Achen and Bartels 2004). The widespread use of the Internet makes negative information or risk information freely accessible to citizens, which goes hand in hand with a decrease of people's trust in government (Chung 2011). Therefore, we may conclude that avoiding errors or blame is a critical factor in strategy selection in times of crisis (Brecher 1979; Janis 1989).

⁷This is also called "negativity bias", which means "the cognitive tendency for more attention to be paid to negative than to positive information and for losses to be valued more highly than gains of an equivalent" (Hood 2007: 197).

2.3.2 *Coping with Uncertainty: Prior Experience Matters*

In contrast with prospect theory drawn from a laboratory setting, Naturalistic Decision Making theory (NDM) aims to explain decisions made by operators (instead of decision made on a strategic level) under uncertainty in a real-world setting (Kahneman and Klein 2009).⁸ NDM researchers especially focus on complex situations marked by time pressure, vague goals, high stakes, team and organization constraints, changing conditions, and varying amounts of experience (Orasanu and Connolly 1993).⁹ A series of research findings were generated from operational-level decision making in emergencies, such as fire fighting (Klein 1989) and military decision making (Klein 1999), that have partly have been applied in the US army operation manual, the *Field manual (FM) 6-0, Mission command: Command and control of army forces* (Klein 2008).

Recognition Primed Decision (RPD), one of the NDM models relevant to this research, highlights the role of *prior experience and expertise* in coping with uncertainty (Klein et al. 1993; Lipshitz 1993; March and Heath 1994; Lipshitz et al. 2001). NDM suggests experienced decision makers tend to use a situation assessment ability, which can help decision makers come up with quicker decisions (Scott 2008). Experienced decision makers adopt the first workable solutions instead of comparing different options as suggested by prospect theory (Klein 1999).

Essentially, RPD tells us that the variety of selected strategies is determined by the extent to which decision makers' experience and expertise can help a first responder understand the uncertain situation and evaluate possible response actions to cope with uncertainties. Three variations can be distinguished concerning the role of prior experience and expertise in decision making.

In the first variation (the "if...then" form), experienced decision makers match the situation with a typical or familiar one that they have encountered in the past. *Recognizing the situation* includes identifying goals (setting a priority), cues (picking up important information), expectations, and action. Once the typical situation is recognized, a typical response action will follow.

In the second variation (the "if (??)...then" form), decision makers cannot recognize or match a typical pattern based on the available information. They may

⁸The idea of NDM originated at a conference in Dayton, Ohio in 1989 (Klein 2008), and resulted in a book edited by Gary Klein, Judith Orasanu, Roberta Calderwood, and Caroline Zsombok (1993).

⁹It is hard to isolate factors contributing to uncertainty from the general complex situations mentioned in the Naturalistic Decision Making theory (for research that especially investigates uncertainty in NDM, see the R.A.W.F.S. model as elaborated in Sect. 2.2). Therefore, the review and argument made in this section are based on a complex situation in general instead of only an uncertain situation.

search for more information to further examine the situation and try to build a story to interpret the inconsistencies. Building the story can help organize inconsistencies into a meaningful interpretation framework. After interpreting the uncertainty, decision makers accordingly choose a response action.

In third variation (the “if...then??” form), the situation is clear to the decision makers, but they find it difficult to figure out the proper response action. Experienced decision makers conduct mental simulations, and come up with an appropriate action quickly in urgent situations (Klein 1999). Mental simulations require experience, but cannot guarantee success in a complicated situation under time pressure and uncertainty. In other words, novice decision makers are especially vulnerable to failure when carrying out a mental simulation.

In sum, research at the individual level suggests that the variety of selected strategies for coping with uncertainty is caused by different understandings of loss and gain, and different prior experiences and expertise. But neither of the theories does take into account the context in which individuals make these decisions, such as the organizational dynamics and the institutional and political environment. The following part will discuss how these environmental and organizational characteristics influence strategy selection when dealing with uncertainty.

2.4 Causes of Diversity in Strategy Selection: Organizational Factors

Organization theorists have long studied how uncertainty in an organization's environment influences organizations and how organizations adapt to these uncertainties (Dill 1958; Crozier 1964; Lawrence and Lorsch 1967b; Thompson 1967; Duncan 1972). In organization theory, the information processing perspective, sensemaking theory and classic institution theory provide three candidate answers to the current research question.

