

# Interpreting Bounded Rationality in Business and Industrial Marketing Contexts: Executive Training Case Studies

## 阐述工商业背景下的有限合理性：执行官培训案例研究

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### Abstract

This article provides training exercises for executives into interpreting subroutine maps of executives' thinking in processing business and industrial marketing problems and opportunities. This study builds on premises that Schank proposes about learning and teaching including (1) learning occurs by experiencing and the best instruction offers learners opportunities to distill their knowledge and skills from interactive stories in the form of goal-based scenarios, team projects, and understanding stories from experts. Also, (2) telling does not lead to learning because learning requires action—training environments should emphasize active engagement with stories, cases, and projects.

Each training case study includes executive exposure to decision system analysis (DSA). The training case requires the executive to write a "Briefing Report" of a DSA map. Instructions to the executive trainee in writing the briefing report include coverage in the briefing report of (1) details of the essence of the DSA map and (2) a statement of warnings and opportunities that the executive map reader interprets within the DSA map. The length maximum for a briefing report is 500 words—an arbitrary rule that works well in executive training programs

Following this introduction, section two of the article briefly summarizes relevant literature on how humans think within contexts in response to problems and opportunities. Section three illustrates the creation and interpreting of DSA maps using a training exercise in pricing a chemical product to different OEM (original equipment manufacturer) customers. Section four presents a training exercise in pricing decisions by a petroleum manufacturing firm. Section five presents a training exercise in marketing strategies by an office furniture

distributor along with buying strategies by business customers. Each of the three training exercises is based on research into information processing and decision making of executives operating in marketing contexts. Section six concludes the article with suggestions for use of this training case and for developing additional training cases for honing executives' decision-making skills.

Todd and Gigerenzer propose that humans use simple heuristics because they enable adaptive behavior by exploiting the structure of information in natural decision environments. "Simplicity is a virtue, rather than a curse". Bounded rationality theorists emphasize the centrality of Simon's proposition, "Human rational behavior is shaped by a scissors whose blades are the structure of the task environments and the computational capabilities of the actor". Gigerenzer's view is relevant to Simon's environmental blade and to the environmental structures in the three cases in this article, "The term environment, here, does not refer to a description of the total physical and biological environment, but only to that part important to an organism, given its needs and goals."

The present article directs attention to research that combines reports on the structure of task environments with the use of adaptive toolbox heuristics of actors. The DSA mapping approach here concerns the match between strategy and an environment—the development and understanding of ecological rationality theory. Aspiration adaptation theory is central to this approach. Aspiration adaptation theory models decision making as a multi-goal problem without aggregation of the goals into a complete preference order over all decision alternatives. The three case studies in this article permit the learner to apply propositions in aspiration level rules in reaching a decision. Aspiration adaptation takes the form of a sequence of adjustment steps. An adjustment step shifts the current aspiration level to a neighboring point on an aspiration grid by a change in only one goal variable. An upward adjustment step is an increase and a downward adjustment step is a decrease of a goal variable. Creating and using aspiration adaptation levels is integral to bounded rationality theory.

The present article increases understanding and expertise of both aspiration adaptation and bounded rationality theories by providing learner experiences and practice in using propositions in both theories. Practice in ranking CTSs and writing TOP gists from DSA maps serves to clarify and deepen Selten's view, "Clearly, aspiration adaptation must enter the picture as an integrated part of the search for a solution."

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The body of “direct research” by Mintzberg, Gladwin’s ethnographic decision tree modeling, and Huff’s work on mapping strategic thought are suggestions on where to look for research that considers both the structure of the environment and the computational capabilities of the actors making decisions in these environments. Such research on bounded rationality permits both further development of theory in how and why decisions are made in real life and the development of learning exercises in the use of heuristics occurring in natural environments. The exercises in the present article encourage learning skills and principles of using fast and frugal heuristics in contexts of their intended use. The exercises respond to Schank’s wisdom, “In a deep sense, education isn’t about knowledge or getting students to know what has happened. It is about getting them to feel what has happened. This is not easy to do. Education, as it is in schools today, is emotionless. This is a huge problem.” The three cases and accompanying set of exercise questions adhere to Schank’s view, “Processes are best taught by actually engaging in them, which can often mean, for mental processing, active discussion.”

**Keywords:** Bounded rationality, Decision system analysis, Original equipment manufacturer, Thematic organization packets, Contingency thinking streams, Aspiration adaptation theory

## 摘要

本文为执行官提供了他们在处理日常业务问题和市场机会时如何阐述自己思考过程的培训。本研究建立在Schank提出的教学基础上,包括:(1)经验学习和最好的指导提供给学习者从诸如全球背景,团队项目和专家经历等的互动的故事提炼知识和技能的机会。(2)告诉不会导致学习,因为在学习需要的行动训练环境中,应强调积极使用故事,案例和项目。

每个培训案例包括执行官解释自己的决策系统分析(DSA,还需要执行官做DSA简报。在训练时要求执行官写DSA简报。在执行官学员写书面报告的说明中包括(1) DSA路线图的本质的细节(2)警告和机会的陈述,读者的行政地图及图内的DSA解释。该报告的最大长度为500字,其规则就是使行政人员培训课程行之有效。

引言之后是第二部分文献综述,简要地总结了有关人们对问题和机会的背景下的想法及文献。第三部分通过使用对不同的贴牌生产客户定价相同的化学产品的培训练习来解释DSA的起源和过程,第四部分展示一个炼油设备公司订价决策的培训练习。第五部分提供一个商业客户办公家具采购的市场策略案例。第六部分是结论和建议。这些建议是关于使用培训课程和发展其他培训课程来磨练执行官制定决策的能力。

文章引导读者利用工具箱研究综合的报告,(DSA)路线图根据生态合理性理论将战略与环境相匹配。这三个案例的研究让学习者在意愿层面征求建议来作出决策。

Todd and Gigerenzer 提出人们使用简单启发式,因为他们自然的决策环境中通过探索信息的结构使适应性行为有可能产生。“简单是一种美德,而不是诅咒”,有限理性理论强调了西蒙的命题中心,“人类理性的行为仿佛一把剪刀,其刀片则是任务环境的结构和执行者的计算能力”。Gigerenzer的观点和西蒙的环

境的危害相关,也和本文中三个环境结构的案例相关。“环境这个词,在这里,并不是指总的物理和生理的环境,而只是指被给予需要和目标的重要有机体

本文关注了结合任务环境的结构和使用适应的工具箱启发的报告。(DSA)路线图根据生态理性理论将战略与环境相匹配。渴望适应理论是这一方针的核心。渴望适应理论将决策制定作为一个没有把目标整合的多目标问题模拟成一个把所有决策选项进行完全的优先顺序化。这三个案例研究让学习者在意愿层面征求建议来作出决策。渴望适应用一系列的调整步骤的形式。一个调整步骤通过仅一个目标变量的变化就可以改变在渴望网格上邻近点当前的渴望水平。上调步骤是目标变量的提高,下调步骤是目标变量的下降。创造和使用渴望适应水平是对有限理性理论的整合。

