

A CASE STUDY OF THE USE OF THE KEPNER-TREGOE METHOD  
OF PROBLEM SOLVING AND DECISION MAKING

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## CHAPTER I

### THE PROBLEM AND DEFINITIONS OF TERMS USED

It is a time honored axiom, though perhaps redundant, that workers work and managers manage. Yet the two essential management functions, those of solving problems and making decisions, have long been unrecognized and misunderstood.

In recent management literature, a great deal of attention has been paid to the difficulties involved in handling problems and making decisions, but unfortunately the common error is in "confusing processes of problem analysis with decision making."<sup>1</sup> The advent of the computer really hasn't clarified anything. Managers are told to apply the computer, in many instances, to their business problems while they are reminded on the other hand that the computer does not make decisions. How then shall a manager function and perform in the two essential areas?

#### I. THE PROBLEM

Statement of the problem. It is the purpose of this study to (1) explain the Kepner-Tregoe approach to problem solving and decision making and potential problem analysis,

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<sup>1</sup>Charles H. Kepner and Benjamin B. Tregoe, The Rational Manager (New York: McGraw-Hill Book Company, 1965), p. 2.

(2) compare the Kepner-Tregoe approach to other systems and ideas of problem solving and decision making and  
(3) present a case study of the Kepner-Tregoe approach to problem solving and decision making as implemented by the Emerson Electric Company, St. Louis, Missouri.

Importance of the study. The cost of unsystematic and irrational thinking by managers is undeniably enormous. Many good managers will blush with shame at recalling from their own experiences a wide assortment of bungled problems and erroneous decisions made in times past.

An executive of a large corporation, long honored for its good management practices, once advised that "the number of undisclosed \$10,000 mistakes made in this company every day makes me shudder."<sup>2</sup> Managers of business firms, large and small, are constantly under pressure today from a daily barrage of operating problems. Faced with the complexities of technological revolutions, strong competition and new patterns of demand never before experienced in this country, it behooves every manager to use the most effective tools available if he is to survive and to achieve maximum profitability for his company.

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<sup>2</sup>Ibid., p. 1.

A Dunn and Bradstreet study indicated that "inexperience and incompetence" account for 92 per cent of all business failures.<sup>3</sup> This would indicate that managers must be competent in problem solving and decision making to provide the best use of the company's resources and therefore attain maximum profitability.

It is hoped that this study will, in part, answer the question, Can there be developed clear concepts and procedures to enable a manager to approach problems systematically and to solve them efficiently for profit and success?

## II. DEFINITIONS OF TERMS USED

Kepner-Tregoe. A pragmatic and scientific approach to problem solving and decision making. This approach was devised by Charles H. Kepner and Benjamin B. Tregoe, both essentially social psychologists with wide experience in industry. It has as its base premise that specific decisions are best made by ferreting out specific problems.

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<sup>3</sup>"How Small Businesses Can Stay Healthy," The Management Review, 58:28, October 1963.

There are "three separate analytical procedures employed; one for analyzing problems, one for making decisions and one for preventing potential problems."<sup>4</sup>

Problem. The term is used as a deviation from a standard of performance. This standard can be arbitrarily established by the manager, but in the larger sense it is established by "what should be"<sup>5</sup> as inherent in a given situation.

Cause. A single event or "combination of events and conditions operating as if they constituted a single event"<sup>6</sup> creating an effect which results in a deviation from a standard which has been established.

Decision-making. This process is an organization of the relevant information so that it can be clearly understood and handled in an intelligent way for making a choice. "In a way parallel to the process of problem analysis, it is the manipulation of information so that a series of needed comparisons can be made."<sup>7</sup>

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<sup>4</sup>Charles H. Kepner and Benjamin B. Tregoe, The Rational Manager (New York: McGraw-Hill Book Company, 1965), flap.

<sup>5</sup>Ibid., p. 47.

<sup>6</sup>Ibid., p. 17.

<sup>7</sup>Ibid., p. 180.