The information processing perspective originating from the contingency school in organizational research highlights structural factors and information processing ability of an organization as contributing to the selection of different strategies. Sensemaking theory depicts a process perspective on resolving uncertain situations. Classic institutional theory doubts the pure influence of organizational structure factors, and claims that “social-culture pressures”, which hide behind formal organizational structures, influence strategy choice (Scott and Davis 2007: 276). Most work from these theoretical perspectives has not been applied to crisis contexts, but these theories do provide helpful insights to explain the research question of this book.

2.4.1 *Coping with Uncertainties: Information Processing Matters*

The ability to process information is an important factor for organizations to cope with the inherent uncertainty of their environments (see Fig. 2.3) (Galbraith 1974). The logic is simple because “the greater the uncertainty of the task, the greater the amount of information that has to be processed between decision makers” (Galbraith 1974: 28). The information processing perspective provides useful insights to answer the research question in the following aspects ways:

- (1) As uncertainty increases, different kinds of strategies should be adopted for coping with uncertainty. In a predictable context, organizations can use rules and plans that are set up prior to upcoming events. When unexpected situations emerge, reporting to its superiors will be required. When uncertainty exceeds the capacity of its superiors, decision makers may choose to reset the targets or goals.
- (2) Galbraith (1974) proposed two design options to cope with the influence of environmental uncertainty: reducing the need for information and increasing the capacity of processing information. For information reduction, organizations mainly use two methods. The first one is to create slack resources. For example, if the organization knows that there might be a shortage of some critical resources in preparing for some potential crisis, they may create a

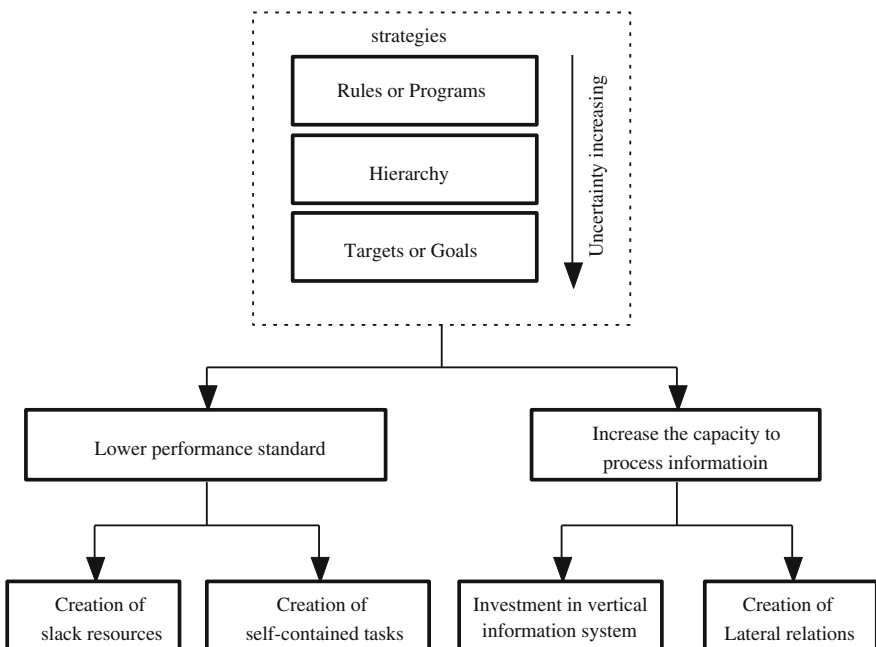


Fig. 2.3 Organizational strategies for dealing with uncertainties: information processing. Adopted and modified from Galbraith (1974)

buffering inventory (like sand bags for floods). The second is to create self-contained tasks that require less coordination among organizations. For example, if community A and community B have a joint command center for emergency medical and rescue service in normal times, it is better for both communities to operate independently to reduce the amount of information exchange and coordination during a crisis.

Two measures stand out as critical for increasing the capacity of information processing. The first is to invest in vertical communication systems among different hierarchies that may speed up information processing under uncertainty. When unexpected situations emerge, an integrated vertical communication system could allow organizations to call upon their superiors more quickly. The second is to create lateral relations. During a crisis response, setting up a multi-department leadership group to cope with an unexpected crisis can help share the information load among lateral organizations and reduce the information load on the vertical dimension (Galbraith 1974).

For example, during the 2008 ice storm in southern China, the Chinese government encountered an unexpected breakdown of its infrastructure systems: the low temperature caused ice formation on the transmission lines and towers, and unexpected large amounts of ice exceeded the designed capacity of the tower, causing the collapse of the power transmission towers. The collapse of the towers further led to the breakdown of the railway system, the postal service, the communication system, and the banking system. All these infrastructural systems were interconnected but managed by different governmental agencies. Therefore, the Chinese government set up a command center to coordinate contingency measures for coal, oil and power supply, transportation and disaster relief (Li 2008).

