

Investigating the Success of Decision Making Processes

Paul C. Nutt

University of Strathclyde

ABSTRACT A decision making process is made up of action-taking steps indicating *how* to make a decision. When linked to indicators of success, process provides the basis for building an action theory for decision making. The success of many different types of processes must be documented before such a theory can be constructed. In this research, processes called 'idea imposition' and 'discover)' are investigated by analysing 202 organizational decisions and their outcomes. Discovery was derived from prescriptive literature, which stresses logical and political rationality. Idea imposition was inferred from the descriptive/interpretive literature, which stresses pragmatics and sense making. Some of the discovery efforts may be abandoned to exploit an opportunity, becoming an 'emergent opportunity' process. Idea imposition efforts end if the motivating idea fails, calling for steps to find a replacement with a 'redevelopment' process. Analysis revealed that discovery was more successful than idea imposition and both process adaptations. Discovery was more successful than the other three processes no matter what the urgency, importance, resource level, initial support, decision maker level, sector, or type of decision.

INTRODUCTION

Decision makers (DMs) make decisions by following a process comprised of steps supported by tactics to carry out each step (Nutt, 2002). DMs work through the process steps to uncover what to do and why. Several types of processes can be found in the literature, bracketed by what decision makers' do and what researchers believe they should do (e.g. Daft, 1995; Eisenhardt and Zbaracki, 1992; Harrison and Phillips, 1991; Nutt, 1989). This research compares the success of four such processes, measured by their adoption, value, and duration.

Descriptive/interpretive research finds that DMs cater to the interests of powerful stakeholders (Cyert and March, 1963; Laroche, 1995) by looking for ready-made solutions they can support (Carter, 1971; Cosier and Schwenk, 1990). A ready-made solution allows the DM to visualize a course of action and its ramifications before commitments are made (Mintzberg and Westley, 2001; Wildavsky, 1979). This process is called

Address for reprints: Paul C. Nutt, Professor of Management, College of Business, University of Strathclyde, 2599 W. Choctaw Drive, London, Ohio 43140, USA (nutt.1@osu.edu).

'idea-imposition' because the idea prompts action. Prescriptions in the literature identify a very different process. Decision makers are called upon to gather intelligence about needs, specify desired results, uncover options, evaluate options according to their benefits, and implement by working with interest groups and their perceptions to install the most beneficial option (Daft, 1995; Eisenhardt and Zbaracki, 1992; Harrison and Phillips, 1991). This process is termed 'discovery' because it calls for learning about possibilities. Circumstances may arise that force a DM to alter a process. If the idea touted an idea-imposition proves to be ill-advised, DMs may shift to a 'redevelopment' process to find a replacement. A discovery process may be abandoned if an opportunity is spotted that seems beneficial (March, 1994).

This research identifies the frequency of use and the success of discovery, idea-imposition, emergent opportunity, and redevelopment, controlling for context and content (decision type). Such a study poses formidable challenges. Process, success, content, and context must be conceptualized and measured. To do so requires documenting organizational decisions with cases, like those offered by Snydcr and Page (1958), Cyert and March (1963), Soelberg (1967), Witte (1972), Allison (1971), McKie (1973), Mintzberg et al. (1976), Nutt (1984), Hickson et al. (1986), Cray et al. (1988), and Numagami (1998). This has prompted simplifications that limit number of decisions (e.g. Bower, 1970), consider select process steps (Dean and Sharfman, 1996), ignore outcomes (Mintzberg et al., 1976), or use process features, such as the extent of interaction or information sources, as outcomes (Hickson et al., 1986). My research set out to overcome these limitations. A database of 176 decisions was collected to document process steps, success, content, and context. The tactics applied by DMs to carry out process steps were evaluated in published papers, as summarized in Table T. In this study, these steps and tactics are combined to form the four process types. More than two hundred *additional* decisions were collected to determine the success of the four process types, also controlling for context and content.

Five research questions are considered. Do decision makers use the process types and do they modify them as suggested? If so, what is the frequency of use and success of each process type? Do the successful decisions suggest one-way or many ways to sequence process steps. Which process steps have the greatest influence on success? Is the best process successful under particular conditions, calling for a contingency theory? Answers provide insights for building an action theory of decision making.

RESEARCH INTO DECISION MAKING

To study decision making, researchers select a unit of analysis and then specify factors for study (Bell et al., 1998). Key factors have been action-taking approach, context, content (kinds of decisions), and outcome (Ragagopalan et al., 1998). X\$awy investigators call for studies that examine decision-making in an organization in which managers, facing an important concern, take *action* to make choices that produce outcomes with immediate and downstream effects. How a DM takes action appears to influence the choices made and its outcome (Dean and Sharfman, 1996; Nutt, 2002). Context and content are also believed to influence choices and outcomes (Bell et al., 1998; Hickson et al., 1986). Each is considered in the discussion that follows.

Table I. Tactical options for the process steps

<i>Step/ tactic</i>	<i>Source/ assessment (success measures*)</i>	<i>Key features</i>	<i>Illustration</i>
<i>Intelligence gathering by:</i>	Nutt (1993a, 2004a, 2006)		
Needs	More successful (CA: 68% IA: 68% R: good/ex. T: 6.7 mos.)	Performance driven, calling for better results based on performance measures	Declines in hospital occupancy noted, identifying needs for better utilization
Opportunities	Less successful (CA: 28% IA: 47% R: good T: 6.2 mos.)	Action driven, offering the ready-made plan suggested by a stakeholder	Stakeholders in an insurance agency called for purchase of new PCs
<i>Directions from:</i>	Nutt (1993a, 1992)		
Ideas	Less successful (CA: 38% SA: 56% R: adq. T: 9 mos.)	Infer reason for acting from the benefits implied by the idea	Company develops a solar heat pump suggested by another firm
Problems	Less successful (CA: 45% SA: 54% R: adq. T: 12 mos.)	Determine direction from a problem analysis	The Ohio Department of Claims analysed its claims backlog to find reasons for delays
Objectives	More successful (CA: 66% SA: 72% R: good T: 8 mos.)	Determine direction from hoped-for results	Hospital identified a cost reduction target and authorized departments to find ways to cut cost that could meet the target
<i>Solutions found by:</i>	Nutt (1993b, 2000, 2004b, 2005)		
Ideas	Less successful (CA: 41% SA: 58% R: adq. T: 8.5 mos.)	No search (impose a ready-made solution)	A new sports arena was proposed by community leaders, calling attention to its alleged economic benefits and benefits to local businesses
Benchmarking	More successful (CA: 51% SA: 63% R: adq./good T: 7.5 mos.)	Ideas found in the practices of others	Materials management system redesign based on practices of competitor
Solicitation	More successful (CA: 51% SA: 63% R: good T: 11.8 mos.)	Ideas found in the bids submitted by vendors/consultants	The Denver International Airport developers sent a 'request for proposal' to potential vendors to provide a baggage handling system
Innovation	More successful (CA: 51% SA: 63% R: good T: 15.3 mos.)	Design a custom-made solution	Ford Pinto gas line protection 'back suit' designed without reference to the remedies devised by others

Table I. *Continued.*

<i>Step/ tactic</i>	<i>Source/ assessment (success measures*)</i>	<i>Key features</i>	<i>Illustration</i>
<i>Evaluation by:</i>	Nutt (1998b)		
Analysis	More successful (CA: 64% SA: 75% R: good T: 9.6 mos.)	Manipulate performance data found in achieves, pilots, or mock-ups, creating summative information to prioritize options	Cost-benefit analysis of CAD (computer aided design) system by using the advertised features of competitors.
Bargaining	More successful (CA: 65% SA: 74% R: good T: 5.8 mos.)	Group interprets data found in records, archives, or user views to prioritize options	Stakeholders rank inventory control proposals after debating the merits of the proposals
Subjective	Less successful (CA: 37% SA: 65% R: good/adq. T: 10 mos.)	DM draws facts from experts and personal experiences that support a favoured choice	Consultant brought in to demonstrate what works and why in support of new way to solicit customers at CompuServe
Judgment	Less successful (CA: 36% SA: 47% R: adq T: 7.5 mos.)	No public justification offered	Prepare a purchase order to acquire a production planning system
<i>Implementation by:</i>	Nutt (1986, 1998c)		
Persuasion	Less successful (CA: 49% IA: 58% R: adq./good T: 26 mos.)	Calling for adoption by listing the benefits of a preferred option	Head of an MIS department presents system upgrades and demonstrates how each could benefit key users by improving EDP department capacity
Edict	Less successful (CA: 38% IA: 50% R: adq. T: 17 mos.)	Install plan by drawing on power, indicating what people must do to comply	Announce a new software package by sending employees a schedule that indicates how to use the package and when it will be available
Participation	More successful (CA: 71% IA: 85% R: good T: 16 mos.)	Delegate to a task force, indicating expected results	Director of a state mental health department carries out a \$150 million downsizing by having task forces set targets and make recommendations for cuts, with the understanding that reasonable ideas will be adopted
Intervention	More successful (CA: 100% IA: 90% R: ex. T: 11 mos.)	Document current performance; network to demonstrate performance gap; hold back until agreement about the need to act emerges	Show the stock out levels of competitors and how the practices found in a materials management system eliminate nearly all stock outs at reasonable costs

* CA, completed adoption rate; IA, initial adoption; SA, sustained adoption; R, rating; T, time in months.