Analysis of Potential Problems. "A systematic forethought to the achievement of objectives."<sup>8</sup>

Mathematical Model. This is a method using mathematics as a tool for management. To do this, one must translate the problem into a language of mathematics. This information calls for "generalizing, quantifying, and identifying the goals and constraints (limitations or restrictions)."<sup>9</sup>

Brainstorming. A term used for a session in which anyone may bring in a given subject or idea at any time. The time limit may be set, but whatever a person has to say must be respected. "Criticism is ruled out. It is withheld until after the session,"<sup>10</sup> if it is allowed at all.

Controlled Brainstorming. The term, in effect, means the same as Brainstorming, except that information concerning the area to be discussed is distributed to those

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<sup>8</sup>Charles H. Kepner and Benjamin B. Tregoe, The Rational Manager (New York: McGraw-Hill Book Company, 1965), p. 228.

<sup>9</sup>Edward C. Bursk and John F. Chapman, New Decision-making Tools for Managers (Cambridge, Massachusetts: Harvard University Press, 1963), p. 351.

<sup>10</sup>Bernard S. Benson, "Let's Toss This Idea Up," Fortune, (October, 1957), p. 145.

persons involved prior to the time of the session. This gives the person time to give thought to the subject in question. Ideas on the subject, then, are given at the Brainstorming session, but without any organizational pattern.<sup>11</sup>

Creative Problem Solving. This

makes the untenable assumption that the characteristics of the problem and its cause are unimportant. It leaps from 'We have to do something' to 'Let's go that way,' paying little heed to the what and the why of the situation that impels the action in the first place . . . it should not be confused with the process of rational problem analysis and decision making.<sup>12</sup>

Intuitive Techniques. This term is used to indicate the immediate understanding or a solution of a problem without a process of inductive or deductive reasoning. It originates, seemingly, from the emotions or feelings.

Formal Reasoning. Formal reasoning is a process of analyzing a problem or securing a solution through "a logical sequence."<sup>13</sup>

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<sup>11</sup>Mr. William Schoppenhorst, personal interview. Corporate Manager of Manpower Development, Emerson Electric Company, St. Louis, Missouri.

<sup>12</sup>Charles H. Kepner and Benjamin B. Tregoe, The Rational Manager (New York: McGraw-Hill Book Company, 1965), pp. 52-53.

<sup>13</sup>Ibid., p. 18.

Heuristic Process. The essence of this process is that "the factors validating a decision are internal to the personality of the individual instead of external to it."<sup>14</sup>

Interim Action. A term for an action taken which buys "the manager time for finding the cause of a problem."<sup>15</sup>

Adaptive Action. This term is used to describe letting "the manager live with the tolerable effects of a problem or with an ineradicable cause."<sup>16</sup>

Corrective Action. This is an action taken which "gets rid of the known cause of a problem."<sup>17</sup>

Preventive Action. This action "removes the possible cause of a problem, or reduces its probability."<sup>18</sup>

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<sup>14</sup>William J. Gore, Administrative Decision Making: A Heuristic Model (New York: Jon Wiley & Sons, Inc., 1964), p. 12.

<sup>15</sup>Charles H. Kepner and Benjamin B. Tregoe, The Rational Manager (New York: McGraw-Hill Book Company, 1965), p. 132.

<sup>16</sup>Ibid.

<sup>17</sup>Ibid.

<sup>18</sup>Ibid.

Contingency Action. A term used to explain the provision of "standby arrangements to offset or minimize the effects of a serious potential problem."<sup>19</sup>

Efficient Action. An action that gives the most results for the least cost and effort.<sup>20</sup>

Devil's Advocate. A title for a person who knows the Kepner-Tregoe theory but who is not oriented with the facts of a problem necessarily. He keeps those involved strictly on the subject at hand.<sup>21</sup>

Stair-stepping Process. A problem which moves from "problem to cause to new problem in successive stages. In this process each cause becomes in turn a new problem to be analyzed."<sup>22</sup>

Apex Course. A training program developed by Kepner-Tregoe, Inc., "for senior and middle managers and for company officers."<sup>23</sup>

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<sup>19</sup>Ibid., p. 133.

<sup>20</sup>Ibid., p. 223.

<sup>21</sup>Mr. William Schoppenhorst, personal interview.

<sup>22</sup>Charles H. Kepner and Benjamin B. Tregoe, The Rational Manager (New York: McGraw-Hill Book Company, 1965), p. 66.

<sup>23</sup>Ibid., p. 229.