The organizational information-processing perspective suggests that organization structure matters in the following aspects: a better vertical communication system and creating lateral relations could facilitate information exchange and help clarify uncertain situations; organizations that create slack resources and have an organizational structure ensuring a decreased reliance on other organizations are better prepared for a crisis in terms of unexpected resource demands and uncertainty caused by coordination, respectively.

2.4.2 Coping with Uncertainty as a Sensemaking/Organizing Process

Weick's sensemaking model explains the organizational process of resolving equivocality or uncertainty.¹⁰ In 1969, Weick's book *the Social Psychology of*

¹⁰According to Weick (1979: 174), "An equivoque is a pun, a term with at least two meanings, two disparate strings of thought tied together by an acoustic knot". Uncertainty means a situation with limited knowledge about what happened, what caused this, and what the future outcome will be.

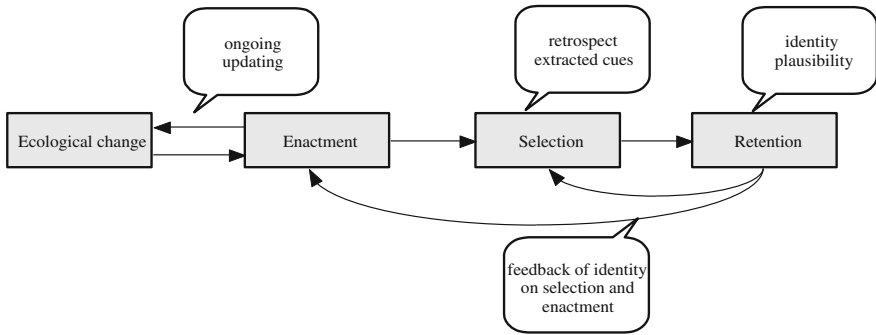


Fig. 2.4 Weick's view of the relationship among enactment, organizing and sensemaking. *Note* Adopted from Jennings and Greenwood (2003: 202, adapted from Weick 1979)

Organizing introduced a view that different from mainstream organization theory, intending to “break the stranglehold that decision making and rational models have had on organizational theory” (Weick 2003: 186). Weick defined “organizing” as “the resolving of equivocality in an enacted environment by means of interlocked behaviors embedded in conditionally related processes” (Weick 1969: 91). Weick subsequently developed his idea of organizing into a theory of sensemaking.¹¹ Through the lens of sensemaking theory, we see how organizations take in uncertainty from environments, try to make sense of that information, remember what is learned, and put it to use in the future. Weick described sensemaking as “the experience of being thrown into an ongoing unknowable, unpredictable streaming of experience in search of answers to the question ‘what’s the story?’... ‘Now what should I do?’” (Weick et al. 2005: 410).

In his sensemaking theory, Weick highlights three key phases in the organizing process: enactment, selection and retention as depicted in Fig. 2.4 and Table 2.2. According to Weick (1988), the enactment perspective could be understood as both a process (enactment) and a product (enacted environment). The former includes two aspects: a process of bracketing and singling out elements based on preconception and a process of reinforcing preconceptions after acting within those

¹¹Weick (2003) explained the difference and relations between sensemaking and organizing. According to Weick (2003: 186), “organizing refers to the modified evolutionary process of ecological change-enactment-selection-retention, while sensemaking implies key organizational events happen long before people even suspect that there may be some kinds of decision they have to make”. Sensemaking connects with organizing in the following aspects, “ecological change and enactment in organizing = ongoing updating and enactment in sense making; selection = retrospect, extracted cues; retention = identity, plausibility; feedback from retention to subsequent enactment, and selection = feedback of identity and plausibility to subsequent enactment and selection. And all of these organizing and sense-making events are presumed to be social” (Weick 2003: 186).

Table 2.2 A process demonstration of the sensemaking model

	Inputs	Processes	Outputs
Enactment	Ecological changes	Notice and bracket	Equivocal data
Selection	Equivocal data Enacted interpretations that worked before (might not exist)	Select plausible interpretations	Enacted environments
Retention	Enacted environments	Stored as a successful sensemaking	Enacted interpretation

bracketed elements. The latter is the result of the enactment process, which is recognized by organizational members as an explanation of a cue in certain situations. In short, the enacted environment serves as “if-then assertions” or causal maps of action and related outcomes, which are also expectations of future actions and focused perceptions.

Sensemaking starts with ecological change, which could be a discontinuity of organizational routines, something unexpected or something expected that did not happen (Weick et al. 2005). The discontinuity provokes a search for certainty and provides raw data for the sensemaking process (Weick 1995).