Both decisions and choices (sorting alternatives) have been the *unit of analysis* (Bell et al., 1998). Decisions are preferred because they include the full spectrum of issues that arise during decision making. Level of analysis is also a crucial consideration, which can be confounded with unit of analysis. Confounding arises in several ways. Some studies include decisions that span several managerial levels (Bell et al., 1998) or consider decisions made by CEOs, top management teams, middle managers, and department heads (Nutt, 2005). Confounding also results when several related decisions are examined to capture a key organizational issue, such as the management of disasters (Wick, 2001) or a large scale project (Cameron and Lavine, 2006). Decisions and organizations are confounded when multiple decisions are drawn from several organizations (e.g. Hickson et al., 1986). To deal with confounding, factors must account for who is involved, the type of DM (e.g. CEOs), the link of decisions to projects or issues, and the organization.

Outcome identifies decision results, and whether the results are justified considering its cost. This requires documenting outcomes and measuring their effects (Bell et al., 1998; Hickson et al., 1986; Nutt, 1986; Papadakis and Barwise, 1998). Outcomes take several forms. Bower (1970) argues for training. Others call for determining changes in people's behaviour and interpretations (Bryson et al., 1990), measuring process (timeliness, commitment, and learning), documenting features of action-taking, such as disruption and scope of negotiations (Hickson et al., 1986), or using success indicators (Nutt, 2002).

Context documents the environment in which a decision is made. Both the internal and external environment are believed to influence what is decided and how the decision is made (e.g. Bell et al., 1998; Perrow, 1967; Thompson, 1967). Internal factors include surprise, confusion, and threat (March and Simon, 1958); organizational features, such as approaches to communication and control and resistance to change (e.g. Nutt, 2002); as well as decision importance (Bell et al., 1998), complexity (Nutt, 1998b) and uncertainty (Thompson, 1967). Decision-maker attributes such as the propensity to take risks, tolerance for ambiguity, creativity, decision style, intelligence, need for control, power, experience, education, and values have been suggested (Bell et al., 1998). External factors include organizational differences, such as public or private (Nutt, 2004b), as well as prevailing economic conditions, given by interest rates and the like (Bell et al., 1998). Researchers include these factors to test contingency arguments, which assert that context influences the choice and its outcome, as well as how a decision is made.

Content captures the type of decision. Many claim to study 'strategic' decisions, but define strategic quite differently. Some focus on crucial but infrequent decisions made by top managers to select a core business that offers competitive advantage (e.g. Hitt et al., 2003). In their seminal work, Mintzberg et al. (1976) call a decision strategic if it has long term effects, demands considerable resources, and sets precedents. This opens the door to a variety of somewhat smaller scale decisions. The Bradford studies (Hickson et al., 1986) adopt this view, as have many others. Decisions can be subjective or objective. Subjective choices involve agenda setting, selecting topics for future decisions (Bell et al., 1998), and ethical considerations, value positions to be taken when making a decision (Nutt, 2002). Hickson et al. (1986) looked at decisions 'objectively', identifying eight types (products/services, financing, internal operations/controls, personnel policy, marketing, buildings, technologies, and reorganizations). Like context, content is

believed to influence the choices made, the outcomes realized, and the processes applied (Butler, 1998).

Action-taking identifies the procedures followed by DMs to make a decision. Researchers approach action taking differently. Some draw on philosophy of science (e.g. Dewey, 1910) to gain insight into how decisions *should* be made. This has led to formulating processes by specifying procedures (e.g. Daft, 1995; Nutt, 1989; Perrow, 1967; Simon, 1977; Thompson, 1967). The plethora of such efforts has prompted researchers to integrate procedural elements into hybrid processes or to identify processes with particular applications, such as decision making (e.g. Havelock, 1973; Nutt, 2004a). Another kind of effort explores what decision makers *do*, looking for an underlying framework (e.g. Mintzberg et al., 1976; Soleberg, 1967; Witte, 1972). Such studies examine DM behaviour, using interviews, surveys, and the like to uncover procedures used in practice (e.g. Hickson et al., 1986; Nutt, 1984). The aim is to document 'process' — the steps followed to make a decision - to find essential steps (Bell et al., 1998). Related research combines prescriptive and behavioural perspectives to uncover what DMs do and how this deviates from recommendations (Nutt, 2002). Finally, some add cognition and measure process features (Ragagopalan et al., 1998). This asserts that cognition determines the kind of process selected. (Cognition is made up of factors such as uncertainty and risk tolerance, which many treat as contextual factors.) Process descriptors include comprehensiveness, involvement, and the like.

Framework specifies relationships between process (action taking steps), context (importance, urgency, etc), content (e.g. the eight Hickson types), and decision outcomes. Several relationships have been posited in which process is causal, mediating, or an outcome. Butler (1998) identifies relationships among what he calls problem (content), solution (outcome), and choice (process) in which each can be a cause, an effect, or an interaction; linking them to computation, expertise, negotiation, and inspirational decisions. (Context is not considered.) In expertise decisions, outcomes dictate content and process with process and content interacting and negotiation calls for process to be causal with content and outcome interacting. Bell et al. (1998) posit a relationship in which context is causal, first influencing process and content and then outcome. Downstream effects are acknowledged, contending that a choice influences a host of tangential interpretations (Bryson et al., 1990) and that outcomes can be delayed (Nutt, 2002). Ragagopalan et al. (1998) posit that context and content jointly influence decision maker cognitions and the process that is embraced, with the outcome stemming from process applied, which is influenced by context and content. Drawing on such relationships, researchers speculate about how outcomes are influenced by process, context, content, or by combinations of these factors.

Empirical research into such relationships poses many challenges. Researchers cope by examining select factors and by limiting the cases collected for study. There seems agreement on several points. Taking a single decision from each participating organization provides generalizability (Nutt, 2002) and avoids aggregations that can mask crucial effects by averaging (Bell et al., 1998). Core business decisions are infrequent and difficult to accumulate in large numbers for a study. As a result, many adopt the definition of 'strategic' first offered by Mintzberg et al. (1976). This allows a variety of decisions to be collected, facilitating comparisons. The eight objective decision types uncovered by

Hickson et al. (1986) provide a way to generalize about organizational decision making (XuU. 2001). Outcomes documented with effectiveness indicators, such as costs and benefit, are preferred over process measures.

Decision making studies with these assumptions have offered many insightful observations. However, an integration of the findings is limited by differences in the conceptualizations. Outcome, content, and context vary, but process conceptualizations are the key obstacle. Often researchers identify features of a process, or its motivation, but not *how* the decision was made. For example, Dean and Sharfman (1996) classify process by procedural features of rationality (systematic collection and interpretation of information), political behaviour (using power), and flexibility (adaptability). Hickson et al. (1986) use process descriptors such as sporadic (with delays and negotiation), fluid (formalized process), or constricted (low effort). Fredrickson (1985) denotes process by comprehensiveness. Bell et al. (1998) identify rational, comprehensive, political action, and sub-unit involvement types. Others treat process as coalition formation or social process control and focus on decision maker attributes such as tolerance for ambiguity, uncertainty, or risk aversion (Poole and Van de Ven, 2004). Although interesting, such studies overlook *how* the decision was made. Classifications, such as comprehensive, analytical, or political, fail to explain how decision makers act comprehensively, conduct analysis, or engage politically. This void in the literature motivated my work.

Four process types are considered in this research. The 'discovery process' was derived from prescriptions (e.g. Daft, 1995) and composite processes, made up of steps and step sequencing believed to be useful (e.g. Mintzberg et al., 1976). Such recommendations have a 'think first' approach, as noted by Mintzberg and Westley (2001), which stresses logic and analysis. Prescriptions call for gathering intelligence about needs; followed by steps to find and manage people's interests, set a direction to guide a search, engage a search to uncover options, and evaluate the options uncovered.

