

# Examining the implications of process

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Therefore a further contribution of this study is that we also seek to take into account this mediating role of choice on decision effectiveness. In this study we address several specific research questions: 1) Does variation in the decision-making process result in variation in response choice; 2) Does variation in response choice result in variation in decision effectiveness; and 3) Can we also trace the effectiveness of different SAD processes as mediated through particular response choices?

Since management can influence the SAD processes, question three is likely to be of more interest than question two. However, if we only look at the direct relationship between SAD processes and effectiveness (I. E. , Dean & Sherman, 1996), we might be attributing differences in effectiveness to process variation when these variations did not actually influence choices. Thus, we need to adequately discern which SAD processes are more effective in these situations and produce the most effective outcomes.

Addressing these questions helps to clarify the integrated influences of process and choice on strategic decision-making effectiveness. This paper proceeds as follows: 1) We review related research on SAD, and leverage prior theory to develop hypotheses for an integrated process-choice-effectiveness SAD model; 2) We examine the model and hypotheses through empirical analysis of data from a crisis response training exercise using an agent-based simulation decision support system technology; 3) We present and discuss the results of our analyses in relation to the model and hypotheses; Copyright C 2010, GIG Global.

Copying or distributing in print or electronic September 2010 3 and 4) We conclude with a discussion of our findings along with implications for practitioners and future academic research. Theory development Prior work by Dean and Sherman (1993, 1996) offers an integrated decision-making model, for framing this study of SAD process-cooperativeness's. Their work examines the assumptions underlying the relationship between decision-making processes, response choices, and SAD effectiveness.

The model proposes that variation in decision-making process (political or rational) will produce different response choices, which result in variation in SAD effectiveness. However, empirical testing of their model is limited to the relationship between political and rational decision-making processes and variation in effectiveness alone, excluding the intermediate response choice variable.

As the potential mediating implications of the response choice intermediate variable are thereby unexamined, we extend and examine Dean and Sherman's (1996) model to clarify the conflicting arguments in the prior SAD literature. We do this through examining the full model with the inclusion of the mediating allegations of response choice through our application to an extreme decision-making context (crisis response).

Our approach is as follows: 1) We extend Dean and Sherman's (1996) strategic decision-making relationship and effectiveness model of variation in process, response choice, and effectiveness by expanding their effectiveness model to include the potential mediating effects of intermediate choices; and 2) We then examine the competing arguments for process effectiveness in

this context from Frederickson and Mitchell (1984), Bourgeois and Eisenhower (1988), and Hart (1992).

In Dean and Chairman's (1996) model variation in the strategic decision-making process (e. G. , Political or Rational approaches) produce variation in response choice, resulting in variation in effectiveness. The effectiveness outcomes therefore depend on the following: 1 ) The strategic decision-making process utilized, and 2) The response strategy choices implemented.

In order to clarify the conflicting dominant arguments in the literature for process effectiveness under uncertainty, as well as test the theorized mediating role of choice, we develop several base-line hypotheses to be ugly consistent with the previous literature. Replicating Dean and Chairman's (1996) model: Hypothesis 1: Variation in strategic decommissioning process will be related to variation in effectiveness.

Examining the sub elements of the implied Dean and Sherman (1996) model: Hypothesis 2: Variation in strategic decommissioning process will be related to variation in response choice. Hypothesis 3: Variation in response choice will be related to variation in effectiveness. To examine the full model as proposed by Dean and Sherman (1996), which proposes a mediating relationship but only examines the erect relationship, we distinguish between the direct effect of SAD process on effectiveness (H1 ) and a mediating relationship acting through response choice.

Whereas, Dean and Chairman's (1996) original model has choice as endogenous to the strategic decision-making and effectiveness relationship,

we model response choice as an intermediate step and consider this as an expansion of the strategy decision-making and effectiveness relationship. We therefore derive hypothesis 4 to examine whether response choice has both a mediating and direct effect Examining the full Dean and Sherman (1996) model: Hypothesis 4: Variation in strategic decommissioning process and variation in response choice will be related to variation in effectiveness. Copyright © 2010, GIG Global.