The “basic raw materials” of Weick’s organizing and sensemaking model consist of “informational inputs that are ambiguous, uncertain, equivocal” (Weick 1969: 40), which emerge naturally in almost every crisis. Crises present organizations with disturbance, disorder, and interruption of normal routine operations (Weick 1988; Maitlis and Sonenshein 2010). These ecological changes cannot be addressed through normal routines, and pose high demands on organizational sensemaking (Weick 1988). Questions like “what ‘the hell’ is going on?”, “What happened?”, “What is the story”, are often asked during a crisis (Colville et al. 2013). Lagadec (1993: 54) helps to catch the dynamics of ecological changes in a crisis: “The event can in some ways be considered as an abrupt and brutal audit: at a moment’s notice, everything that was left unprepared becomes a complex problem, and every weakness comes rushing to the forefront.”

Below we will discuss the three core elements of the sensemaking process and its relevance for explaining how organizations cope with uncertainty in a crisis.

Enactment is the process generating equivocal data¹² (or “might have beens”) that are eligible for further analysis, by which ecological changes are selectively noticed and bracketed according to the organizational flow of experience. This enactment process links objective realities (ecological changes) and organizational subjective construction of those realities. The process involves two mechanisms:

¹²Equivocal data are the ecological changes with at least two possible meanings that are perceived by organizational members.

noticing and bracketing. Noticing filters ecological changes inconsistent with organizational experience. The noticed cues could be some changes inconsistent with the framework, or expected events that do not occur (Starbuck and Milliken 1988). After ecological changes are noticed as cues, bracketing serves to bring cues to further attention and attach a label to cues based on existing frames (Weick 1979: 45 and 147). Both mechanisms are influenced by organizational experiences cumulated in the organization's history. Organizations tend to have different experiences which lead to different noticing and bracketing mechanisms. These different experiences create different filtering processes when facing ecological changes, which influences strategy selection.

Turner's (1997) incubation theory which explains the organizational causes of a crisis describes parts of the enactment process. After studying 84 British industrial accidents, Turner (1997: 72) found an "incubation period" before a disaster, involving "a number of events which are at odds with the picture of the world and its hazards represented by existing norms and beliefs". These events are filtered as irrelevant to normal operations as a result of communication and intelligence failures within organizations. Therefore, the incubation theory highlights failures of the filtering process when organizations cope with ecological changes (events at odds with organizational norms in the disaster incubation theory), while Weick explains both the successful (helping to pick up important cues) and failing parts of the filtering process.

Selection produces an interpretation of equivocal data generated from the enactment process. In the selection process, organizations can either connect the equivocal data with an enacted interpretation that worked before (stored in the retention which will be explained in the next paragraph) or create a new interpretation of the equivocal data. This provides two different ways of coping with equivocal data (uncertainty). If the selection process discredits an enacted interpretation, organizations give a specific interpretation to the equivocal data which creates a plausible story to cope with the emerging uncertainty. Weick describes this type of selection as a specific interpretation. By contrast, if organizations connect the equivocal data with an existing enacted interpretation, organizations tend to match an interpretation to an uncertain situation. Weick names this type of selection as the stabilization of the figure-ground arrangement, or a scheme interpretation (Weick 1979: 45). Maitlis (2005) has adopted other terms to distinguish these two kinds of selection: the production of accounts (similar to a specific interpretation) versus the "activation" of existing accounts (similar to a scheme interpretation).

Retention is the process of storing successful sensemaking for future use. The result is a causal map that connects cues with an interpretation framework. When such a causal map is considered successful, it tends to be stored in the organizational memory for future use. In future sensemaking, retention thus guides and constrains enactment and selection. Here, sensemaking theorists do not distinguish different kinds of strategies but only describe the sensemaking process in a general way. Obviously, if the successful selection is stored as retention, organizations have

an additional way to interpret ecological changes (uncertainty), which might lead to the selection of a new strategy.¹³

2.4.3 *Coping with Uncertainties: Institutions Matter I*

The Institutional school provides two theoretical perspectives to explain the variety in strategy selection under uncertainty (Zucker 1987). *Classical institutionalism* focuses on the institutionalization process of organizations and how institutionalization contributes to organizational actions (strategy selection as an action). *New institutionalism* explains how strategy selection is not just determined by individual choices and organizational structures, but how it is also shaped by organizational contexts or macro-environments. These environments consist of informal or formal rules and procedures (either current or historical choices). Such rules, procedures and norms are embodied in the organizational environments and influence organizational actions as coercive, normative and mimetic forces (Hannigan and Kueneman 1977; DiMaggio and Powell 1983, 1991; March and Olsen 1984; Wildavsky 1987; Vaughan 1997).¹⁴ This section highlights how institutions influence strategy selection at the organizational level (classical institutional perspective). In the next section, the influence of institutional environments at the macro-level (neo-institutional perspective) will be discussed.