Genco Course. A training program developed by Kepner-Tregoe, Inc., "for middle and junior managers and for supervisors."<sup>24</sup>

Vertex Course. A training program developed by Kepner-Tregoe, Inc., "for sales managers and supervisors."<sup>25</sup>

FBA Course. A training program developed by Kepner-Tregoe, Inc., "for managers in government agencies and other nonprofit organizations."<sup>26</sup>

Synergetics. This is "an intensive program applying up-to-date management research findings to get superior performance by integrating analytic concepts with sound organization principles." Synergetics has been developed by some ex-Kepner-Tregoe personnel. This system is an incorporation of some of the principles described in the book, The Rational Manager by Kepner and Tregoe and those described in the book, The Managerial Grid by Blake and Mouton.<sup>27</sup>

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<sup>24</sup>Ibid.

<sup>25</sup>Ibid.

<sup>26</sup>Ibid.

<sup>27</sup>Sterling Institute, "Applied Synergetics," A Pamphlet Prepared by Applied Synergetics Center, Inc. (Route 128 Office Building, 235 Bear Hill Road, Waltham, Massachusetts) (617) 891-6170.

### III. METHOD OF PROCEDURE

This study is divided into four parts:

1. An explanation of the Kepner-Tregoe approach to problem solving and decision making. Most of the information was taken from an analysis of the book, The Rational Manager.

2. A comparison of the Kepner-Tregoe approach to other systems and ideas of problem solving and decision making. The comparison of methods was used to show how the Kepner-Tregoe approach differs from other systems and how it is similar to other existing methods of problem solving and decision making frequently used today.

3. A presentation of the implementation of the Kepner-Tregoe approach to problem solving and decision making in a major company in the Midwest. It was necessary to find a company or to find several companies who employ the Kepner-Tregoe method of problem solving and decision making.

A letter was written to Dr. Charles H. Kepner, of Kepner-Tregoe, Inc., Princeton, New Jersey asking for a personal interview. After a considerable time had passed, the company office in Princeton, New Jersey, was called only to find that Dr. Kepner was out of the country for the remainder of the month. Reference was given to the Ann Arbor, Michigan, office of Kepner-Tregoe, Inc. The Ann Arbor office

was called and the name of Emerson Electric Company, St. Louis, Missouri was given as the only company in the Midwest that was employing the Kepner-Tregoe program extensively.

Contact was made with Mr. William Schoppenhorst, Corporate Manager of Manpower Development, and an interview was scheduled for April 4, 1969. The interview was held at Mr. Schoppenhorst's office in St. Louis, Missouri, with a tape recorder used to record the interview.

Background information concerning the Emerson Electric Company was secured from Standard and Poors, Moodys, and the 1966, 1967, and 1968 annual reports from Emerson Electric Company for a better understanding of the company in preparation for the interview.

A call was made to Mr. William Schoppenhorst of Emerson Electric Company on May 27, 1969, in order to clarify one point discussed in the interview.

4. A summary of the strengths and weaknesses of the Kepner-Tregoe approach to problem solving and decision making.

#### IV. LIMITATIONS OF THE STUDY

Chapter III is taken entirely from the book, The Rational Manager by Charles H. Kepner and Benjamin B. Tregoe published by McGraw-Hill Book Company in 1965. For this reason, only direct quotes will be footnoted.

The study of the implementation of the Kepner-Tregoe method of problem solving and decision making was limited to the Emerson Electric Company. Though there are many other companies using this method, Emerson Electric was the only company within workable range of Kansas State Teachers College in which the Kepner-Tregoe approach to problem solving and decision making is used extensively.

There is such a vast amount of literature available on problem solving and decision making that the other approaches used were limited to those that were available through the interlibrary loan from Harvard University, Cambridge, Massachusetts, the University of California at Los Angeles, the Kansas City Public Library and the William Allen White Library at Kansas State Teachers College that were listed in the annotated bibliography of The Rational Manager.

## CHAPTER II

### RELATED LITERATURE

It is very interesting to read much of the literature related to the subject of problem solving and decision making by other authors and to find, essentially, that the viewpoints break down into three approaches.