文章通过提供学习者经验和实践环节增加了意愿采纳和有限合理性的理解和特点。利用DSA图排列CTSs和撰写TOP可以清晰和深化Selten的观点“清晰,意愿采纳必须作为研究的解决方案整合到整个蓝图中”。

这些有限理性的研究许可了在现实生活中为什么,如何作决策的理论和在自然的环境中利用启发式的学习训练两方面的发展。

本文中的练习鼓励根据不同使用目的学习快速而简洁的启发式技巧和原则。这也正回应了Schank的思想“从本质上来看,教育不是让学生们知道发生了什么,而是让他们感受到所发生的事情。这不容易做到。在如今的学校教育是没有情感的,这是一个很大的问题”。这三个案例和附加的练习问题遵守了Schank的观点。“这种教育过程最好是通过参与他们其中来实现,也可以这样认为,精神层面的积极讨论”。

**关键词:** 有限理性, 决策系统分析, 原产商, 专题组织包, 意识流, 渴望适应理论

## I. Introduction

This article provides training exercises for executives and strategic management /marketing students seeking to increase their sense making skills (Weick 1995; Weick and Sutcliffe 2001) in evaluating the strengths and weaknesses of competing streams-of-actions in business-to-business contexts. This study builds on premises that Schank (2005) proposes about learning and teaching including (1) learning occurs by experiencing and the best instruction offers learners opportunities to distill their knowledge and skills from interactive stories in the form of goal-based scenarios, team projects, and understanding stories from experts. Also, (2) telling does not lead to learning because learning requires action—training environments should emphasize active engagement with stories, cases, and projects (Schank 1999, p. xii).

Each training case study includes executive (i.e., reader) exposure to decision system analysis (DSA, see Howard, Hulbert, & Farley 1975; Woodside 2003). The training case requires the executive to write a “Briefing Report” of a DSA map. Instructions to the executive trainee in writing the briefing report include coverage in the briefing report of (1) details of the essence of the DSA map and (2) a statement of warnings and opportunities that the executive map reader interprets within the DSA map. The length maximum for a

briefing report is 500 words—an arbitrary rule that works well in executive training programs. These steps in preparing a briefing report complement earlier research appearing in *Industrial Marketing Management* on creating training exercises for improving executives' skills in decision making (Woodside 1995)

Writing briefing reports increases executive skills in interpreting action—what is actually happening and what are the consequences of these actions. Writing briefing reports requires the learner to display what she knows and believes to be critical. An executive decision trainer's reading of the briefing report permits discussion with the learner—the executive writing the report—of critical insights incorporated in the DSA and what that the briefing report fails to capture that needs emphasis. Such trainer interpretations and interactive reviews of briefing reports by the learners and trainer are similar to player-coach analyses of films of plays completed in real-life sports games.

Writing and interpreting briefing reports of DSA maps permits the creation of alternative end-of-map options by the executive writing the report—with or without the training coach. The case studies in this article include presenting alternative decisions-actions. Practice writing and interpreting briefing reports responds to Schank's (2005, p. 10) wisdom that “in real life, you can't go down a list of alternatives and choose the best one. Any training program that lets us choose from alternatives is usually just playing a trick on us.” Thus, multiple choice exams are inappropriate for learning that results in useful insights and high-quality skills.

Executives facing repetitive decision issues do develop a combination of conscious and unconscious contingency-thinking streams that are relevant to evaluating alternatives that come-to-their-minds (“simple heuristics that make us smart” relates to the thinking processes of contingency thinking streams, see Gigerenzer, Todd, and the ABC Research Group 1999). Subsequent sections of this article describe and illustrate contingency-thinking streams.

Following this introduction, section two of the article briefly summarizes relevant literature on how humans think within contexts in response to problems and opportunities. Section three illustrates the creation and interpreting of DSA maps using a training exercise in pricing a chemical product to different OEM (original equipment manufacturer) customers. Section four presents a training exercise in pricing decisions by a petroleum manufacturing firm. Section five presents a training exercise in marketing strategies by an office furniture distributor along with buying strategies by business customers. Each of the three training exercises is based on research into information processing and decision making of executives operating in marketing contexts. Section six concludes the article with suggestions for use of this training case and for developing additional training cases for honing executives' decision-making skills.

## II. How Humans Think in Contexts in Response to Problems and Opportunities

The scientific (e.g., Gigerenzer, Todd, and the ABC Research Group 1999; Wilson 2002) literature and popular press (e.g., Gladwell 2005; Gigerenzer 2007) cover a substantial body of research that leads to the following summary points. First, the human mind operates most efficiently by relegating a good deal of high-level, sophisticated thinking to the unconscious, just as a modern jetliner is able to fly on automatic pilot with little or no input from the human, “conscious” pilot. The adaptive unconscious does an excellent job of sizing up the world, warning people of danger, setting goals, and initiating action in a sophisticated and efficient manner (Wilson 2002).

The term “adaptive unconscious” is meant to convey that nonconscious thinking is an evolutionary adaptation. The ability to size up our environments, disambiguate them, interpret them, and initiate behavior quickly and nonconsciously confers a survival advantage and thus was selected for (Wilson 2005, p. 23).

Second, human thinking and problem solving proceed by decomposing complexity into simpler subroutines or into a set of production rules. Think-aloud procedures of human subjects indicate that humans create and apply noncompensatory decision rules that reduce effort in handling complexity and enable an outcome decision that is satisfactory even if not the most accurate or best answer to a problem (Gigerenzer, Todd, and the ABC Research Group 2000; Newell and Simon 1972; Simon 1979).

Third, individual and organizational behaviors are functions of the thinking and the environment. The apparent complexity of a human's behavior over time is largely a reflection of the complexity of the environment in which the human finds himself/herself (Simon 1956). Humans have a strong tendency to explain behavior internally without analyzing the environment—a tendency known as “the fundamental attribution error.” “Adaptive theorists focus on the relation between the mind and the environment rather than on the mind alone” (Gigerenzer 2007, p. 51). Consequently, adaptive theory applications in business and industrial marketing favors examining thinking process of individuals and groups for a range of problem/opportunity field and laboratory environments.