The question of what institutions are will be addressed before elaborating the two institutional perspectives. According to New institutionalism, organizational environments can be seen as institutions. Here, institutional environments must be distinguished from technical environments: the latter are “those within which a product or service is exchanged in a market such that organizations are rewarded for effective and efficient control of the work process”, whereas the former are “characterized by the elaboration of rules and requirements to which individual organizations must conform if they are to receive support and legitimacy from the environment” (Meyer et al. 1983: 140). In this view, an institution could be an organized procedure, a shared system, social pattern or arrangement of laws, rules, norms, symbolic, and cultures, which can reproduce itself and is “external to the consciousness of the individual” (Jepperson 1991: 145; Ferris and Tang 1993).

Classical institutionalism defines an institution as an organization that is *infused* with *values*, and is characterized by “a distinctive competence or a trained or built-in incapacity” (Selznick 1957; Selznick 1996: 271). In this perspective, institutions are specific organizations (Ferris and Tang 1993), and “organizations vary in the degree of institutionalization” (Scott 2008: 79). Members of a highly institutionalized organization are committed to the organization and its way of

¹³Students of sensemaking theory assume that the action and interpretation cannot be separated in the organizing process, and insist that actions persist once the uncertainty is interpreted.

¹⁴This will be elaborated in the neo-institutionalism section.

working (Selznick 1948).¹⁵ The institution is valued by relevant actors in the organization's environment as well, which provides the organization with legitimacy and support from its constituents.

Classical institutionalism mostly studies how an organization becomes institutionalized (Selznick 1949; Brewer 1989).¹⁶ This theory also helps us understand how the level of institutionalization shapes, guides and constrains organizational actions and strategy selection, as is relevant for this book. Scott (1998: 66) defines institutionalization as a "process by which an organization develops distinctive character structure". In the process, "unstable, loosely organized, or narrowly technical activities" turn into "orderly, stable, socially integrating patterns" (Broom and Selznick 1968: 238).

Varying degrees of institutionalization tend to impact differently on organizational actions. Selznick proposed two extreme types of organizations in terms of institutionalization: organization versus institution. The types of organization might influence strategy selection when coping with uncertainties. Institutions have a stable and orderly pattern of working, and tend to be confident in their way of working and their capacities of coping with problems faced. The orderly and stable patterns are taken for granted, and supported and endorsed by the organizational environment. Therefore, strategies for coping with uncertainty tend to be predictable and based on these stable patterns. By contrast, organizations do not have stable patterns of working, and organizational members and constituencies lack commitment to the organizational values. Organizations have to serve the interests of stakeholders. Organizations have no deeply embedded and valued practices and schemes to rely on, but tend to select strategies based on ad hoc analysis and discussion (Boin and 't Hart 2000).

2.5 Causes of Diversity in Strategy Selection: The Macro Environment

2.5.1 *Coping with Uncertainties: Institutions Matter II*

This section focuses on institutions as organizational environments and reviews insights from New Institutionalism on how institutional environments and pressures influence organizational actions (again action refers to strategy selection under uncertainty).

Mainstream New Institutionalism holds that institutional environments affect organizational actions through so-called isomorphism effects (Meyer and Rowan 1977; DiMaggio and Powell 1983). Isomorphism captures a process that

¹⁵In this book, the term "highly institutionalized organization" refers to an institution. Conversely, "lowly institutionalized organization" refers to an organization.

¹⁶Some important works include Selznick's (1949) study *Tennessee Valley Authority* and Brewer's (1989) study on *NASA*.

organizations in a similar “niche” tend to become more alike. When some practices or procedures are believed to be externally validated and enjoy high legitimacy among stakeholders in the organizational environment (DiMaggio 1988), organizational actions become predictable and are considered as taken for granted and “obvious” (Berger and Luckmann 1967; Zucker 1977; Vaughan 1996).