#### I. LITERATURE THAT EMBODIES INTUITIVE TECHNIQUES

Gore, in his Administrative Decision Making: A Heuristic Model, indicates that the factors validating a decision are internal to the personality of the individual instead of external to it.<sup>1</sup> He advises that

whereas the rational system of action evolves through the identification of causes and effects and discoveries of ways to implement the results, the Heuristic process is a groping toward an agreement seldom arrived at through logic.<sup>2</sup>

He further advises that

whereas the rational system of action deals with the linkage between a collective and its objectives and between a collective and its environment, the Heuristic process is oriented toward the relationship between that private core of values embedded in the center of the

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<sup>1</sup>William J. Gore, Administrative Decision Making: A Heuristic Model (New York: Jon Wiley & Sons, Inc., 1964), p. 12.

<sup>2</sup>Ibid.

personality and its public counterpart ideology. The dynamics of personality are not those of logic, but rather those of emotion.<sup>3</sup>

In one of Gore's analogies, he tells the story of a manager of a baseball team who puts in a player looking at the odds of the situation rather than in terms of his anxieties, but that a fireman, even though he knows what his job is, must act according to the situation at the time or possibly lose his life.<sup>4</sup> In effect, Gore is saying that the rational decision making is good at certain times, but that "such systems are not appropriate to every situation."<sup>5</sup> The "Heuristic behavior is marked by improvisation, spontaneity, and accomodation."<sup>6</sup> There is an intuitive and emotional understanding of the problem and the decision that needs to be made for any problem solving.

Similarly, the

synectics theory applies to the integration of diverse individuals into a problem-stating problem-solving group. It is an operational theory for the conscious use of the preconscious psychological mechanisms present in man's creative activity.<sup>7</sup>

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<sup>3</sup>Ibid.

<sup>4</sup>Ibid., p. 10.

<sup>5</sup>Ibid., p. 11.

<sup>6</sup>Ibid., p. 28.

<sup>7</sup>William J. J. Gordon, Synectics (New York: Harper Brothers, 1961), p. 3.

The idea used by Gordon is to make the person more flexible through systematic treatment of the problem solver rather than through systematic organization of the relevant information.

Also in the same category must fall William Jones' Memorandum "On Decision Making in Large Organizations," wherein he states that in a crisis phenomena each staff element will view a crisis at different times in accordance with its own ability to deal with it at the time.<sup>8</sup> The human element is very strong in a crisis decision. Here, once again, are the overtones of an emotional and intuitive process of decision making depending upon a set of circumstances.

## II. THE LITERATURE OF BRAINSTORMING

"Let's Toss This Idea Up" is a phrase borrowed from Bernard S. Benson's article published in the October, 1957, issue of Fortune Magazine. He suggests that the goal is to receive as many ideas as possible, with the viewpoint in mind that if enough ideas are produced, some are bound to be good. Criticism is not allowed until after the discussions

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<sup>8</sup>William J. J. Jones, Memorandum RM-3968-PR, "On Decision Making in Large Organizations" (Prepared for: United States Air Force Project Rand, The Rand Corporation, Santa Monica, California, 1964).

are complete and any idea is respected and given due consideration.<sup>9</sup> "Freewheeling" is welcomed; quantity is emphasized. In addition to contributions of your own, a person is encouraged to suggest improvement on the idea of others and possibly see the interrelationships of two or more ideas and how possibly it can contribute to a third idea.<sup>10</sup>

This is, essentially, the theme of the book Applied Imagination by Alex F. Osborn, published by Charles Scribner's Sons in 1957. Osborn indicates in his book that most of the 500 largest United States corporations and many of the small companies in this country use brainstorming as a method of problem solving.<sup>11</sup>

He has contended that "the ability of management to adapt to new and changing conditions requires thinking beyond the established areas of past experience."<sup>12</sup> With the uncovering of new ideas come possibly new solutions to old problems.

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<sup>9</sup>Bernard S. Benson, "Let's Toss This Idea Up," Fortune, (October, 1957), p. 145.

<sup>10</sup>Ibid.

<sup>11</sup>Ibid.

<sup>12</sup>Alex F. Osborn, Ph. M., Applied Imagination (New York: Charles Scribner's Sons, 1957), p. 346.