Fourth, thinking involves indexing. In order to assimilate a story or experience (also referred to here as a case) into memory, we must attach it someplace in memory. The premise behind the conception of a dynamic memory is that we try to help ourselves in understanding by finding the most relevant information we have [already] in our memory to use as a guide. So, a person unconsciously asks himself, ‘Do I know a story that relates to the incoming story, and is it one that will allow me to rest from mental processing or one that will cause me to have to think?’ As learners, one of our goals is to gather evidence about the world so that we can formulate

better beliefs, ones that will equip us better to deal with the real world” (Schank 1999, pp. 90, 93, 94, italics in original).

Fifth, humans create and apply thematic organization packets (TOPs) (Seifert 1990; Schank 1999). TOPs are convenient collections of memories involving goals and plans, stored in terms of a sufficiently abstract vocabulary to be useful across domains. Creating TOPs involves attempts to explain what we do not understand—such attempts involve attempts to make generalizations about various aspects of the world. “We want to know how this new rule [e.g., “offer price discounts to acquire large-size orders”] applies to other, similar situations” (Schank 1999, p. 152).

This article illustrates the use of TOPs by real-life decision-makers in solving real-life marketing-purchasing problems. The objectives here do not include a review of the literature on unconscious and conscious thinking. The objectives here are to increase sense making skills in interpreting how business and industrial executives think and act in solving marketing problems and opportunities. Gigerenzer (2007), Schank (1999), Wilson (2002) offer more thorough expositions on human unconscious and conscious thinking than this report provides.

### III. Decision Systems Analysis of Executive Thinking in Business Marketing Contexts

DSA mapping includes methods for visualizing thinking, deciding, interacting with others, and/or implementing actions. “Mapping strategic knowledge” (Huff and Jenkins 2002), “information processing and decision marketing in marketing organizations” (Hulbert, Farley, and Howard 1972), ethnographic decision tree modeling (Gladwin 1989), and Tufte’s body of work (e.g., *Envisioning Information*, 1990) are some useful sources of such mapping approaches.

DSA mapping is a tool useful for increasing accurate description of processes and increasing useful sense-making of what and how streams of antecedents affect thinking and actions. Some DSA maps often capture alternative-contingent thought-decision streams (e.g., Howard and Morgenroth 1968; Morgenroth 1964); other DSA maps represent a more macro approach that attempt to capture the thoughts, decisions, and actions through several weeks, months, or years to show the implementation process by an organization or informal network of organizations (e.g., Pattinson and Woodside 2008). The case-study learning exercises in this article are examples of the micro contingency-thought-processing research approach to DSA versus the second, more macro, DSA of mapping the dynamics of thinking-actions-outcomes. Ethnographic decision-tree modeling in the anthropology literature (Gladwin 1989) is very similar to DSA micro mapping.

#### 3.1. DSA Map of Contingency Thinking Streams by Executives in a Chemical Manufacturing Firm

Figure 1 is a map that includes contingency thinking streams for a chemical manufacturing firm in pricing solvents purchased by original equipment manufacturing (OEM) firms. In executive training case environments, learners receive instruction to prepare a written briefing report that describes all the contingency thinking streams (CTSs) appearing in Figure 1 and to offer a gist (i.e., one sentence decision rule) of each stream. Each CTS includes a TOP—a CTS includes a procedure for a given theme. For example, unique CTSs provide different rules to follow for an aggressive large-order customer versus a passive small-order customer.

Here is an example of one CTS in Figure 1 and an interpretation of the stream. Stream A: 1→2→3→4→13. Stream A shows the marketer’s contingency thinking stream relevant for a large aggressive customer who has high expertise in purchasing and the marketer is willing to respond with a very low price to such a customer if this customer is willing to single-source her organization’s buying requirements. Gist: set lowest price for aggressive large customer who single sources with us).

The trainer may ask the learner participating in this bounded rationality exercise to include an explicit statement of the multiple goals appearing in Figure 1. This pricing decision map illustrates a central proposition to Simon’s (1957) theory of bounded rationality—aspiration levels are not permanently fixed but are rather dynamically adjusted roadblocks or opportunities occurring in a given context. Executives raise their aspiration levels if satisfactory alternatives are easy to acquire and lower their aspiration levels if satisfactory levels are hard to acquire. “This adaptation of aspiration levels is a central idea in Simon’s early writings on bounded rationality” (Selten 2001, p. 14).

Figure 1 includes the multiple goals by the pricing executives in the solvent manufacturing firm of (1) achieving a high unit price; (2) responding favorably to customer demands for cost reductions if made; (3) increasing or sole sourcing the share-of-business awarded by the customer; and (4) retain business when a competitor offers a price reduction. One of the features of aspiration adaptation theory is that the theory models decision making as a multi-goal problem without aggregation of the goals into a complete preference order over all decision alternatives (e.g., decision streams in Figure 1). The decision maker has a number of real-valued goal variables. For each goal variable, more is better. (If, for example, one of the goals is to keep costs low, then this goal can be modeled by negative costs as a goal variable) (Selten 2001).

This case-study learning exercise may include the task of asking the learner to order the decision streams by the marketer’s aspiration level. What decision stream or path would the solvent manufacturing firm prefer to take? Which stream would the marketer find least desirable? Path 1→2→3→6→11→15 likely reflects the highest adaptive aspiration level for the manufacturer; this path permits focusing on customer with large purchase requirements who is willing to accept price increases—does not have a price reduction or cost