The effects that organizational environments have on organizations can be coercive, mimetic and normative (DiMaggio and Powell 1983). Mimetic means learning from other successful practices, procedures or organizational structures in order to cope with high environmental uncertainty. Normative effects originate from similar attitudes held by professional groups and associations and passed on via hiring and training. Coercive effects describe the influence of legal mandates or regulation forces, or other sources affecting organizations. The institutional environment may sanction the organization when its behavior is perceived to be inconsistent with dominant social values and norms (Dowling and Pfeffer 1975). If organizations follow the procedures and rules, they show that they have done everything possible to reduce a risk or address an uncertainty. They demonstrate their responsibility to the community and “avoid claims of negligence” (Meyer and Rowan 1977: 344; Vaughan 1997). If they do not, organizations can become the object of intense critique (Boin and 't Hart 2000).

Organizational environments also vary in terms of institutionalization, which tends to impact organizational actions differently. Some organizational environments may have no formulated rules or norms (which could be referred to as a state of institutional void), and then the adoption of an institutional structure or procedure is less influenced by existing norms. By contrast, when the environments have been infused with publicly accepted norms and rules, adopting a strategy tends to be more a response to pressures from the institutional environment “regardless of their value for the internal functioning of the organization” (Tolbert and Zucker 1983: 26; Donaldson 1995).

Additionally, Oliver (1991) argues that organizations do not just react passively to their institutional environments, but act strategically (Perrow 1986; DiMaggio 1988; Scott 2008: 169). According to Oliver (1991), these strategic responses vary from imitating successful models from other organizations to actively manipulating the environment.¹⁷

Although Oliver (1991) does not give us a clear empirically based conclusion on what makes organizations choose to conform to or resist institutional pressure, she does provide a framework to map out different factors of institutional environments. These factors cover the main framework of institutional theory,¹⁸ including (1) the causes of organizational conformity to institutional pressure, which might be perceived legitimacy or economical gains; (2) the multiplicity of constituents or the

¹⁷For more about these classifications, see Oliver (1991: 151–159).

¹⁸Here Oliver also integrated the resource dependence theory. Basically, Oliver tried to explore how institutional factors impact organizations regarding resisting or conforming to institutional pressure.

extent to which organizations depend on constituents; (3) the extent to which the institutional pressure is consistent with organizational goals, and the perceived discrepancy after conforming to institutional pressure; and (4) legal coercion and voluntary diffusion.

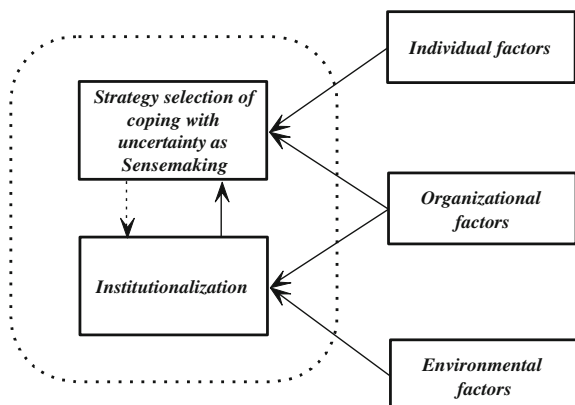
In conclusion, these different perspectives offer a variety of theories and concepts that help explain how crisis managers may select different strategies to deal with critical uncertainty in socially organized settings. Based on these theories, a series of factors contributing to the variety of strategies selected under uncertainty have been identified. As shown in Fig. 2.1, these factors include different types of uncertainty, individual cognitive bias regarding loss and gain, experience, information-processing capacities, the sensemaking process, the degree of organizational institutionalization and institutional environments. Two preliminary conclusions can be drawn from the theories reviewed:

Firstly, most of these theories are based on the functioning of organizations in normal times, not on crisis states of organizational life. Whether these theories are sufficiently suited for crisis states needs to be examined.

Secondly, these contributing factors operate at different analytical levels: the environmental level (such as institutional environments), the organizational level (organizational institutionalization, sensemaking process and information processing capacities), and the individual level (cognitive bias regarding loss and gain, and experience). These factors all seem to have an impact on strategy selection, but there has not been much effort to synthesize the different levels of analysis, which might provide a more comprehensive answer to the research question.

Although the efforts are to incorporate different levels of analysis, the analysis unit of this study centers on the organizational level—an individual organization. To understand the organizational behavior of coping with uncertainty, studying intra-organizational and inter-organizational relations becomes an indispensable part. Among the reviewed theories, sensemaking theory and institutional theory are not confined to a single analytical level, but try to focus on the intra-organizational and inter-organizational relations. As can be seen in Figs. 2.1 and 2.5, sensemaking theory provides a general framework to describe the organizational process of

Fig. 2.5 An institutional model of sensemaking



coping with uncertainty, which mainly connects the individual and organizational level. Institutional theory explains factors both at the organizational level and the environmental level. In the next section, an institutional sensemaking model will be proposed integrating both theories to explain how an organization coped with uncertainties during a crisis.