### III. LITERATURE INVOLVING FORMAL REASONING

This literature and its exponents embodies much of the approach of the Kepner-Tregoe system. For instance, Cooper, in The Art of Decision Making, states that a superior method of problem solving is to write out your problem on paper. He indicates that this has the advantages of (1) finding and arranging facts, (2) discovering relationships among elements and (3) identifying gaps in thoughts and facts as well as conflicts of ideas. This recording of the problem serves later as a reference.<sup>13</sup>

He compares problem solving to a trunk of a tree. If you cut a cross section out of a tree you would see a pattern of rings. If you took the same tree trunk and cut a cross section vertically rather than horizontally, you would see the same tree structured differently.<sup>14</sup> In effect, he is suggesting that problems should be approached from more than one standpoint, which relates to the alternatives involved in the Kepner-Tregoe method.

Maier also implies the formal reasoning process although he attaches more emphasis to conference discussion than do

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<sup>13</sup>Joseph D. Cooper, The Art of Decision Making (Garden City, N. Y.: Doubleday, 1961), p. 282.

<sup>14</sup>Ibid., p. 284.

other authorities. He gives nine principles for creative discussions in which he states that the success of decision making depends upon the leader of the conference and his ability to formally direct the conference group upon identification, consideration, and suggestion of solutions.<sup>15</sup>

Others have used the formal approach with their own little innovations such as Blake and Mouton, in the book The Managerial Grid, wherein they contend that the essentials to good problem solving and good decision making are dependent upon the right climate and the right culture.<sup>16</sup>

The most formal of the approaches to formal reasoning is that known as mathematical models and which is discussed in the book New Decision Making Tools for Managers by Edward C. Bursk and John F. Chapman. In this book they suggest reducing any problem to a mathematical formula and proceed to solve problems along a mathematical framework.

This process was used quite extensively recently by the former Secretary of Defense, Robert M. McNamara, in ascertaining the problems and the necessity for correct

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<sup>15</sup>Norman F. Maier, Problem-solving Discussions and Conferences (New York: McGraw-Hill, 1963), pp. 240-251.

<sup>16</sup>Robert R. Blake and Jane S. Mouton, The Managerial Grid (Houston: Gulf Publishing Co., 1964), pp. 8-9.

decisions for the anti ballistic missile system. It has also been used by those who are involved in long range planning for investment and financial requirements.

It is interesting to note the various broad categories into which management decision making and problem solving break down. The emphasis seems to be along psychological, sociological and mathematical lines. It would seem that someplace in between these areas could be an approach which incorporates all three of the approaches. It is believed that this was the possible approach, or ideas in mind that motivated Drs. Kepner and Tregoe in developing their technique of problem solving and decision making.

## CHAPTER III

### EXPLANATION OF THE KEPNER-TREGOE APPROACH TO PROBLEM SOLVING AND DECISION MAKING

It was the inefficiency of even experienced managers that attracted the attention of Kepner and Tregoe in the 1950's when they were working with advanced systems of defense for the Air Force. This eventually started them to think about the ways that people use information in a highly automatic data processing system. On their own time they studied the effects of automation in industry and "from there it was only a step to the processes of decision making."<sup>1</sup>

Charles H. Kepner has a Ph.D. in social psychology and Benjamin B. Tregoe holds a Ph.D. in sociology. The two men terminated their positions with the Air Force to set up a "think factory"<sup>2</sup> in a garage to develop the Kepner-Tregoe approach to problem solving and decision making upon which the book The Rational Manager was based.

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<sup>1</sup>Charles H. Kepner and Benjamin B. Tregoe, The Rational Manager (New York: McGraw-Hill Book Company, 1965), p. 3.

<sup>2</sup>Mr. William Schoppenhorst, personal interview.

The Rational Manager is divided into three sections: (1) problem solving, (2) decision making, and (3) potential problem analysis.

#### PROBLEM SOLVING

The process of problem solving begins with identifying the problem, continues with analysis to find the cause and concludes with a decision.

Problem solving involves sharp observations, analysis, specific comparisons, with all designed to find the cause.

There must be clear information concerning the level and kinds of performance expected as set forth in company standards, ideals, or norms. If the standards are not clear, it is difficult to have something in which to compare in order to know when there is a problem or to know when a problem has been corrected.