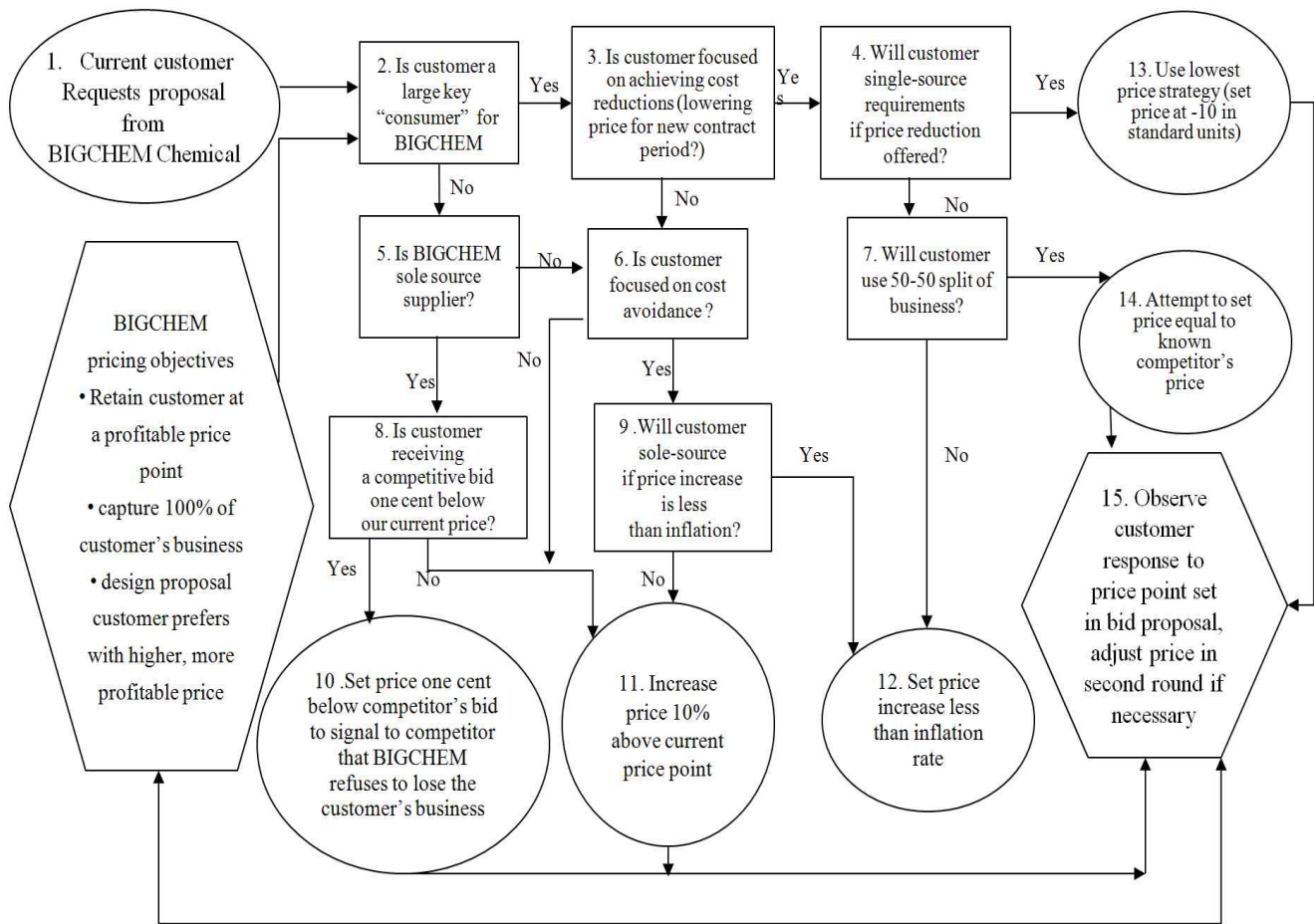


Fig. 1. Pricing, Negotiations, and Decision Model for a Multi-National Chemical Firm (BIGCHEM) and Its OEM Customers  
Source: Adapted from Woodside and Wilson (2000).

(increase) avoidance program integral to the customer's purchasing process.

The ranking of decision paths by aspiration level serves to illustrate three principal adaptation rules. (1) Downward rule: if an intermediate aspiration level is not feasible, the downward adjustment step is taken which lowers the partial aspiration level of the retreat variable. For example, if a customer's price response program prevents taking a path leading to a high price increase, then take a moderate price increase path if available.

The Table 1 includes possible complete rankings of the CTSs appearing in the solvent bounded rational model. The ordering of the CTSs is subject to revision and the creation and discussion of this ranking or alternative rankings are integral to the learning exercise in bounded rationality. The Table here is to illustrate what the learner should provide as part of her briefing report. While a pre-briefing report discussion might include an example of a CTS path and its rationale, the instructions for doing the exercise should not include showing table to learners.

(2) Upward rule: if an intermediate aspiration level is feasible and an upward adjustment step is available, then the most urgent upward adjustment step is taken. For example, the

most urgent adjustment level in Figure 1 appears to be paths that permit retention of a large customer's share-of-business (i.e., the path leading to node 13)

(3) End rule: if an intermediate aspiration level is feasible and no upward adjustment step is feasible, then this aspiration level is taken. For example, if certain conditions are met and can not be adjusted, the executives in the solvent manufacturing firm are willing to drop the price to a small customer (i.e., the path leading to node 10).

Selten (1991, 1998, 1999) provides a full exposition of aspiration adaptation theory in advancing bounded rationality modeling. The present article includes the proposal that this case study exercise into contingency decision-making clarifies understanding of the tenants of aspiration adaptation theory and how the theory advances bounded rationality modeling.

Two issues relating to the CTSs and multiple goals need further elaboration here. First, what is the creation process of the levels of the multiple goals appearing in a DSA map? The development process that results in multiple goals likely involves an interaction of objectives of executives and environmental opportunities and restraints that the DM finds in the problem context. Thus, a CTS that includes the multiple goals of achieving high volume with a given customer in

Table 1. Contingency Thinking Streams for BIGCHEM CHEMICAL Bounded Rational Model

Aspiration Adaptation Level Rank	Contingency Thinking Stream (CTS)/ Thematic Organization Procedure (TOP)	Gist
1	1→2 →3 →6 →11 →15	Big customer accepts price increase, full p ↑
2	1 →2 →3 →6 →9 →12 →15	Big customer wants cost avoidance, set low p ↑
3	1 →2 → 3 →4 →13 →15	Aggressive big customer willing to sole source, set p ↓
4	1 →2 → 3 →4 →7 →15	Big customer willing to split 50-50, set p = C's p
5	1 →2 →5 →8 →11 →15	Small customer, sole sourcing, no C, full p ↑
6	1 →2 →5 →10 →15	Small customer, sole sourcing, C active, set p = C's p
7	1 →2 →5 →6 →9 →12 →15	Small customer, willing to sole source, set low p ↑
8	1 →2 →5 →6 →11 →15	Small customer, split order, C not aggressive, full p ↑
9	1 →2 →5 →6 →9 →11 →15	Small aggressive customer, full p ↑
10	1 →2 →3 →4 →7 →14 →15	Big aggressive customer, set low p ↑

Key: p ↑ = price increase      p ↓ = price decrease      C = competitor

conjunction with increasing price must match with the occurrence of one or more customers that fit such a thematic organization packet. CTSs that may be theoretically possible but never occur in real-life are excluded from DSA maps. From a positive theoretical perspective, a CTS must occur at least in one instance for its continuing existence in a DSA map. Such a discussion implies that the study of goal levels conjunctively for explicit context is particularly useful—realistic and/or achievable goals and goal levels occur only in respect to specific contexts.

Second, what is the process by which a specific CTS occurs? Examining DSA maps indicates some amount of automatic processing of the context occurs that serves to generate particularly relevant patterns of conscious thinking. Thus, Figure 1 is relevant for a marketing DM who quickly, and with little effort, perceives that a large or small, assertive or timid, and single versus multiple sourcing customer (or other customer type) is present—in the immediate context. Such context recognition serves to automatically retrieve one CTS as more appropriate than others. Environmental assessment serves to remind the DM of the CTS, the sequence of actions, the goals, and goal levels that are appropriate and likely to follow (Han et al, 2008; Svensson 2008; Kim et al, 2007; Kim 2004; Yoo et al, 2008).