Copying or distributing in print or electronic 4 International Journal of Decision Support System Technology, 2(3), 1-15, July-September 2010 To examine the conflict in the literature regarding the inconsistency among the Frederickson and Mitchell (1984) and Bourgeois and Eisenhower (1988) propositions for uncertain and high velocity environments, as well as the Hart (1992) propositions for effectiveness by type of decision-making process, we develop hypotheses AAA and b: Hypothesis AAA: In highly turbulent environments, Rational decision-making processes should be positively related to effectiveness, while Political decommissioning processes should not have a positive relationship with effectiveness (Bourgeois & Eisenhower, 1988; Hart, 1992). Hypothesis b: In highly turbulent environments, Rational decision-making processes should be negatively related to effectiveness, while Political decommissioning processes should have a positive relationship with effectiveness (Frederickson & Mitchell, 1984). Analytical considerations Study context Crisis events (I. E. , natural disasters, terrorism, etc. Are environments characterized by varying levels of turbulence and ambiguity (National Commission on Terrorist Attacks, 2004). While government organizations differ from those in the private sector,

research in the management field on SAD may be applicable to government organizations dealing with crisis events. For example, the core task of organizations is the creation and/or maintenance of a fit between the organizations' internal strengths and capabilities and the demands placed on them by their environments. Government organizations must also draw upon unique resources and capabilities across various departments and levels of government to respond to challenges in their environments.

Similarly, the levels of turbulence and ambiguity present in a government agency operating environment may also be direct contributors to the difficulties inherent to SAD in these contexts. The nature of the environmental pressure, turbidity, and outcome implications make this a unique and challenging operating environment. Prior related work on this topic from other fields includes the development of homeland defense strategy for the White House (KUDUS, 2004), the modeling of disease outbreaks (Ravager & Longing, 1985; Kurd & Hare, 2001; Kaplan, Craft, & Win, 2002, 2003; Bank, Gull, Kumar, Marathon, Cravings, Tutorial, & Wang, 2004; Craft, Win, & Wilkins, 2005).

Further uses have included numerous academic, government, and practitioner publications on epidemiological, terrorism response, and homeland security and defense strategies (Deutsche, 1963; Hoffman, 1981; Hugh & Selves, 2002; Ramirez-Marquee & Afar, 2009). Sample data We test our model and hypotheses using data collected from a multi-step approach consisting of an experiment (a U. S. Department of Homeland Security training exercise called Measured Response (MR.)) in conjunction with an

intelligent agent-based simulation. We use this data to examine the extended Dean and Sherman (1996) model and the associated hypotheses for variation in SAD process, choice, and effectiveness. We use a computational experimentation methodological approach to do this.

This approach consists of two steps: 1) Using a validated survey instrument to collect data on strategy process and choice from a lab experiment with actual practitioners grouped into several response teams; and 2) An intelligent agent-based simulation utilized in the exercise to produce data on the effectiveness of the groups' SAD processes and response choices. We test Our model and its hypotheses through empirical analysis of a sub sample of 268 combined observations from the survey and simulation data collected from the exercise. Copyright C 201 0, GIG Global. Copying or distributing in print or electronic September 2010 5 Measured Response Exercise.

The MR. Homeland Security training exercise consisted of nine teams of human agents comprised of three to five individuals each (representing their actual functional responsibilities in most asses) to play the roles of the Departments of Homeland Security (DISH), Healthand Human Services (DISH), and Transportation (EDT) at the local, state, and federal levels. These human agents operated in a " Joint Operations Center environment where they were able to execute a variety of decisions and respond interactively to changes in the simulated environment throughout the exercise. Simulation Model. The Measured Response training exercise utilizes a synthetic environment as the decision support system technology for the exercise.

This system uses a dynamic virtual computer simulation environment to simulate the outbreak and dispersion of a biological agent on a mid-sized city in the United States. This outbreak affects tens of thousands of computer-based intelligent agents.

These agents approximate the diversity of behavioral characteristics and demographics of the actual modeled population for the city. Additionally, we utilized pathogen-specific data from the Centers for Disease Control (CDC) in the simulation model to ensure the attack takes place in a realistic manner on the virtual population of intelligent agents. Further, the organizational aspects of the simulation model incorporate data from actual DHS and CDC response plans. The simulated scenario therefore replicates the actual characteristics of a real-world attack in which the decommissioning process and response strategy choice can significantly affect outcomes in terms of infection rate, contagion spread, population death rate, and public mood.

Given these factors, these types of decision support system technologies offer a rich and dynamic simulation environment, which largely alleviates the common concerns previously associated with using simplistic homegrown or off-the-shelf simulation tools in academic research (Linebacker et al. , 2009; Mustachios & Susann, 2009). Specifically, our training exercise utilizes thousands of different participant decisions on a variety of teams, at multiple levels, which affect thousands of computerized agents who respond dynamically to the collective participant inputs, as well as each agent's response behavior to the inputs (See Structured, Meta, & ornerier, 2005;



Harrison, Line, Carroll, & Carrey, 2007 for more detail on simulation modeling).