Drs. Kepner and Tregoe have developed seven basic concepts for problem solving and seven basic concepts for decision making. "Together these fourteen concepts comprise a two-part cycle, one-half governing problem analysis and the other half governing decision making."<sup>3</sup>

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<sup>3</sup>Charles H. Kepner and Benjamin B. Tregoe, The Rational Manager. (New York: McGraw-Hill Book Company, 1965), pp. 41-42.

The seven basic concepts of problem analysis are:

(1) The problem analyzer has an expected standard of performance, a "should" against which to compare actual performance. (2) A problem is a deviation from a standard of performance. (3) A deviation from a standard must be precisely identified, located, and described. (4) There is always something distinguishing that which has been affected by the cause from that which has not. (5) The cause of a problem is always a change that has taken place through some distinctive feature, mechanism, or condition to produce a new, unwanted effect. (6) The possible causes of a deviation are deduced from the relevant changes found in analyzing the problem. (7) The most likely cause of a deviation is one that exactly explains all the facts in the specification of the problem.<sup>4</sup>

For clarification of the concepts, a case will be presented to follow each step of the Kepner-Tregoe approach to problem solving.

#### "The Case of the Bad Butterfat"<sup>5</sup>

Reliable Separator Company received an urgent call from a plant manager of Reliable's largest Midwestern customer. The manager complained that the butterfat received recently from the Midwest plant was bad and was ruining the company's food product.

In the last two days, merchants had been complaining and health authorities had impounded the product.

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<sup>4</sup>Ibid., pp. 44-46.

<sup>5</sup>Ibid., p. 107.

The manager had run a check on Reliable's bacteria counts. Some of the bags of butterfat were satisfactory while many of the bags from the shipment were putrid.

Reliable sold butterfat in bulk to the complaining customer at the rate of a truckload or more a day. The butterfat was taken out of the separators in semi-fluid state, put in sterilized 38-pound plastic bags, heat sealed, and then frozen to -20 degrees F. The frozen bags were shipped in precooled vans to this customer, a distance of about 100 miles, and during the trip the butterfat rose to -15 degrees F., but this was still far below the temperature at which bacteria multiply. The customer used the butterfat within a few hours, his quality control men taking a bacteria count on samples of each shipment when it was received. Reliable's own quality control men took a bacteria count both at the time of packaging and when the bags were shipped.<sup>6</sup>

Reliable stacked the bags on pallets, and the bags tended to freeze together which made them easier to handle.

The plant manager said that about a week ago the takeoff temperatures of the butterfat at the time of separation had been stepped up from 75 to 95 degrees F. The reason given was that higher temperatures made the butterfat flow faster and allowed higher production for the busy season just beginning. A change had also been made in the sterilization procedure for cleaning the separators after each daily run, thereby lowering costs.<sup>7</sup>

Another change was that a new quality control manager had been secured. The control manager had changed the sampling procedure by having two samples taken at the same time as the butterfat went into the package. New

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<sup>6</sup>Ibid., pp. 107-8.

<sup>7</sup>Ibid., p. 110.

refrigeration equipment was now suspended from each bay and a wall of freezers was installed to increase capacity about three weeks ago.

Each of the concepts will be followed through with a breakdown of the above case listed under each concept.

1. "The problem analyzer has an expected standard of performance, a 'should' against which to compare actual performance."<sup>8</sup>

(a) "Should" - Butterfat should always be good with the proper bacteria count. (The minimum and maximum temperatures should be included here as stated by the research department)

(b) "Actual" - Some of Customer X's butterfat is bad and has a high bacteria count.

2. "A problem is a deviation from a standard of performance."<sup>9</sup>

(2) There is a problem with the butterfat of Customer X--some of the bags in the shipment are unusable.

3. "A deviation from a standard must be precisely identified, located, and described."<sup>10</sup>

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<sup>8</sup>Ibid., p. 44.

<sup>9</sup>Ibid.

<sup>10</sup>Ibid., p. 45.

The specification worksheet is used at this point. Each step will be written out on the worksheet which follows.

Deviation: Some Customer X's butterfat is bad.

SPECIFICATION WORKSHEET

IS IS NOT What is DISTINCTIVE of the IS? Any CHANGE in this?