#### IV. Contingency Decision Making in Pricing Petroleum to Retailers

Figure 2 is a micro DSA map of executive information search and handling for a petroleum manufacturer. The map focuses on making pricing decisions in reference to competitors' prices. The map includes searching for price information in reference to two sets of competitors: a major competitor's wholesale price in a given local market initiating a price change (see start node 1) and the prices of other major competitors in the local market (nodes 7 and 14). Figure 2 includes three executives in firm X participating in the CTSs: (1) the executive with the authority to implement a price change; (2) a district sales manager (nodes 4, 8, and 13); and (3) a price analyst (node 6).

The shortest CTS in Figure 2 include the following nodes: 1→2→3→4→5. This CTS includes the environmental event that a major competitor increases the wholesale price in a local market where a price change is under consideration. The authorizing decider for firm X (ADx) searches for information from the firm's district sales officer (DSOx) and if the DSOx recommends a price increase, ADx stops search and increases firm X's wholesale price. The following statement is a gist of the TOP in this CT: increase price to match major competitor's price increase if the DSOx agrees.

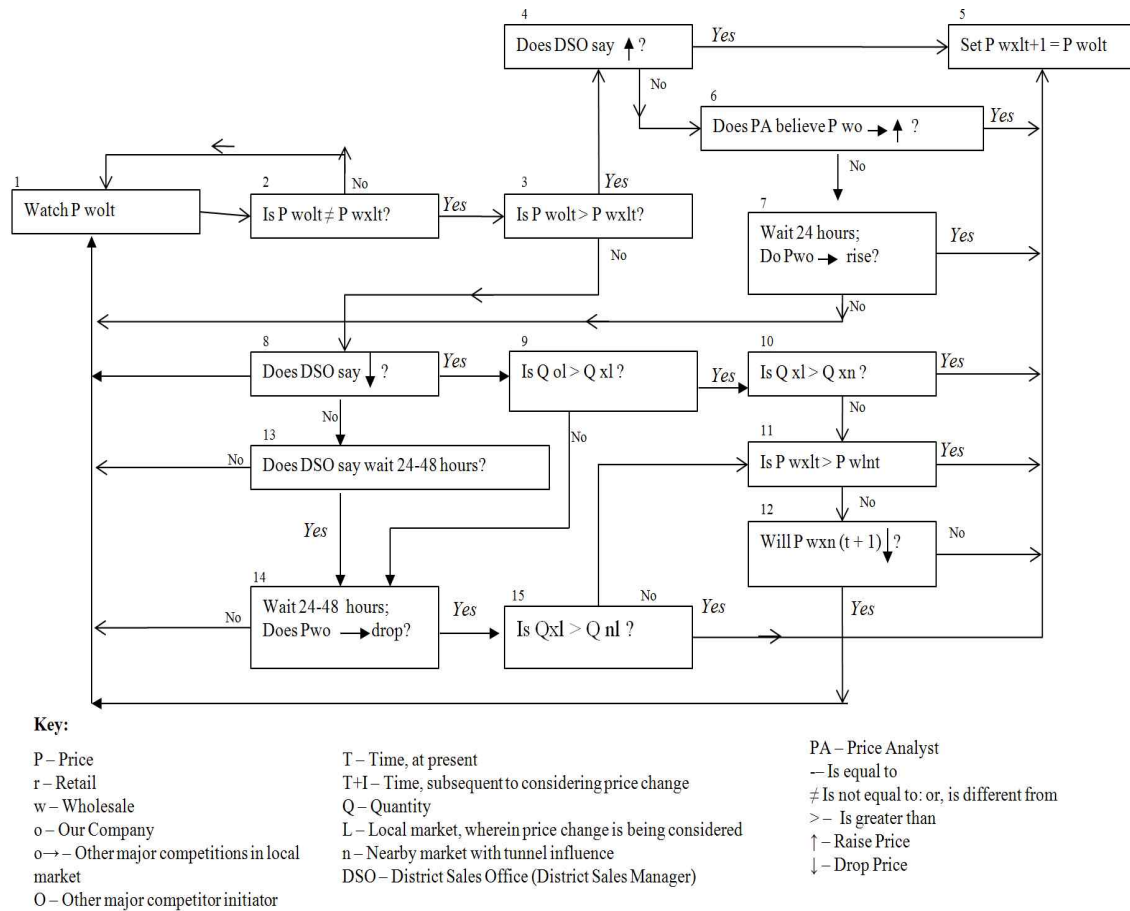


Fig. 2. Decision Systems Analysis Map of Executive Thinking in a Petroleum Manufacturing Firm  
Source: Adapted from Morgenroth (1964)

Note in examining Figure 2 that ADx aspires to implement price increases versus price decreases. Price increases include less information search than price decreases; price increases involve less complexity—fewer contingency statements—than price decreases. Retail demand for gasoline is rather price inelastic for a wide range of prices but rather price elastic for any one retailer. Thus, retailers, wholesalers, and manufacturers all benefit from moving together to increase price. Consequently, the ADx seeks to contain price decreases locally—prevent price wars if possible. However, the ADx recognizes the need to respond aggressively by matching a major competitor’s price decrease in important markets to prevent firm X from experiencing major decreases in sales. Thus, when a major competitor decreases price in a local market where a price change is under consideration, the ADx seeks to wait to the next time period to give this competitor time to reverse the this competitor’s decision. ADx aspires to use CTS’s that include TOPs involving nodes 12 and/or 14 to permit continuation of watching the major competitor (who just decreased price) into the next time period.

The following CTS that includes the TOP that the ADx least prefers to employ: 1→2 →3→8→9→10→5. This CTS includes a price decrease by a major competitor with sales greater than firm X’s sales in a critical local market for X.

The fact that this local market represents sales greater for X than nearby markets defines its criticality. The following statement is a gist for this lowest aspiration level TOP: lower price to match a major competitor price decrease in a critical market if the DSOx concurs.

Note that for both price increases and price decreases that the ADx searches for information from the DSOx. Such search serves several functions: reduces the likelihood of error in making a decision the ADx will regret later and builds cooperation and trust with the DSOx that likely result in DSOx willingness to provide information in future time periods and willingness to implement decisions quickly and accurately.