'Idea imposition' was taken from descriptive/interpretive studies that find DMs to be idea-driven (Cyert and March, 1963; Hall, 1984; McKie, 1973; Mintzberg and Waters, 1982; Nutt, 2002; Snyder and Page, 1958; Soelberg, 1967; Witte, 1972). DMs seem not know what they want until they see what they can get (Wildavsky, 1979), and make sense of their circumstances by exploring concrete actions (Weick, 1979; Weick and Quinn, 1999), suggesting a 'see first' approach (Mintzberg and Westley, 2001). This is demonstrated in the BART system that sought to mimic European mass transit (Hall, 1984), in Steinberg's 'wholesale Groceteria' that gave rise to the self-service grocery store (Mintzberg and Waters, 1982), and in acquisitions such as the purchase of Snapple by Quaker that mimicked a prior Gatorade acquisition (Nutt, 2002). Such decisions begin with an idea, followed by evaluation and implementation.

Idea imposition and discovery can be abandoned. When this occurs, a new process emerges with different steps. The idea triggering idea imposition may prove to be unwise, calling for 'redevelopment' to find a replacement. An 'emergent opportunity' can displace development process. Here an idea arrives after the decision making process has begun, replacing a discovery process with an emergent opportunity process. The motivation to adopt an emergent opportunity can be linked to satisficing (March and Simon, 1958), substituting an available and acceptable solution for the

elusive ideal solution. When either shift occurs, the steps undertaken in the now abandoned process continue to influence what is done, adding new steps to redevelop or deal with the emergent idea.

Support for *discovery* can be found in the prescriptive literature. Proponents offer justifications using logic and case histories (e.g. Daft, 1995; Nutt, 1989; Perrow, 1967; Thompson, 1967), but seldom conduct systematic tests of their recommendations in real settings. Prescriptions call for DMs to work their way through intelligence gathering, implementation, and direction setting early in the process because these steps are believed to have the greatest impact on success (Lant and Mezias, 1992; Nadler and Hibino, 1990). Support for idea imposition stems from descriptive/interpretive studies that find decisions to be idea-driven (Mintzberg and Westley, 2001). Such studies uncover the steps applied by DMs to make crucial decisions and imply that they merit emulation. These studies rarely link the process uncovered with the results it produces, beyond the case used to derive it (e.g. Mintzberg et al., 1976; Weick, 2001).

Indirect evidence can be found from an assessment of what each process advocates. In an *idea imposition* process, a ready made plan provides an idea-derived direction, which is followed by evaluation and implementation. The implied benefits of the idea become a proxy for expected results. The ready-made idea is defensively evaluated to provide supporting arguments (Cohen et al., 1972; Mausch and LaPotin, 1989). There is little motivation to look for other ideas. As a result, DMs gather little intelligence, leave directions implicit, skip search, use their resources to promote the idea, and pay little attention to people's interests; although decisions fail for just these reasons (Nutt, 1999). The discovery process calls for gathering intelligence, marshalling support, establishing a direction, and conducting a search as separate activities making it more open to identifying possibilities. Searching broadly, with minimal constraints, is often advocated in the literature (e.g. MacCrimmon and Taylor, 1976). Although success can not be guaranteed, indirect evidence suggests that discovery is more apt to be successful, suggesting that:

Hypothesis 1: The prospect of success increases when DMs follow a discovery process compared to an idea-imposition process.

Hypothesis 1 merits study for several reasons. Discovery prescriptions, despite their logic, are rarely followed in practice (Nutt, 1999, 2002). There are many descriptive/interpretive studies that taut an idea-driven process (Langley et al., 1995; Mintzberg et al., 1976; Weick, 1979). But success is seldom considered in these studies, so researchers imply that what decision makers do merits emulation. There is little empirical evidence to support either decision making prescriptions or what decision makers prefer to do, making such research a priority.

Process shifts. Pressure to act makes sustaining a discovery process difficult (Janis, 1989). Such pressure intensifies (Starbuck, 1983) should a stakeholder spot an 'opportunity' (Cohen et al., 1972; MacCrimmon and Taylor, 1976). If a discovery process is abandoned to accommodate the opportunity, search is terminated (Eisenhardt and Zbaracki,

1992; Mausch and LaPotin. 1989). This suggests that the initial steps follow those of discover)', terminating search and adding evaluation to test the emergent idea (Table II). Little is known about such a process. Adopting an *emergent opportunity* may have little effect on success because the emergent idea must measure up to the expectations set during direction setting. But search is terminated before it can provide results and search is widely recommended (e.g. Kolb. 1983; MacCrimmon and Taylor, 1976; Nisbett and Ross. 1989), suggesting that:

Hypothesis 2: The prospect of success declines when DMs use an emergent opportunity process, compared to a discovery process.

Another kind of process shift occurs when the ready-made plan in an idea imposition effort proves to be ill-advised. This suggests a *redevelopment process* to find a replacement, adding search steps (Table II). Idea aborts are not discussed in the literature so little is known about such efforts, posing several questions. Does the prospect of success decline after an idea abort? Can a redevelopment effort approximate the success of discovery? One can surmise that the prospect of success would decline for DMs who have advocated an ill-advised idea (Janis, 1989; Kolb, 1983), which could taint a redevelopment effort. Also, redevelopment has some but not all of the steps recommended for discovery, suggesting that:

Hypothesis 3: The prospect of success declines when DMs use a redevelopment process, compared to a discovery process.

Situational influences. Contingency models identify boundary conditions that call for a particular kind of action. Daft (1995), Thompson (1967), and many others (e.g. Allison, 1971; Nutt, 1989; Perrow. 1967) incorporate situational factors into their decision making models. Advocates contend that differences in environmental stability (Mintzberg and Waters, 1982), time pressure (Lippitt and Mackenzie, 1976), novelty (Fredrickson. 1985), complexity (Perrow, 1967), resource dependency (Daft, 1995), and the like require a different approach (e.g. Bell et al., 1998). Decision making processes are matched to high and low complexity, etc. Some of the implied relationships have been subjected to empirical testing (e.g. Bell et al., 1998; Bryson et al., 1990; Dean and Sharfman, 1996). This has led to recommending 'rational methods' for non-urgent and non-routine decisions to be made in stable environments (e.g. Daft, 1995).

Extending such arguments suggests that discovery should be limited to non-urgent, routine decisions. This appears to contradict the arguments offered to build discovery-like processes. Furthermore, empirical studies have been contradictory. Fredrickson (1985) found that comprehensiveness (a proxy for discovery) works best in stable environments. Other researchers found just the opposite: comprehensive methods (like discovery) work better in high velocity (unstable) environments (Eisenhardt, 1989; Eisenhardt and Bourgeois. 1989). Miller et al. (1997) found that extensive analysis (as called for in discovery) was preferred in formalized and centralized settings. Alter and Hage (1993) found that centralization and formalization discourage a discovery-like

Table II. Matching the process types to the steps and tactics

<i>Intelligence gathering</i>	<i>Proactive implementation</i>	<i>Direction setting</i>	<i>Option development</i>	<i>Evaluation</i>	<i>Reactive implementation</i>
<i>Discovery process</i> Need-based	Optional tactics (intervention or participation)	Optional tactics (objectives or problems)	Optional tactics (solicitation, benchmarking, or innovation)	Optional tactics (analysis, bargaining, judgment, or subjective)	Optional tactics (persuasion or edict)
<i>Idea imposition process</i> Opportunity-based		Implied by the ready-made plan		Optional tactics (analysis, bargaining, judgment, or subjective)	Optional tactics (persuasion or edict)
<i>Emergent opportunity process</i> Need-based	Optional tactics (intervention or participation)	Optional tactics (objectives or problems)	Opportunity (a ready-made idea emerges)	Optional tactics (analysis, bargaining, judgment, or subjective)	Optional tactics (persuasion or edict)
<i>Redevelopment process</i> Opportunity-based		Ready-made plan fails	Optional tactics (solicitation, benchmarking, or innovation)	Optional tactics (analysis, bargaining, judgment, or subjective)	Optional tactics; N

approach. In addition, these studies typically consider a limited number of contextual factors. As a result, little can be said about the decision situation beyond the factor considered, such as complexity (Astley et al., 1982), urgency (Pinfield, 1986), or risk (Schilit, 1990).