IS	IS NOT	What is DISTINCTIVE of the IS?	Any CHANGE in this?
<p>W H A T: Deviation Object</p> <p>High bacteria count. Some butterfat shipped to Customer X.</p>	<p>Any other complaint All butterfat shipped to Customer X; any to other customers; Rel. products.</p>	<p>Function of heat. Selective of part of shipment.</p>	
<p>W H E R E: On object Observed</p> <p>Some bags, Customer X. At Customer X's plant.</p>	<p>Other bags, Customer X. Other customers' plants; in Reliable's plants.</p>	<p>Part of shipment affected X is heavy user. X gets truckload lots. X gets pallet handling.</p>	
<p>W H E N: On object Observed</p> <p>At use, Customer X's plant. Over the last week; product impounded 2 days.</p>	<p>At quality check, receiving inspection. Before last week; before last 2 days.</p>	<p>Busy season beginning.</p>	<p>Takeoff temp. +20°. New sterilization.</p>
<p>E X T E N T: How much How many</p> <p>Very high bacteria count, some butterfat putrid. Unknown number, but many bags bad.</p>	<p>Marginal count. Just a few rare bags.</p>		
<p>Possible causes for test:</p>	<p>Increased takeoff temperature makes butterfat too slow in cooling. Separator not fully cleaned at end of run, contaminates next day's butterfat. Hotter butterfat in palletized stacks makes center too slow to cool.</p>		

"An ideal specification of the Butterfat Case, based on the information available . . . The only changes that do show up come from the time period and its distinction, busy season beginning. The cause turns out to be a change in this distinction plus another distinction, 'X gets pallet handling.'"

4. "There is always something distinguishing that which has been affected by the cause from that which has not."<sup>12</sup>

As seen in the specification worksheet, the distinctives are listed as:

- (a) "Function of heat."<sup>13</sup>
- (b) "Selective of part of shipment."<sup>14</sup>
- (c) "Part of shipment affected."<sup>15</sup>
- (d) "X is heavy user."<sup>16</sup>
- (e) "X gets truckload lots."<sup>17</sup>
- (f) "X gets pallet handling."<sup>18</sup>
- (g) "Busy season beginning."<sup>19</sup>
- (h) "Function of heat."<sup>20</sup>

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<sup>12</sup>Ibid.

<sup>13</sup>Ibid., p. 110.

<sup>14</sup>Ibid.

<sup>15</sup>Ibid.

<sup>16</sup>Ibid.

<sup>17</sup>Ibid.

<sup>18</sup>Ibid.

<sup>19</sup>Ibid.

<sup>20</sup>Ibid.

5. "The cause of a problem is always a change that has taken place through some distinctive feature, mechanism, or condition to produce a new, unwanted affect."<sup>21</sup>

Again referring to the specification worksheet, they are:

(a) "Takeoff temperature +20°."<sup>22</sup>

(b) "New sterilization."<sup>23</sup>

6. "The possible causes of a deviation are deduced from the relevant changes found in analyzing the problem."<sup>24</sup>

The possible causes, in this case, have been deduced to the three causes listed at the bottom of the specification worksheet on page 26.

7. "The most likely cause of a deviation is one that exactly explains all the facts in the specification of the problem."<sup>25</sup>

Other changes had been reported to the manager since the specification sheet had been completed. The manager listed the changes.

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<sup>21</sup> Ibid., p. 45.

<sup>22</sup> Ibid., p. 110.

<sup>23</sup> Ibid.

<sup>24</sup> Ibid., p. 46.

<sup>25</sup> Ibid.

All that remained now was to frame a testable hypothesis concerning each of the changes. To be testable, a hypothesis must state, in a positive manner, that a certain change will bring about a certain result.

The most likely cause (Concept number 7) was

Taking the butterfat out of the separator at 95 degrees F. instead of 75 degrees F., and stacking the bags on a pallet before cooling, allows bacteria in the butterfat at the center of the stack to multiply beyond limits; whereas butterfat at the outside of the stack is frozen before bacteria<sup>26</sup> may have a chance to multiply to any serious extent.

The most likely cause must be tested.