## V. Contingency Decision Making in Marketing and Buying Office Furniture

Figures 3 through 5 include CTS for both a marketer and customers for business-to-business products and services. This set of DSA maps presents a more challenging assignment than the solvent and petroleum learning exercises for the following reasons. First, Figures 3 through 5 include customers’ CTSs in response to the marketer’s CTSs and subsequent marketer’s CTSs in response to customers’ CTSs. Thus, the information

in Figures 3 through 5 is ambitious in describing the thinking routines involving social rationality. The study of social rationality is a special case of ecological rationality where environments consist of other agents with which to interact. "Social rationality adds a further class of goals to decision making: social goals that are important for creating and maintaining social structure and cooperation" (Gigerenzer 2001, p. 48).

Secondly, some of the TOPs in Figures 3 through 5 are not fully explicated. For example, Figure 5 node 12 does not provide the heuristic (decision rule) on how to use the four cues in the criteria. Analyzing these DSA maps offers the learner the opportunity to identify and report ambiguities in the CTSs. Discussion what one or more heuristics might include for some ambiguities provides valuable experience in creating search, stopping, and decision rules.

An executive within an office furniture distributor represent the first decision-maker in Figure 3. Question one in the learner's assignment includes explicating each CTS appearing in Figure 3 and in the other two figures. Question one includes showing nodes and arrows for each CTS; providing a

brief written summary description for each CTS; and providing a one sentence gist for each TOP in each CTS. Question two requires the learner to rank the CTSs by aspiration adaptation preferences for relevant decision makers and to provide a rationale for the CTS with the highest and lowest aspiration levels. Question three asks the learner to describe possibly heuristics that include the criteria in nodes that do not explicate decision rules. Question four asks the learner to report on possible anomalies or questionable/undesirable heuristics and behavior that these three exhibits might include.

Note in Figure 3 that the following stream is the CTS providing the highest aspiration level: 1→3→5→6→8→9. This CTS represents the marketer servicing a customer's requirement within a national contract signed by the distributor's principal (i.e., the office furniture manufacturing firm) and the centralized procurement organization at headquarters for the local firm. For nearly all TOP executions involving this CTS, the heuristics for the distributor and the customer are very fast and frugal. The following statement represents the gist for the distributor: fill the order according to the product specifications

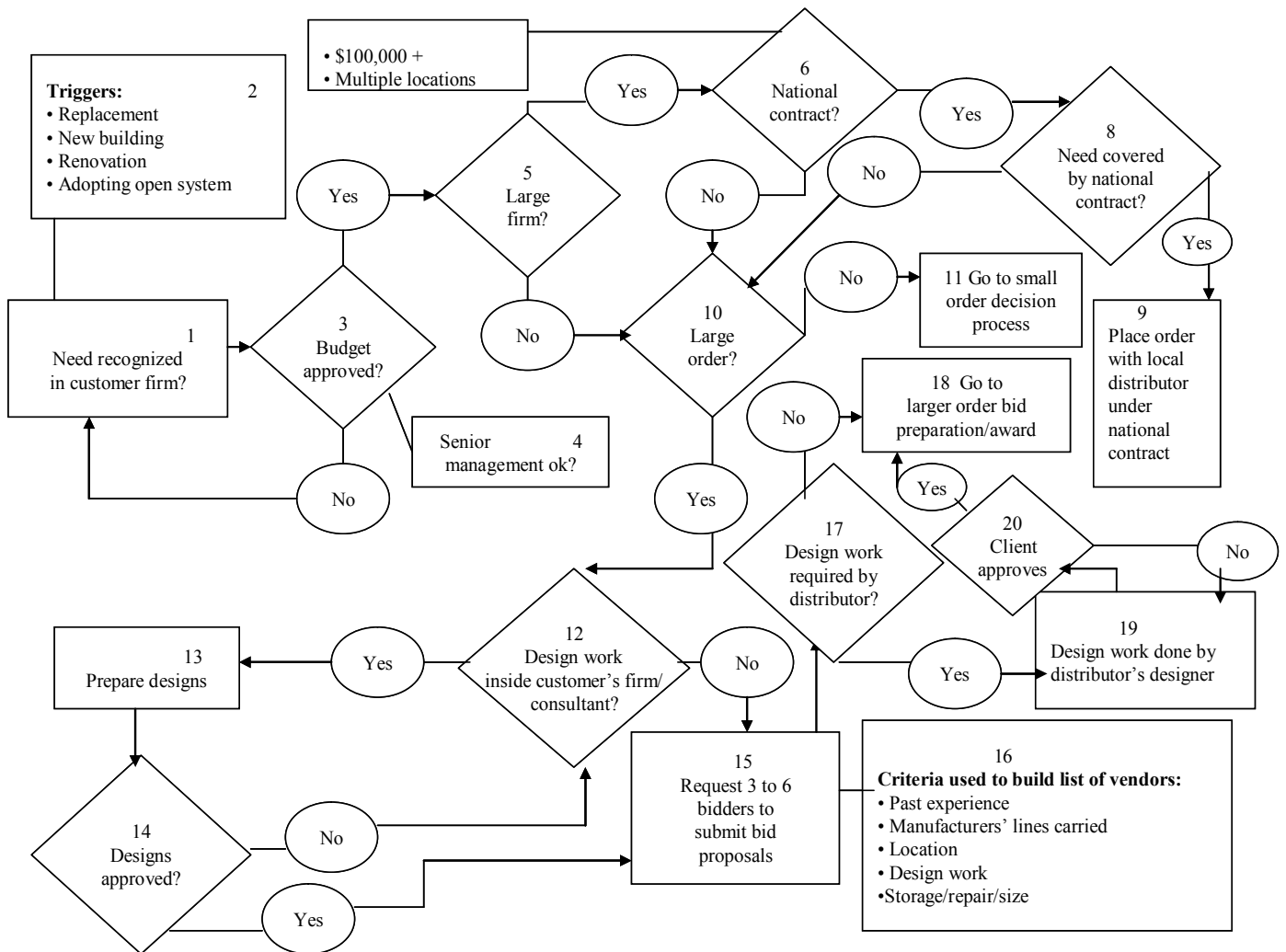


Fig. 3. Office Furniture Contingent Streams in Purchasing Processes  
Source: Adapted from Woodside (2003).