Deriving a hypothesis requires generalizing to the processes being investigated. The contradictions found in past work and how action taking is treated make it difficult to sum up the effects of context on process (defined as how DMs take action). Empirical research *has* examined how *tactics* (that make up a process) are influenced by decision type, the organization's profit status (profit or non-profit), DM level (top, a CEO, COO, or CFO; or middle) as well as complexity, urgency, importance, staff skill, resources, and initial support (Nutt, 1992, 1993a, 1998b, 2001). These studies find that the best performing tactics provide the best result, regardless of the situation. Following the more important steps and relying on the better performing tactics, as is called for by discovery, is apt to have the same effect, suggesting that:

Hypothesis 4: For each of the contingencies considered, such as high and low urgency, the prospect of success will be greater when DMs follow a discovery process, compared to the three other processes.

METHODS

In this study, the explanatory variables are made up of the process types and the context and content factors, with success indicators as the dependent variables. Comparing the success realized by discovery, idea imposition, emergent opportunity, and redevelopment as well as comparing the success of the process types under various conditions provides a way to test of the hypotheses. Use questions are addressed by how often the process types are found in practice. In this section, definition and measurement of the variables is presented along with the analysis approach.

Explanatory Factors

Process types. The process types are constructed from prior studies. This requires discussion of data gathered for both the prior work and the current study and how the findings of past studies are merged to form the process types. The findings identified in past studies (Table I) were derived from a database of 176 decisions. The current study draws on a database of 224 decisions gathered after the first 176 decisions, following the same data collection procedures. The two databases are similar. There are comparable numbers of profit and non-profit organizations; both have top managers (CEOs, COOs, CFOs, etc) and middle managers as participants, and include the eight decision types identified in the Bradford studies of products/services: financing, internal operations/controls, personnel policy, marketing, buildings, technologies, and reorganizations (Hickson et al., 1986). A partial listing of the decisions and the organization in which each was made appears in Appendix I. The scope of decision makers, decision types, and

decision settings suggests that the decisions considered are broadly representative of those made in contemporary organizations.

The steps and tactics applied to make these decisions were uncovered from an analysis of the *actions* taken by the DMs. Actions were elicited from independent interviews with the decision maker and one other person involved with the decision (see Appendix II for details). The guidelines of Lincoln and Guba (1984), Huber and Power (1985), Denzin (1989), Patton (1990), and Yin (1993) were followed to fashion an interview protocol to reconstruct these actions. The actions were triangulated by reconciling the views of two informants with one another, and with existing documents. These actions were recorded in diagrams to summarize what was done (see Nutt, 1984, 1992). Decisions were classified according to the tactics applied to complete *each* decision making step. To make the tactic classifications, the decision summaries were placed with others in which the DM took similar actions. To avoid making assumptions about how tactics were applied, all of the DM actions were considered to make the classification. Colleagues reviewed the decision summaries and, applying the definitions in Table I, indicated which tactic they believed was being used for each step, including an unclassified category. For the studies noted in Table 1, agreement was 89 per cent or more. The same approach was applied for the second set of decisions. Here, the lowest agreement for the tactic classifications was 90 per cent. Only decisions with agreement were used, *reducing* the database from 224 to 202 decisions. The 22 discarded decisions had either too little detail to tell what was done or unresolved disagreements. Appendix II and the Table I citations offer additional detail on how decisions were solicited, documents investigated, interview procedures applied to uncover the actions taken in making a decision, the triangulation procedures used to reconcile the two *informant's* recall of the actions *taken*, procedures applied to reconcile recall with the documents, case summary creation, and the classification procedures.

This research finds that DMs work their way through a process by selecting steps and sequencing them in different ways. A variety of tactics can be used by a DM for each activated step. A decision making process is given by the tactics selected to carry out intelligence gathering, direction setting, option identification, evaluation, and implementation (see Table I). Theoretically, there are 384 ($2 \times 3 \times 4 \times 4 \times 4$) processes that can be formed from all tactical combinations. A subset of these processes is investigated that adhere to the steps and tactics called for in idea imposition, discovery, emergent opportunity, and redevelopment. Table II provides a flow chart that shows how the steps in the four processes unfold and the available tactical options.

Specifying the process types. The first row in Table II indicates the steps and step sequencing for *Discovery* as well as feasible tactics. Row 2 in Table II identifies the steps, step sequences, and available tactics for *idea imposition*. Row 3 in Table II identifies the steps, step sequences, and available tactics for *emergent opportunity*. Row 4 in Table II identifies the steps, step sequences, and available tactics for *redevelopment*. Each of the 202 decisions in the second database was studied to find decisions in which the four process types were applied.

A process was classified as discovery if the DM activated steps that identified a need, lead with implementation, using intervention or participation tactics, and directed search

with either a problem or an objective; using any of the search and evaluation tactics. Decisions were classified as idea imposition if the DM followed steps that began with a ready made plan (and an idea direction), did *not* activate a search, applied any of the evaluation tactics, and implemented using either persuasion or an edit. To be classified as an 'emergent opportunity', the process began as discovery and applied discovery steps until an emergent idea terminated search. Steps were then taken to evaluate the emergent idea (any tactics), using the information obtained in the evaluation to implement. Decision makers could alter their initial implementation stance (switching to persuasion or edicts) or maintain it (continuing to use intervention or participation). When the idea in an idea imposition process is discredited and effort mounted to find a replacement, the process becomes a candidate for redevelopment. A redevelopment process begins with an opportunity and an idea direction, followed by an appraisal that finds the opportunity to be ill-advised. Any of the search tactics can be used to seek a replacement idea coupled with any of the evaluation tactics with implementation applying either edict or persuasion. Decisions classified as discovery, idea imposition, emergent opportunity, and redevelopment explicitly adhered to these steps, step sequences, and tactical options.

Success Indicators

Indicators of effectiveness and efficiency are used to measure success. Effectiveness is measured by use and estimates of value assuming that only decisions put to use will realize hoped-for benefits (Beyer and Trice, 1982). Efficiency is measured by duration. DMs report that they prefer rapid action (e.g. Starbuck, 1983), suggesting duration as an indicator. These measures are independent. Decisions with considerable perceived value may not be put to use and vice versa, and the adopted as well as the high valued decision can be delayed. Decisions may take an extended period of time and considerable effort, but have little effect.

Instrumental use is key (Beyer and Trice, 1982; Pelz, 1978), which requires an adoption. Symbolic use, finding a desirable action but taking no action to realize it, and conceptual use, indicating aims without follow through, are not used in this study. Delays in use, proportion of use, and terminated use provide adoption qualifications. The 'sustained adoption' measure adds ultimate adoptions and deletes ultimate failures, measured two year later, to capture downstream changes in use. The 'complete adoption' measure treats a decision with partial use as a failure, indicating the extent of use.

Objective indicators of value are preferred but hard to collect. Many of my informants declined to provide data about benefits, such as utilization or turnover. In addition, utilization, turnover, and related measures must be converted to a common metric, such as cost. Such conversions are argumentative, difficult to describe, and distract from the message. Bryson and Cullen (1984), Alexander (1986), and Hughes et al. (1986) offer a way to around these difficulties; their studies find that objective indicators are highly correlated with a well placed informant's subjective estimate of value. Many researchers who study decisions use subjective measures of value (Papadakis and Barwise, 1998).

Decision makers can make self serving estimates. To avoid this, only the two *secondary* informants made estimates of decision value. An anchored rating scale with five anchors was used to collect decision value ratings from the informants. The scale anchors called

a rating of 5, 'outstanding' to be assigned to decisions that made a decisive contribution by providing exceptional perceived quality. A rating of 1, termed 'poor', was assigned to decisions that had no impact or merit. The remaining scale points for the decision value measure were termed 'good' for a rating of 4, 'adequate' for a rating of 3, and 'disappointing' for a rating of 2. The two informants, independently and without discussion, checked along a rating scale with these anchors to indicate their views of decision value. At this point, a researcher can measure differences or take steps to enhance precision. Steps to improve precision seem the preferred approach. Estimate–discuss–estimate (EDE) was used because research shows that this procedure moves a subjective estimate towards a true value, by improving recall (e.g. Gustafson et al., 1973). First, an average of the initial ratings is computed. Then, informants discuss the result. If the individual ratings are far from the average there is pressure to explain. Informants offer reasons for rating a decision as they did. In the exchange, the more compelling arguments carry the most weight. When informants consider such arguments it shifts the average rating towards a true value. The average of the informants' second rating was used in the analysis.

Efficiency is measured by elapsed time (Cray et al., 1991; Hickson et al., 1986), made up of the time from recognition to finding a remedy and the time that follows, ending when the decision is adopted or abandoned. These indicators were also collected from the two secondary informants. First, informants estimated the time from recognition to the development of a remedy and then the elapsed time from the end of development to use or abandonment. The EDE procedure was used to improve the precision of these estimates.