2.6 Towards an Institutional Sensemaking Model

Sensemaking and institutional theory have been developed as two parallel theories, and only limited efforts have been made by researchers to connect them (Weick et al. 2005; Powell and Colyvas 2008). Sensemaking focuses more on cognitive complexity, less on social and historical contexts (Jennings and Greenwood 2003; Weber and Glynn 2006). When it comes to the Institutional theory, it provides an explanation on the influence of organizational factors and organizational contexts, but focuses less on the individual actions (Oliver 1991). Researchers in the field of New institutionalism, such as Zucker (1991: 105), have called for opening the black box of institutionalization at the organizational level instead of focusing on the macro institutional analysis only. Organizational actions cannot be explained without the social context either, whereas the social context can only be understood through organizational cognition (Friedland and Alford 1991). This book relies heavily on classical institutional theory, because it has a similar central focus on organizations but still connects well between organizations and their environment.

Theorists from both sides (sensemaking and institutionalism) have called for research to link micro and macro elements (Weick 2003; Powell and Colyvas 2008). However, only some theorists, such as Wick (2001), Jennings and Greenwood (2003), Weber and Glynn (2006), and Jeong and Brower (2008) have initiated preliminary dialogues aiming to link both theories. There is even less research focusing on the impacts of institutionalization on sensemaking in the context of crises (Maitlis and Sonenshein 2010). An important aspect shared by both institutional theory and sensemaking theory is that both theories acknowledge the influence of historical and cultural factors. The very idea of an institution captures historical and cultural elements embedded as recurrent routines, procedures, cultural beliefs, scripts or appropriate actions. Sensemaking theory features the concept of retention, which is a historical and cultural factor influencing the enactment and selection process.

The institutional sensemaking model (see Fig. 2.5) views coping with uncertainty as a process of sensemaking, and tries to explore the influence of institutionalization on sensemaking.¹⁹ In the following section, we will explore how institutionalization may influence sensemaking.

¹⁹In this section, we will only discuss the impacts of institutions on the sensemaking process. We will not focus on how sensemaking actions remold the organizational institutionalization process (as marked with a dotted line in Fig. 2.5) [these actions were named “transformational mechanisms” by Weber and Glynn. For details, read Weber and Glynn (2006)].

Institutionalization sets boundaries for organizational members' perception, including the process of sensemaking. To be specific, institutions provide taken-for-granted cognitive constraints for organizational actions (Taylor and Van Every 2000; Weber and Glynn 2006; Maitlis and Sonenshein 2010). Cooley and Angell (1956) and Jepperson (1991: 153) take a more extreme view, suggesting that individuals and organizations are always influenced by the "effects of institutions". Powell and Colyvas (2008: 277) indicate more specific impacts of institutions:

Institutional forces shape individual interests and desires, framing the possibilities for action and influencing whether behaviors result in persistence or change. Macro institutional effects, through processes of classification and categorization, create conventions that are the scripts for meaning making.

As discussed in Sect. 2.4, organizations vary in terms of their degrees of institutionalization (Jepperson 1991; Tolbert and Zucker 1996). Organizations with a high degree of institutionalization have shared typifications (usually some taken-for-granted categories and appropriate actions), generalized expectations of a situation and common interpretations of behaviors (Barley and Tolbert 1997; Weber and Glynn 2006). These highly institutionalized organizations are confident of their institutional way of working, which consistently encourage the selection of typified actions and interpretations (or causal maps) (Meyer and Rowan 1977; Grandori 1987: 86; Wicks 2001; Jeong and Brower 2008), and decreases opportunities for understanding unexpected emerging cues or selecting alternative interpretations (Barley and Tolbert 1997; Weick and Sutcliffe 2001; Weber and Glynn 2006).

The Federal Aviation Administration's initial response to the 9/11 attacks is a case in point to explain this simple matching of cues with typified situations and identities in a highly institutionalized organization during a crisis. The FAA is well-known for its high reliability in air traffic control and has been identified as a model High Reliability Organization (Roberts 1990; La Porte 1996; O'Neil and Krane 2012). The FAA has created and institutionalized very specific procedures to prevent errors in air traffic for both controllers and the aviation industry (Spencer 2008). On the day of the 9/11 attacks, when *American Airline 11* lost communication with the Indianapolis Air Traffic Control Center, the controllers assumed that there was a temporary communication problem or the captain forgot to change the channel of communication equipment when the flight arrived in the service area of the other air traffic control center. The controller just waited and continued to try to contact the aircraft. The aircraft had not been registered as being hijacked, because the FAA guidelines specified that the pilot must notify the control center with a special code for a hijack. At the FAA, all controllers were trained to follow existing guidelines and procedures and they heavily relied on these procedures to cope with uncertainties. Therefore, the FAA did not change its institutionalized perception until the second aircraft crashed into the Twin Towers (The 9/11 Commission 2004).