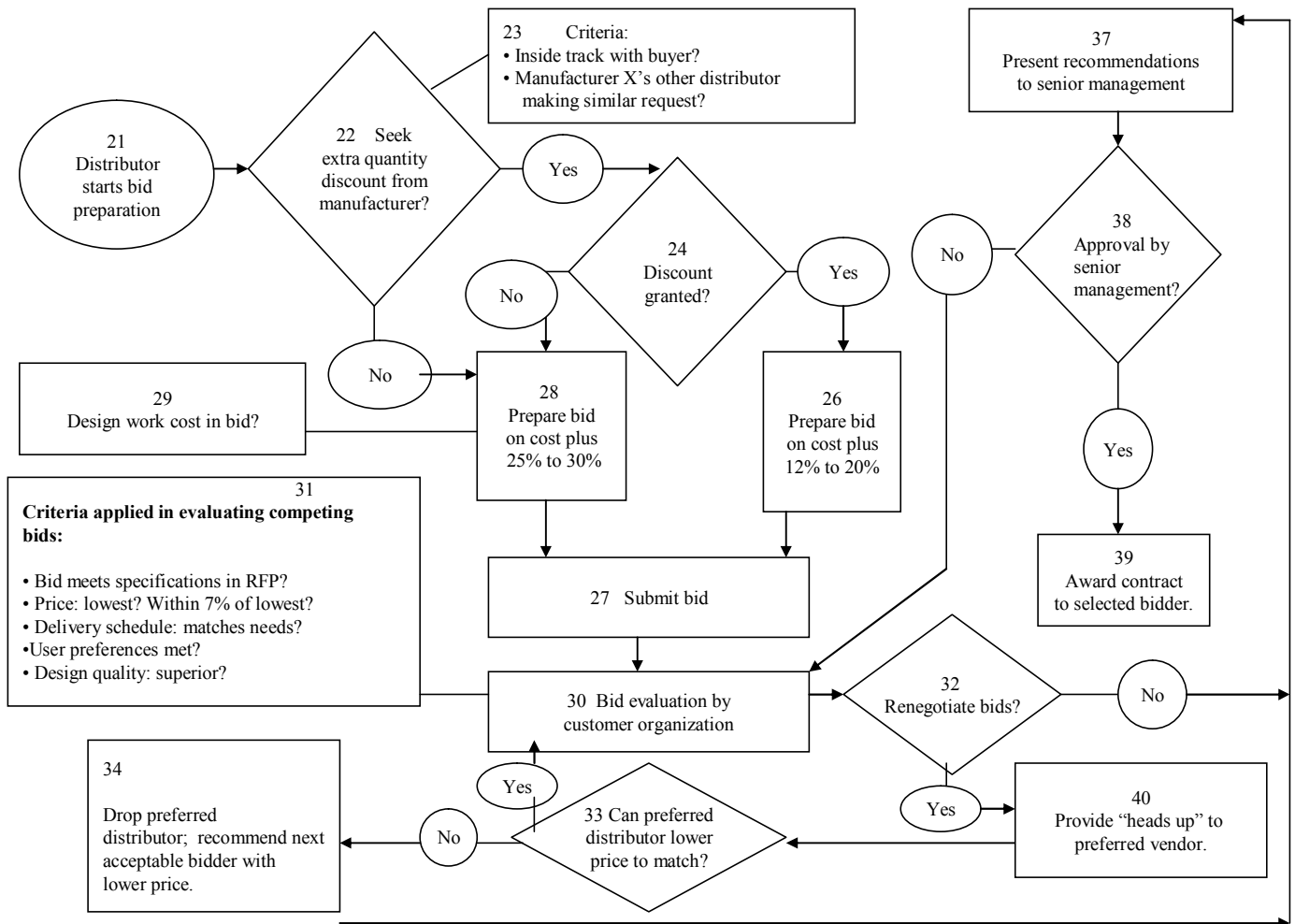


Fig. 4. Contingency Model of Large Order Marketer Bid Preparation and Buyer Award Process  
 Source: Adapted from Woodside (2003).

and prices as found in the national contract. The following statement is the gist for the customer for this same CTS: buy from the local distributor of the supplier named in the national contract at the price listed in the national contract.

Figure 4 includes CTSs for larger orders. Figure 5 includes CTSs for small orders. The distributor aspires usually to use CTSs in Figure 3 that takes the distributor’s firm to Figure 4 rather than Figure 5.

Note that node 29 in Figure 4 is particularly worthy of discussion. This DSA map does not explicate the heuristic-in-use as to the rule for deciding whether or not to include design work that is to be done by the distributor in the bid to a large customer. Is the bid going to include the costs of such design work? If yes, should the design portion of the bid include margins for overhead and profit or only a cost-for-design work? What might reasonable heuristics include—the learner might be asked to provide contingency statements in response to this issue. In this environment, if a large customer with a history of providing orders to the distributor’s firm

asked the distributor to provide prepare speculative design work at not cost, the distributor complied with the request. In almost all such cases the business was awarded to the distributor providing such free design work, however, exceptions to these cases did occur (Woodside 2003).

Note that Figure 4 includes the questionable TOP of allowing a preferred supplier a head’s up (node 40) that this supplier is about to loose a bid. In such cases the preferred supplier modified specifications and/or price in the original bid quickly and resubmitted the bid. Consequently, the preferred supplier was able to maintain or increase its share of available business from the customer and the competitor offering the initially preferred bid lost the bid. Such a heads-up procedure is counter-productive to customers seeking competing bids in future time periods; competing suppliers are less likely to continue to respond to request for bid proposals knowing that current suppliers are going to receive unique heads-up information—a violation of the fairness principle in social rationality (see Gigerenzer 2001, p. 48).