Context and Content Factors

The survey given to the two secondary informants also contained rating scales for the contextual factors (see Appendix II). Decision urgency, importance, staff skill, resources, and initial support were collected in this way (Nutt, 1986, 1993a, 1998a, 2001). Informants independently and without discussion checked along anchored rating scales with indicators that ran from 1 = least to 5 = most for each contextual measure to rate each factor. The EDE procedure was used to improve precision of the estimates and to deal with common method variance (Podsakoff and Organ, 1986). DM level (top, a CEO, COO, or CEO; or middle), the organization's profit status (profit or non-profit), and decision type (the eight Hickson types) were also coded.

Analysis

Analysis was carried out with MANOVA and ANOVA. MANOVA controls for correlations among the success measures (sustained adoption, complete adoption, decision value, and total time) that may have arisen in the data. The MANOVA analysis combines the success measures into a single outcome measure, weighting each equally, reversing the scale of the time measure so desirable outcomes move in the same direction. If MANOVA and ANOVA produce the same result, correlations among the dependent variables had little effect upon the results, allowing the easier to interpret ANOVA findings to be used.

ANOVA specifies the success of the process types with *averages* of the success indicators (sustained adoption, complete adoption, decision value, and total time). ANOVA requires a cell size of four (Box et al., 1978), so classifications with fewer than four decisions are not considered. A Duncan Multiple Range Test (DMRT) identifies significant differences in the mean values of a success indicator when more than two categories are compared. The results denoted by the letter 'A' indicate the best results ($p < 0.05$), 'B' the second best, and so on. The process type with the most 'A' designations is the most successful. The adoption measures are binary, but the F tests used to draw inferences are robust. Departures from normally distributed standard errors, which arise when binary values are used as the dependant variable, can be tolerated if the proportion of adoptions to rejections is less than one in four (Box et al., 1978). The 37-50 per cent failure rates in the database met this test.

The study is also concerned with the interaction of the contextual factors and the content factors with the process types, leaving interesting questions about the *main effects* of these factors for subsequent work. To simplify the interaction, the internal support, importance, urgency, resources, and staff support measures were collapsed into 'high' and 'low', signifying 4 or 5 as high and the rest as low. Decision maker level and profit status were coded with two levels. Content was made up of the eight decision types. The interactions of the process types with these factors were considered one factor at a time, to see if the conclusions about process types can be generalized to decisions classified as high and low urgency, etc.

RESULTS

Results of the analyses appear in Tables III and IV. The data reported in Table III provide a test of Hypotheses 1-3. Look across the rows in a table to determine the success of each process type (the bold type indicates the best result). Compare row 1 with row 2 to test Hypothesis 1. Compare row 1 with row 3 and row 1 with row 4 to test Hypotheses 2 and 3. In these analyses, the MANOVA proved to be significant, so the mean values for the success measures in the ANOVAs are interpreted. A test of Hypothesis 4 is provided by grouping the process types according to each contingency (see Table IV). A DMRT was carried out to order the four processes for each condition (e.g. high urgency) according to their success, indicating the most successful with bold type. To confirm a contingency argument, a different process will have more success for a given contingency (e.g. discovery best for high urgency, another process for low urgency).

Discussion is organized by decisions that continued a process and those that altered a process. Decisions were drawn from the database to illustrate how decisions were made with each process type, looking for what led DMs astray and how things could be improved.

Decisions with Continuity

Discovery had far more success than idea imposition ($p < 0.05$), offering considerable support for Hypothesis 1. The following discussion documents and then explores this finding.

Table III. The process types and their success

Process types	Users			Effectiveness			Efficiency				
	Frequency			Complete adoption			Decision value				
	N	Freq.	DMRT ¹	Rate	DMRT ¹	Rate	DMRT ¹	Rating ²	DMRT ¹	Months ³	DMRT ¹
Discovery	39	19%		90%	A	85%	A	4.3	A	11.9	B
Idea imposition	29	14%		55%	C	41%	D	3.5	B	20.5	C
ANOVA/p value (two contrasts)				0.0005		0.0001		0.05		0.01	
MANOVA/p value ⁴				0.01							
<i>Abandon discovery for an emergent opportunity</i>											
Emergent opportunity	15	7%		73%	B	66%	B	3.6	B	21.7	C
<i>Find replacement for failed idea</i>											
Redevelopment	28	14%		64%	B	57%	C	3.6	B	16.9	B
ANOVA/p value (four contrasts)				0.01		0.005		0.05		0.03	
MANOVA/p value ⁴				0.03							
Total	111	55%		53%		50%		3.6		17.1	
Totals for the database	202	100%									

Notes:

¹ Duncan Multiple Range Test: the letter codes indicate significant differences in the mean values with the equivalent of a paired t-test, $p < 0.05$, with letter A denoting the best outcome; B the second best, etc. Best performing process outcomes are shown in bold.

² Scale: 5 = outstanding; 4 = good; 3 = adequate; 2 = disappointing; 1 = poor.

³ Time is measured in months from beginning of development to the ultimate use or abandonment of the decision.

⁴ The value, adoption, and efficiency measures are weighted equally in the MANOVA, reversing the scale for efficiency.

Table IV. Context and process types

Process/factor	Use		Effectiveness					Efficiency		
	Frequency		Sustained adoption		Complete adoption		Decision value		Total time	
	N	Freq.†	Rate	DMRT	Rate	DMRT	Rating	DMRT	Months	DMRT
<i>Process with high urgency</i>										
Discovery	16	41%	91%	A	82%	A	4.5	A	12.0	A
Idea	8	27%	72%	B	69%	B	3.8	B	16.0	C
Redev.	6	21%	50%	C	33%	C	3.8	B	14.6	B
EO	2	13%	—	—	—	—	—	—	—	—
<i>Process with low urgency</i>										
Discovery	23	59%	95%	A	90%	A	4.4	A	15.0	A
Idea	21	73%	57%	C	57%	C	3.5	B	18.0	B
Redev.	22	79%	68%	B	64%	B	3.6	B	17.7	B
EO	13	87%	69%	B	61%	B	3.5	B	19.3	B/C
<i>Process with high importance</i>										
Discovery	29	75%	89%	A	96%	A	4.5	A	11.3	A
Idea	10	35%	70%	C	42%	C	3.6	B	24.0	B
Redev.	19	68%	84%	B	74%	B	4.1	A	10.8	A
EO	10	66%	70%	C	70%	B	3.5	B	19.5	B
<i>Process with low importance</i>										
Discovery	10	25%	70%	B	70%	B	3.5	B	13.7	B
Idea	17	65%	59%	C	41%	C	3.6	B	11.8	A
Redev.	9	32%	22%	D	22%	D	2.6	C	17.1	C
EO	5	33%	80%	A	80%	A	4.0	A	24.7	D
<i>Process with high resources</i>										
Discovery	14	36%	91%	A	68%	A	4.6	A	14.1	A
Idea	12	41%	58%	B	50%	B	3.7	B	32.0	B
Redev.	10	36%	43%	B/C	50%	B	3.9	B	14.9	A
EO	7	46%	60%	B	28%	C	2.8	C	16.7	A/B
<i>Process with low resources</i>										
Discovery	25	64%	89%	A	84%	A	4.0	A	10.8	A/B
Idea	17	59%	53%	C	35%	C	3.5	B	7.9	A
Redev.	18	64%	59%	C	61%	B	3.5	B	18.2	B
EO	8	54%	90%	A	67%	B	4.4	A	25.5	C
<i>Process with top managers</i>										
Discovery	22	56%	91%	A	97%	A	4.4	A	9.7	A
Idea	20	71%	55%	C	45%	C	3.8	B	22.7	C
Redev.	24	86%	71%	B	63%	B	3.7	B	15.5	B
EO	9	60%	67%	B	67%	B	3.3	B/C	17.2	B/C
<i>Process with middle managers</i>										
Discovery	15	44%	80%	A	87%	A	4.0	A	14.5	A
Idea	6	21%	67%	B	50%	C	3.8	B	16.7	A/B
Redev.	4	14%	25%	C	25%	D	3.2	B/C	22.2	C
EO	6	40%	83%	A	67%	B	4.2	A	33.0	D