In sharp contrast, under-institutionalized organizations lack clear ideas on what they are expected to do, what their appropriate roles are, or even internal or external

consensus on what to do, and how to do it. In other words, there is no typified experience to help extract cues from ecological changes. Instead, there might be controversy between different actors within organizations regarding cue extraction. Such controversy might hinder the generation of a mental picture that is shared between different organizational groups. Weick's (1993) classical case study of the Mann Gulch disaster demonstrates that a temporal organization (which is an under-institutionalized organization) failed to build up a shared understanding to cope with uncertainties during a crisis response. During a response to the wildfire in the Mann Gulch area of the Helena National Forest in Montana, United States, a temporary team consisting of sixteen members was dispatched to fight the fire. The team leader, Wag Dodge, did not know most of the crew in the temporary team. When Dodge realized that their fire fighting method might fail, he ordered the crew to "drop their tools" (such as shovels and saws) and improvised, lighting a fire in front of them and ordering them to lie down in the area it had burned (a so-called escape fire).²⁰ For most crew members, keeping "their tools" in hands was standard procedure and was required according to their training. Dropping their tools and starting the escape fire was novel to them and was at odds with the method they were trained. Therefore, none crew members adopted the escape fire method. As a result, two of them survived on an unburned ridge, and the other thirteen died.

Institutionalization sets boundaries for organizational perception, but can also help to figure out cues during a sensemaking process. In the enactment process, institutionalization helps to define a situation of interruption and generate cues for further attention through comparing ecological changes with organizational expectations according to past experiences. Highly institutionalized organizations tend to produce scripts (typified actions to situations) as an anchor to judge ecological changes.²¹ If an ecological change does not match typified scripts, the ecological change is considered a cue for further attention. Organizations may not generate a single expectation in response to the ecological change, but rather multiple and possibly contradictory expectations.

After cues are recognized by organizations as requiring continuous attention in the enactment process, the selection process relies on institutionalization to narrow down the equivocality and decide what to deal with and what to leave alone, or ignore. The selection process relies on existing interpretation frameworks which have gained the "moral and ontological status of taken for granted facts", as retentions in the previous sensemaking cycle (Barley and Tolbert 1997: 94).²² Facing an existing interpretation framework and the enacted cues, organizations

²⁰Escape fire is a method to set some fires nearby before wildfire comes close to firefighters. The burnt areas can provide a life-saving space when a wildfire approaches. In the Mann Gulch fire, this method has not been taught to the firefighters.

²¹Here I adopt the definition from Barley and Tolbert (1997: 98): "Scripts are observable, recurrent activities and patterns of interaction characteristic of a particular setting".

²²Weick (1969) states that "organizing serves to narrow the range of possibilities, to reduce the number of 'might occurs'. The activities of organizing are directed toward the establishment of a workable level of certainty".

must decide to either reinforce the existing interpretation framework, or reframe or alter it. In the enactment process, organizations might produce contradictory expectations in response to the cue, which could be an interpretation based on an institutionalized framework versus a specific interpretation discrediting the current framework.

Based on the theoretical discussion of institutional influence on sensemaking actions, the following general hypotheses have been constructed about the relationship between institutionalization and strategy selection to cope with uncertainty in a crisis:

Organizations with a high degree of the institutionalization tend to stick to existing scripts or frames to interpret uncertainty.

Organizations with a low degree of institutionalization do not use an existing interpretation framework to match enactment cues, but instead these organizations create an interpretation framework from enactment cues.

These hypotheses will guide the empirical research in the following chapters.

2.7 Conclusion

This chapter has reviewed relevant theories at three analytical levels, and concluded that there is a need for integrating these analytical levels in order to provide a more comprehensive answer to the research question. An institutional sensemaking model is proposed which combines sensemaking theory and institutional theory. The former explains coping with uncertainty as a process of sensemaking which integrates the micro and meso level factors. The latter serves to bring together the meso and macro level factors, which impacts the sensemaking process. The aim of this research is to explore how institutionalization influences sensemaking actions, and if it influences strategy selection when coping with uncertainty in crises. Chapter 3 will operationalize key concepts and variables of the institutional sensemaking model used in the empirical part of the research.

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