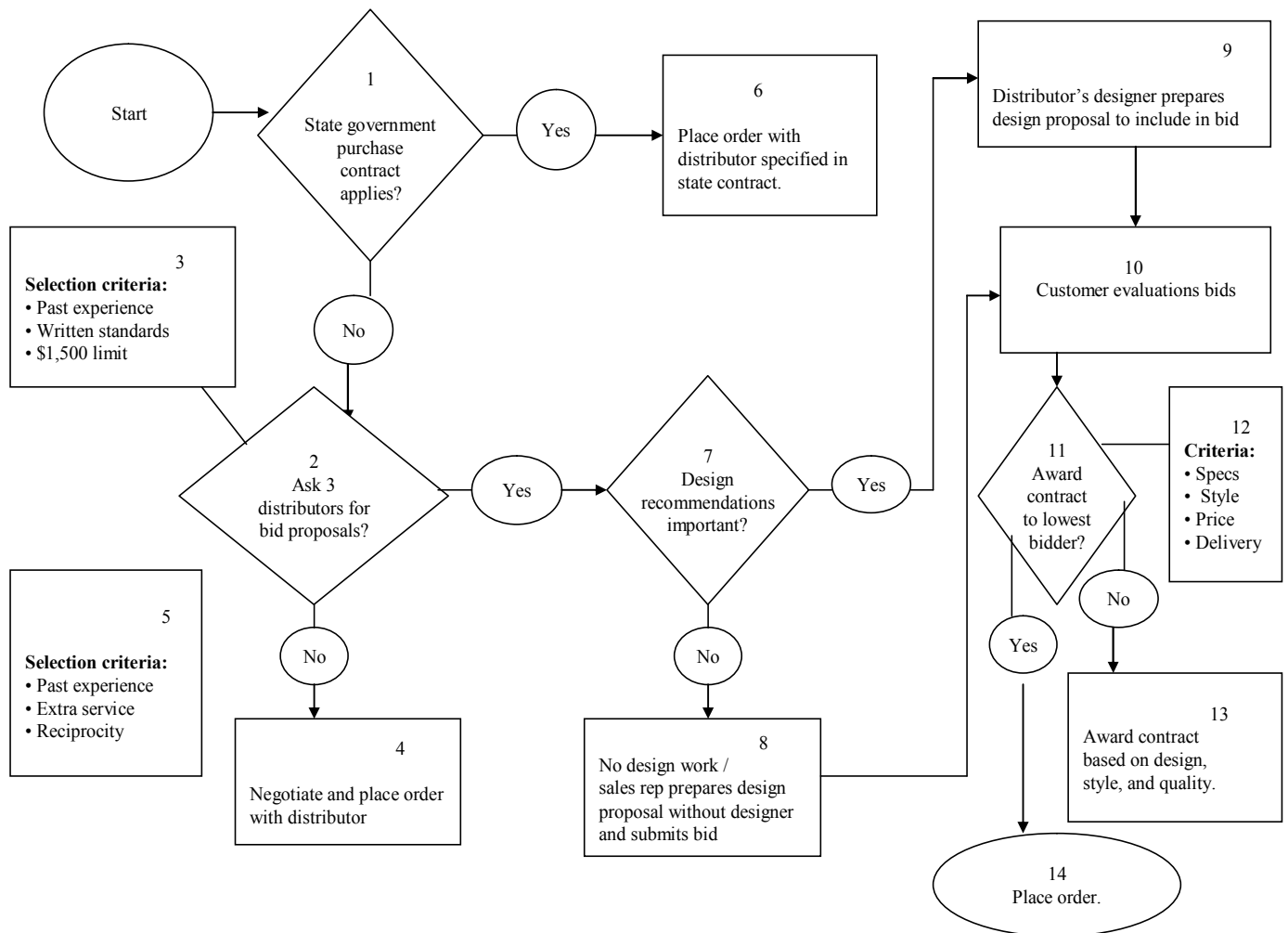


Fig. 5. Small Order Marketing-Purchasing Process  
Source: Adapted from Woodside (2003).

## VI. Conclusions with Suggestions for Creating Additional Training Exercises into Bounded Rationality

Todd (2001) and Gigerenzer (2001) propose that humans use simple heuristics (i.e., noncompensatory versus compensatory procedures) because they enable adaptive behavior by exploiting the structure of information in natural decision environments. “Simplicity is a virtue, rather than a curse” (Todd 2001, p. 53). Bounded rationality theorists emphasize the centrality of Simon’s 1990, p. 7) proposition, “Human rational behavior ... is shaped by a scissors whose blades are the structure of the task environments and the computational capabilities of the actor.” Gigerenzer’s (2001, p. 39) view is relevant to Simon’s environmental blade and to the environmental structures in the three cases in this article, “The term environment, here, does not refer to a description of the total physical and biological environment, but only to that part important to an organism, given its needs and goals.”

The present article directs attention to research that

combines reports on the structure of task environments with the use of adaptive toolbox heuristics of actors. The DSA mapping approach here concerns the match between strategy and an environment—the development and understanding of ecological rationality theory. Aspiration adaptation theory (Selten 1998, 2001) is central to this approach. Aspiration adaptation theory models decision making as a multi-goal problem without aggregation of the goals into a complete preference order over all decision alternatives. The three case studies in this article permit the learner to apply propositions in aspiration level rules in reaching a decision. Aspiration adaptation takes the form of a sequence of adjustment steps. An adjustment step shifts the current aspiration level to a neighboring point on an aspiration grid by a change in only one goal variable. An upward adjustment step is an increase and a downward adjustment step is a decrease of a goal variable (Selten 2001). Creating and using aspiration adaptation levels is integral to bounded rationality theory (Gigerenzer 2001).

The present article increases understanding and expertise of both aspiration adaptation and bounded rationality theories by

providing learner experiences and practice in using propositions in both theories. Practice in ranking CTSs and writing TOP gists from DSA maps serves to clarify and deepen Selten's (2001, p. 31) view, "Clearly, aspiration adaptation must enter the picture as an integrated part of the search for a solution."

The body of "direct research" by Mintzberg (e.g., Mintzberg 1973; Mintzberg, Raisinghani, and Theoret, 1976), Gladwin's (1989) ethnographic decision tree modeling, and Huff's (1990) work on mapping strategic thought are suggestions on where to look for research that considers both the structure of the environment and the computational capabilities of the actors making decisions in these environments. Such research on bounded rationality permits both further development of theory in how and why decisions are made in real life and the development of learning exercises in the use of heuristics occurring in natural environments. The exercises in the present article encourage learning skills and principles of using fast and frugal heuristics in contexts of their intended use. The exercises respond to Schank's (1999, p. 135) wisdom, "In a deep sense, education isn't about knowledge or getting students to know what has happened. It is about getting them to feel what has happened. This is not easy to do. Education, as it is in schools today, is emotionless. This is a huge problem." The three cases and accompanying set of exercise questions (see the Appendix) adhere to Schank's (1999, p. 260) view, "Processes are best taught by actually engaging in them, which can often mean, for mental processing, active discussion."

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## Appendix

### Questions to Answer in a Bounded Rationality Exercise

Instructions. Study the decision systems analysis (DSA) map. Provide a written report that answers the following questions.

- \* Using the numbers for each nodes and arrows (→), list all possible contingency thinking streams (CTS) from node 1 to the ranking for the least preferred CTS appearing in the map.
- \* Rank order the CTSs according to what you believe the decision-maker's (DM's) aspiration adaptation levels starting with 1 for most preferred to the highest number for the least preferred CTS.
- \* Provide a gist that summarizes the thematic organization procedure within each CTS.
- \* Provide a rationale for the CTS receiving your top ranking for aspiration adaptation level. Why does the DM prefer to take this path if the environment permits the path to be taken? Also, provide a rationale for the CTS with the lowest ranking for aspiration adaptation level. Why does the DM prefer to avoid this path if the environment permits such avoidance?
- \* Provide a brief summary of the multiple goals and goal levels that appear in the DSA map. Discuss the relative importance of the DM's goal levels. For example, how important is achieving a price increase versus sole sourcing by a customer—assuming that the DSA map that you are working with includes these goal levels. Be sure to discuss all goal levels that appear in the DSA map.