Table IV. *Continued*

Process/factor	Use		Effectiveness				Efficiency			
	Frequency		Sustained adoption		Complete adoption		Decision value		Total time	
	N	Freq.*	Rate	DMRT	Rate	DMRT	Rating	DMRT	Months	DMRT
<i>Process with internal support</i>										
Discovery	26	45%	88%	A	81%	A	4.1	A	13.4	A
Idea	16	27%	50%	C	44%	C	3.6	B	18.0	C
Redev.	11	19%	80%	A	80%	A	3.3	B	14.9	B
EO	5	9%	60%	B	60%	B	3.4	B	19.5	D
<i>Process lacking internal support</i>										
Discovery	9	27%	88%	A	89%	A	4.6	A	7.2	A
Idea	9	27%	55%	B	33%	C	2.6	D	18.5	B
Redev.	11	33%	18%	C	18%	D	3.6	B	17.7	B
EO	4	12%	50%	B	50%	B	3.0	C	24.7	C
<i>Process with high staff skill</i>										
Discovery	25	48%	88%	B	84%	A	4.5	A	10.1	A
Idea	9	17%	100%	A	77%	B	4.6	A	28.7	D
Redev.	10	19%	80%	B	80%	A	4.2	A	21.7	C
EO	8	15%	75%	C	75%	B	3.7	B	18.7	B
<i>Process with low staff skill</i>										
Discovery	12	27%	92%	A	92%	A	3.8	A	12.5	B
Idea	19	34%	37%	D	26%	C	3.1	B	17.8	A
Redev.	18	32%	55%	C	44%	D	3.3	B	14.9	C
EO	7	12%	70%	B	57%	A	3.6	A	24.0	D
<i>Process in for profit org.</i>										
Discovery	14	47%	100%	A	86%	A	4.2	A	10.3	B
Idea	6	20%	33%	C	17%	D	3.0	B	5.7	A
Redev.	4	13%	50%	B	25%	C	3.2	B	22.8	D
EO	6	20%	50%	B	50%	B	3.1	B	17.5	C
<i>Process in non profit org.</i>										
Discovery	25	31%	84%	A	84%	A	4.3	A	12.9	A
Idea	23	28%	61%	B	48%	D	3.7	B	23.7	D
Redev.	24	30%	67%	B	63%	C	3.7	B	19.0	C
EO	9	11%	89%	A	77%	B	4.0	A	16.7	B

* Proportion of the process types.

Idea-imposition. For 57 (28 per cent) of the decisions, decision makers used an idea imposition process: beginning with an opportunity-claim, and then evaluating the idea and installing it. About half (29; 51 per cent) of the idea imposition efforts were completed. (The remainder shifted to a redevelopment process to replace a failed idea, discussed later in the paper.) Idea imposition begins with a solution, prompting the solution-champion to show how the idea would work. When an idea activates a decision making, no target is set. Instead of a search, proponents argue for the remedy they are

touting. This puts a solution on the table at the outset and channels subsequent actions. The solution is evaluated to certify its value and to determine its acceptance to key people, such as users or customers. Implementation follows using the arguments marshalled from the evaluation to make a case for adoption. The solution can be refined but the basic idea remains unchanged in idea-imposition decisions. Overall, idea-imposition has a 55 per cent sustained adoption rate, which falls to 41 per cent when partial use is accounted for and the process is inefficient, averaging 20.5 months to complete, producing 'adequate to good' decision results (Table III). Decision makers are drawn to idea-imposition because it seems timely and pragmatic. The quick fix in the ready-made solution realizes neither. The results indicate little timeliness, low quality, and very low adoption rates compared to discovery ($p < 0.05$).

The CIO of Limited embraced a ready-made solution when calling for a 'state of the art' information system. Existing systems applications were to be inventoried and replaced with a new system. The CIO argued that the latest advances in information technology would be required to 'position the company for the next decade' (opportunity claim). The CEO bought into the idea. After years of effort and considerable investment by the company, the CIO was unable to move his IS vision from the drawing board to reality. Critics contended that the project was to be too big and the technology untried. Costs grew to well beyond initial estimates. Surveys indicated that users failed to see how the system would help them (analytical evaluations). Users saw the proposed information system as forcing applications of questionable value, while ignoring their information needs (failed persuasion). After four years of effort and \$30 million in expenditure, the IS idea was abandoned and the CIO was asked to resign. Note how directions were set by expectations for the ready-made plan (better information with new technology). As a result, no one asked about expected results (reduced costs, better service, etc). In decisions of this type, there is seldom clarity about the direction (hoped for benefits). And no one looks for competing ideas (other ways to garner information).

Discovery processes. Compare the results noted for idea imposition to those obtained for discovery in Table III. Use rates nearly doubled. Discovery produced far better outcomes, with 90 per cent sustained adoptions, 85 per cent complete adoptions, rated as good to excellent, completed in nearly half the time (11.9 months). Discovery was more efficient and more effective than idea imposition ($p < 0.05$).

Discovery was applied for 54 (26 per cent) of the decisions. Discovery begins by documenting a need, followed by implementation and direction steps and then search and evaluation steps; selecting tactics to set a direction, implement, search, and evaluate. Two-thirds (39; 72 per cent) of these decision making efforts were completed. (In the others, an emergent opportunity displaced a search, discussed later in the paper.) During discovery, the decision makers gather intelligence about needs, set directions, and consider barriers to action before they search or evaluate. Needs indicate what is to be improved, such as utilization, revenues, or production capacity. The need clarifies the results wanted so solutions that offer performance improvements are put on the table for discussion. For instance, executives at the Mead Paper Company found that company production costs exceeded that of competitors (need). The DM enlisted managers to serve on teams to look for cost cutting ideas (implementation). There was no resistance

when the DM set cost reduction targets to guide the team's efforts (directions), as key players had bought into the need for change. Next the lead team hired McKinsey Consulting (search) and their Delta-p cost reduction program to address the cost reduction target (direction). The consultants conducted pilots to verify that costs would be lowered (evaluation).

This sequence of steps differs from the sequence found in idea-imposition. Decision making was triggered by needs that make performance (e.g. utilization or cost) shortfalls the focus of attention. The DM marshalled support by showing that the performance needs are real. A successful demonstration helps to enlist people in a solution search and to guide their efforts with a target, which indicates improvements seen as both desirable and feasible and identifies the information required by an evaluation.

Decisions that Altered a Process

Discovery and idea imposition were abandoned in a number of the decisions and each had a different pattern of success, although none was as successful as discovery ($p < 0.05$).

Emergent opportunity. In one-third of the discovery efforts an emergent opportunity stopped an ongoing search. Search was terminated after a seemingly desirable solution was uncovered. An 'emergent opportunity' process has a need-implementation-direction-emergent opportunity/displaced search-evaluation-installation sequence of steps.

Decisions classified as an emergent opportunity had mixed results. Sustained adoptions (factoring in abandoned decisions and those that were ultimately used) were 73 per cent, which fell to 66 per cent when degree of use was accounted for (Table III). These decisions were quite inefficient, taking nearly twice the time of that required for discovery (21.7 months) and rated as 3.6 (adequate to good). Emergent opportunities were neither timely nor pragmatic, with lower ratings and increased failure as well as a drawn out process compared to discovery ($p < 0.05$), supporting Hypothesis 2.

The Dunning-Lathrop Insurance Company applied such a process to revise a bonus system that had been inherited from a merger. The bonus system was thought to be too subjective, based solely on the discretion of the former owner, and too generous, often exceeding 20 per cent of an employee's annual salary. With these payments, the wages paid exceeded wage rates paid by others, when the company was looking for ways to cut staff cost (need). The CEO (the DM) wanted to halve the size of the bonus (objective) and assigned the task to his COO, who set out benchmark bonus systems in local companies (search). The CEO intervened after three months and no apparent progress. He wrote a memo stating that future bonuses would be based on commissions (opportunity/judgmental evaluation/edict implementation), ending the search.

This decision, like other emergent opportunity decisions, terminated search before options were uncovered. The interview data show that the secondary informants believed search had been terminated prematurely, contending that better ideas could have been uncovered. The data bear this out, as noted above. Decisions that followed an emergent opportunity process were less successful than decisions that let a search play out ($p < 0.05$). Adopting an emergent opportunity failed to save time. (Discovery requires

11.9 months, emergent opportunity 21.7 months.) Insiders saw the DM's motives as suspect and resisted the plan, which delayed installation. The time required to reassure stakeholders with suspicions and mollify those with something to lose make the emergent opportunity process inefficient.

Redevelopment. Decision makers abandoned an idea-imposition process in nearly half of these efforts. The idea was discarded when opposition emerged or when the cost and effort to install it appeared to exceed its alleged benefits. In all such instances, effort was mounted to find a replacement. A redevelopment process followed an idea-idea failure-search-evaluation-installation sequence of steps.

The success of redevelopment was far below discovery ($p < 0.05$). Sustained adoptions fell to 64 per cent, complete adoptions to 57 per cent for decisions rated between adequate and good (3.6), carried out in 16.9 months (see Table III). But, terminating an idea-imposition process is better than continuing it ($p < 0.05$). Success improved substantially compared to following an idea-imposition process to completion. Redevelopment has fewer adoptions and takes more time, compared with discovery efforts ($p < 0.05$), supporting Hypothesis 3.

CCH Computax, with annual revenues of \$200 million, provides computerized tax processing sendees to CPAs, lawyers, and others involved in tax accounting. CCH had a three-year lease of two IBM 3090 mainframes that did both tax processing and administrative tasks, such as accounting and budgeting. The executive vice president of CCH was alarmed by the rapid switch of CCH customers from mainframe-based products to PC-based products. The CEO (the DM) chose to mollify customers and maintain the old system because the mainframes were too expensive for just administrative tasks (opportunity). This proved to be unwise and customers went elsewhere. To get his costumers back, the CEO looked for a vendor who, in three years, could provide software for internal budgeting and accounting that would run on a standalone PC and do at least what current systems could do (search). Search was focused on finding a way to realize the implied benefits of an unworkable idea and not more broadly to find a cost-effective way to replace the mainframe with better information handling capability that can also meet the needs of customers.

Redevelopment efforts engaged a search to find a replacement idea without thinking about a direction. The rejected idea's implied benefits were substituted for setting a direction. Vendors who were asked to provide a replacement found expectations ambiguous. The vendors contacted by CCH were focused on getting software in place and not on recapturing lost customers. All of the redevelopment processes initiated search with vague expectations. This allows the ideas being offered to serve the needs of the vendor, such as force fitting an off the shelf product, which reduces the prospect of success.

Situational Influences

The impact of contextual factors is shown in Table IV. The process-context interaction is statistically significant for urgency, importance, resources, and decision maker level, internal support, extent of staff assistance, and profit status ($p < 0.05$), so each will be

discussed. For the process-content interaction, several of the decision type-process combinations had insufficient observations (three or less), so these results are *not* considered.

A contingency argument makes *process* success conditionally dependent - some processes are more successful under a particular set of conditions. The data in Table IV summarize the effects of the 14 conditions tested. Discovery had significantly more success than the other processes for nine of the conditions ($p < 0.05$) and comparable success for four of the conditions. To illustrate, for *high urgency decisions* discovery had 91 per cent sustained adoptions, 82 per cent complete adoptions, and a rating of 4.5 (good to excellent), carried out in 12 months (see Table IV). The next best performing process applied to decisions with high urgency had 72 per cent sustained adoptions, 69 per cent complete adoptions, a rating of 3.8 (good), and required 16 months to complete. For only one of the conditions tested did discovery fail to have superior or equal success, and for that condition discovery was a close second ($p < 0.05$). Discovery was clearly superior when more *demanding* conditions were being confronted by a DM; as noted for urgent decisions, important decisions, decisions lacking internal organizational support, decisions lacking staff support, and decisions with limited resources ($p < 0.05$).

Emergent opportunity was as successful as discovery in non-profit settings, for low importance decisions, for middle managers, and when resources were lacking. This argues against allowing an emergent opportunity to terminate discovery in *for profit* settings and when the more demanding conditions identified above are present. The data show that idea imposition was often unsuccessful. Only when there was *substantial* staff support did idea imposition produce the best results ($p < 0.05$). Discovery was more successful than idea imposition for 13 of the 14 conditions tested, with greater adoptions and higher ratings completed in a shorter time period ($p < 0.05$). These differences were often very large (see Table IV). When facing the more tying conditions that can arise during decision making, the data suggest that a DM should avoid emergent opportunities and let discovery play out. Also, DMs should not expect a redevelopment process to bail out a failed idea-driven process. The success of discovery was noted for nearly the entire range of decision making conditions considered ($p < 0.05$), offering considerable support for Hypothesis 4.

The findings for *content* follow a pattern similar to that found for context. Discovery had comparable or better success than the other three processes ($p < 0.05$) for all decision types with sufficient observations to analyse. (Four of the eight types had 3 or fewer observations.)

CONCLUSIONS

Because decision making studies focused on analysis, comprehensiveness, leadership, personality, groups, and the like, such constructs have made up decision making theory. This study adds action-taking to the list, offering insights into process for theory building - the sequence and nature of actions that increase the chance of success.

Four processes were considered. Descriptive/interpretive studies suggest idea imposition. Prescriptive work calls for discovery, which offers an appraisal of needs and desired results to direct a search. Because managers examine a solution to make sense of their needs, ideal imposition has been called 'see first' (e.g. Langley et al., 1995; Mintzberg and

Westley, 2001). This creates a preference for ready-made plans and the urge to adopt an emergent opportunity (e.g. Mausch and LaPotin, 1989; Olsen, 1976). Prescriptions call for discovery that emphasizes a systematic gathering of information to learn about possibilities. Some of the discovery and idea imposition efforts were abandoned; idea imposition when the idea failed and when an emergent opportunity supplanted discovery. When an idea failed the process shifted to a redevelopment effort and an emergent opportunity process displaced some discovery efforts.

Discovery was attempted in 26 per cent and idea-imposition in 28 per cent of the decisions studied. There is little empirical support for an idea imposition process and the support for a discovery process is compelling. Also, Discovery was more successful than either of the hybrid processes of emergent opportunity and redevelopment. In addition, discovery was more successful than the other processes for more demanding conditions (e.g. high urgency), more successful than idea imposition for all but decisions with substantial staff support, more successful than emergent opportunity for all but low importance decisions, and more successful than emergent opportunity for all but decisions with low internal support, in which success was comparable. Despite this, decision makers were as apt to use a failure-prone process as discovery. A third of the discovery efforts were abandoned when an emergent opportunity surfaced and half of the ideas in an idea-imposition effort proved to be ill-advised, with redevelopment applied to find a replacement. Emergent opportunity replaced discovery and redevelopment replaced idea-imposition as theorized.

The findings add insights into the sequencing of process steps and the importance of each step for theory building. The steps followed during decision making matter. The more important steps investigate needs, conduct a stakeholder-sensitive implementation, and set a direction. Successful DMs carry out these steps early in their decision making efforts. There appear to be no shortcuts. Essential steps stress logical and political rationality, calling for expectations to be set and politics to be managed early in the process. Compared to the others, evaluation is the least important step, suggesting that politics and logic are more important than economics. If the direction is clear *and* the social and political forces are managed, success is likely. If these steps are not engaged, evaluations have little influence on success.

Idea-imposition and emergent opportunity are *idea-driven*. Both are guided by a ready-made solution and mobilize action to put the solution to use, as noted in information system decision. DMs who prefer idea-imposition seem wedded to action. The preference for a 'quick fix' is motivated by pragmatics and by fear. Being decisive by seizing an opportunity is seen as the hallmark of a successful executive (Brunsson, 1982), creating a preference for speed (Starbuck, 1983). When such an opportunity surfaces it prompts some decision makers to act by documenting the idea's benefits. This deflects situations that could spin out of control and harm a career. The quick fix has several important shortcomings. It creates a trap that limits search and discourages knowledgeable people from offering ideas. The 'opportunity' can appear to be a pet idea, raising questions about the DM's motives. The hoped-for rapid response is delayed as the DM lines up support and offers a defence. In addition, the time to tailor a ready-made plan to fit with the organization and its environment is often underestimated (Nutt, 2002). All this directs people's energy and company resources away from learning (Senge, 1990). Instead, time

and energy are devoted to finding desirable attributes of the solution, promoting it, or tailoring it to fit the organization. Had replacing the failed idea been factored into the success profile of an idea-imposition process, its success would fall to even more dismal levels.

Themes of opportunity and ambiguity suggest additional avenues for theory building. Opportunities that seem compelling make decision making failure-prone. As a result, remedy-driven conceptions of decision making, such as sense making (Weick, 1979), describe what decision makers *prefer* to do, but fail to capture what *should* be done. This occurs because imposing a remedy creates a misleading clarity of purpose. Sources of ambiguity are swept aside. Consider the fiasco produced by Limited's information system decision. Organizational members never questioned why the company needed to change its approach to information gathering and dissemination, or asked about expected results. Decisions that began with a remedy found in an opportunity, considered only that idea. Reframing questions such as 'why do we need a new system' or 'how do we reduce costs or provide better service' were not asked. This difficulty arose in redevelopment as well. When seeking a replacement for a failed idea, expected results remained vague. With little to guide the effort, redevelopment took many unproductive turns.

Ambiguity adds another ingredient for process theory building. As Wildavsky (1979) points out, people do not know what they want until they see what they can get. Having an answer sweeps aside ambiguity, giving temporary relief, but this derails search. Beginning with a remedy is rash when decision makers lack an understanding of their needs. Instead of contemplating needs, decision makers are drawn to documenting the virtues of an idea and stakeholders' reactions to it. The more blatant this becomes, the more defensive the evaluation; seeking to turn aside a critic's objections. Accepting ambiguity is a powerful motivator to confront and then deal with troubling issues.

Several other questions merit study. Exploration of the interactions of process types with each of the contextual factors can offer many interesting qualifications. Space prohibited exploring the nuances offered by the interactions of decision type, urgency, importance, resources, staff support, internal organizational support, the organization's profit status, and decision maker level with the process types. Discovery's success was unaffected by these factors. But, the other three processes were influenced in very negative ways by some of the contingencies. Exploring these effects can offer additional insights into what *limits* success. Also, an examination of additional contextual factors is needed. Testing the 'content question' with additional decisions that add to the numbers of decision types would be useful. Factors such as high velocity environments, decision style, uncertainty, and risk may be important. They may identify additional conditions under which a discovery process may or may not be successful, how such conditions arise, and ways to limit or exploit them to increase the chance of success. Comparison of the relative importance of context and process was not reported. Such a test compares the size of the main effect of process to the main effects of the contextual factors to see whether process or context explains more variance in the success measures. Process explained significantly more variance, suggesting that process has more influence on success than the contextual factors considered. Space limitations prohibited discussing this finding. About half of the decisions fit none of the process types examined in this study. Exploration of these yet to be classified decisions may be useful, revealing other

Success of Decision Making Processes

kinds of processes that can be labelled in various ways, such as 'mixed mode'. Other process types, such as chance (Cohen et al., 1972), may be found in the data and offer interesting findings. Several questions about such processes warrant attention, such as identifying the features of processes that are highly successful or very unsuccessful. Cycling and interrupts cause steps to be repeated and a process to backtrack. The measures collected for these factors proved to be unreliable so cycling and interrupts could not be included in the analysis. Thus, little is known about how each influences the four process types. Better measures could elaborate the findings in useful ways.

APPENDIX I: ILLUSTRATIONS OF ORGANIZATIONS AND DECISIONS IN THE CASE DATABASE

*Organizations**

Quaker-Snapple
Ross Laboratories
Florida Medicaid Division
Ohio DNR
US Air Force
Veterans Administration
City of Columbus, Ohio
Ohio DOT
Michigan Health Department
Public School System
US Navy
McDonald's
Korean Tire Co.
Nationwide Insurance
Allied Van Lines
Marshall Fields
Bank One
Fifth-Third Bank
GE
National City Corp.
I ,ennox
Mead Paper
Anthony Thomas Candy
Delco
CompuServe
Bethlehem Steel
Battelle Memorial Inst.
Toyota Dealership
Nationwide

Decisions

Acquisition of Snapple
Marketing infant formula to developing countries
Fraud management system
Supporting wildlife programs
Decompression service
Restructuring
Light rail
Budget system revamping
Dispose of contaminated cattle
Redesign curriculum
Radar development
New location and design
Marketing in South America
Computer system capacity
Pricing services
New product line
Sell **Visa** cards
Drop Saturday service
MRP system
Private label credit card
Recycle toxic waste
Cost cutting system
New product
Tariff management
New on-line service
Scheduling blast furnace maintenance
Contract bidding
Increase sales
Build hockey arena

Limited, Inc.	Purchase an information system
American Electric Power	CAD/CAM system
General Motors	Robotic assemblers
Shell	Dispose of the Brent Spar oil platform
Huntington Bank	Billing and collection procedures
American Telephone and Telegraph	Marketing plan
400 bed acute care urban hospital	Lithotripsy service
McDonald-Douglas	TQM teams
Barings Bank	Allow unsupervised commodities trading
Dunning Lathrup Insurance	Modify bonus policy
Disney	Locate Euro Disney in Paris
1000 bed university hospital	Purchase a magnetic resonance imager
343 bed acute care hospital	Create a DeTox unit
Lane Bryant, Inc.	Intimate apparel
For-Profit abstracting company	Reference library
A large company	Marketing program
Delco, electronics	Inventory control system
Hertz-Penske Rental	Customer service system
NCR	Cash flow management

* Some organizations requested anonymity.

APPENDIX II: ASSEMBLING THE DATABASE OF DECISIONS

Soliciting Participation

People holding key positions in organizations were asked to participate in a project designed to uncover decision-making practices. A decision was defined as an episode, beginning when the organization first became aware of a motivating concern and ending with an implementation attempt. To ensure interest and first hand knowledge, the contact person was asked to select a recent decision (made within the past six months) of consequence, due to the resources required and presidents set. The contact person was asked to identify *three* people that could be interviewed, including the person who had primary responsibility for the decision. Typically, the contact person suggested a decision for which he/she was responsible and became the primary informant. The contact person was then asked to solicit two additional informants who were familiar with the decision. Cases grew in this way for 25 years.

Informants

The three informants had different roles. The primary informant, the decision-maker, provided information about the steps undertaken to make the decision. *One* of the secondary informants, selected by the decision-makers as the more knowledgeable, also

provided a listing of steps as a check. The two secondary informants filled out questionnaires to rate the decision's value and most of the contextual factors (urgency, importance, etc), and indicate duration. To separate thinking about outcomes from the recall of how the decision was made for the secondary informant who also listed decision steps, the questionnaire data was collected prior to the interview and on a separate day.

Interviews

Self-justification, memory lapses, and logical inconsistencies can make an informant's recall of events inaccurate. To improve the prospect of full and accurate disclosure, multiple informants and data sources were used. The interviews focused on factual events, seeking convergence of interpretations. A 'second chance review' was used to jog memory. Limiting the study to recent decisions reduced memory lapses. Only informants with first hand knowledge were consulted. Also, archival records and documents, cross checking the sources were used to validate. The interviews sought to converge on an understanding of the actions taken to make each decision and not on measuring differences. Two informants were independently interviewed to uncover these actions. The interview procedure was devised to deal with the dual problems of what people remember and choose to tell. In separate interviews, the informants were asked to recall what *first* captured their attention. Questioning proceeded from this point, asking 'what happened next'. For example, after an informant described what captured hi/her attention, he/she was asked why this seemed important and merited action. Questioning took cues from the last response to fashion the next query. The information gleaned from the second informant was used to corroborate what the primary informant said.

Triangulating Responses

I prepared a narrative of about 20 pages to record the interview information that described the decision and the actions taken to make it, as recalled by *each* informant. The informants reviewed their narrative separately and made changes they believed were warranted. Then, documents such as notes, proposals, or files that still existed were collected and reviewed. Documents and the actions noted by the informants were compared to find inconsistencies and gaps in their 'story'. Inconsistencies and gaps were explored in a follow-up interview with the *primary* informant, the decision-maker. In this interview, attempts were made to reconcile differences and fill in gaps. Thus, method and two types of informant triangulation were used to test the accuracy of each decision description. A clear picture of the actions taken, agreeable to the primary informant, was required to include a decision in the database. A number of decisions failed to meet the clarity or agreement tests and were abandoned. Summary case profiles were prepared for the surviving decisions. The profiles listed the actions taken by tracing them through a 'transactional model' and 'morphology' to depict how (and if) recommended decision-making steps were activated, and how each was carried out; tracing the order of actions taken as transactions and procedures (Nutt, 1984, 1993b).

Identifying Tactics

Tactics were uncovered by the researcher from the summaries, using questionnaire data and other documents when disagreements and gaps arose. The narratives and the summaries provided the key information source used to determine the steps followed to make a decision. Data from the questionnaires were used to refine some of these steps. Separate reviews of the steps were carried out to identify tactics. Each decision was examined to determine how intelligence was gathered, direction set, options identified, evaluations done, and implementation carried out. The cases were sorted to find distinct tactics, repeating each sort until there was classification agreement. Each sort put the decisions into expected tactic categories (e.g. participation for implementation), emergent categories (e.g. intervention for implementation), or an unknown category (no clear pattern). The sort was then repeated to see if the tactic categories could be reproduced. When previous classifications were reproduced, it was assumed that intra-rater reliability was achieved. Inter-rater reliability was determined by having colleagues sort the decisions. Using the definitions, the second rater matched cases and categories.

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