Testing is actually the process of searching for any exception that can be found to any possible explanation of a problem. It is placing a possible cause in the change-effect equation to see if it will completely and exactly produce the known characteristics of the problem. Thus, it is the specification that positively tests the cause. Ideally, if a statement of possible cause exactly fits all the facts in the "IS" and the "IS NOT" of the specification, then this must be the statement of the cause that produced the problem in the first place.<sup>27</sup>

The most likely cause, as listed above, was tested and it was found that within a few minutes after the stack had been placed in the freezer, the spaces between the bags of butterfat had become choked with frost and ice.

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<sup>26</sup> Ibid., p. 122.

<sup>27</sup> Ibid., p. 118.

Recognizing that frost and ice is insulation . . . the vice president realized that the solidness of the block of bags had become a barrier to the dissipation of heat trapped at the center. The direct bacteria counts showed the effects of this slow cooling very dramatically; the butterfat at the center showed an exceedingly high count--in fact, the plant manager reported that it was quite putrid.<sup>28</sup>

The cause has been found and thus it is time for Decision Making.

### DECISION MAKING

Making the best decision involves a sequence of procedures based on seven concepts. According to Kepner-Tregoe they are as follows:

(1) The objectives of a decision must be established first. (2) The objectives are classified as to importance. (3) Alternative actions are developed. (4) The alternatives are evaluated against the established objectives. (5) The choice of the alternative best able to achieve all the objectives represents the tentative decision. (6) The tentative decision is explored for future possible adverse consequences. (7) The effects of the final decision are controlled by taking other actions to prevent possible adverse consequences from becoming problems, and by making sure the actions decided on are carried out.<sup>29</sup>

The concepts will be followed, in very simplified form, in Decision Making as they were followed in Problem Solving using the Butterfat Case.

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<sup>28</sup> Ibid., pp. 127-28.

<sup>29</sup> Ibid., pp. 48-50.

1. "The objectives of a decision must be established first."<sup>30</sup>

(a) The butterfat should be of high quality with the proper bacteria count for all bags for all customers served.

There could be a number of objectives in which consideration would be given to men, money, material, time, and power.

"Maximum and minimum limits should be set for both critical resources and required results."<sup>31</sup>

2. "The objectives are classified as to importance."<sup>32</sup>

3. "Alternative actions are developed."<sup>33</sup>

(a) The takeoff temperature could be reduced.

(b) Overtime could be included to take up the slack in production caused by a slower flow of butterfat.

(c) The palletizing procedure could be changed, putting fewer bags in each pallet and leaving space between the bags.

4. "The alternatives are evaluated against the established objectives."<sup>34</sup>

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<sup>30</sup>Ibid., p. 48.

<sup>31</sup>Ibid., p. 183.

<sup>32</sup>Ibid., p. 48.

<sup>33</sup>Ibid.

<sup>34</sup>Ibid., p. 49.

It is at this point that a procedure for scoring alternatives is established which meets the "MUST" requirements and may meet some "WANT" objectives. Because of the simple case being used as an illustration, this procedure will be explained rather than used.

In judging the performance of each alternative in the area of "want" objectives, the manager should score each of them against each of the objectives separately. This can be done by giving each alternative a numerical score, such as on the basis of one to ten. The best alternative may be given the top score and the effective alternative given the lowest numerical score. If there is no apparent difference on the performances to meet "want" objectives, they can be given the same score.

These scores, or rankings, reflect the way that each alternative performs against specific objectives. They do not reflect the relevant importance or emphasis that the manager has placed on each of the objectives.

To get the overall worth of each alternative, it is necessary to multiply the score of each objective by the weight assigned to each alternative. This weight score expresses the performance that the alternative will yield in regard to the fact of performance and the importance of that performance.

The scores can be added and a total given to each of the alternatives. The manager then will see the relative position of the performance of the alternatives toward specific objectives.

Using these numbers in no way makes a decision for the manager. At each step, judgment is based on the facts available, the manager's experience, and the experience of others. The numbers only record the judgments the manager has made. They make it possible for him to deal systematically with a great many judgments without losing track of what he is trying to accomplish.

The alternative that receives the highest score on performance against the objective is presumed to be the best course of action to take but it must be cautioned that this is only a tentative decision. Thus far, it is checked out as the best of the alternatives available, that is, providing the most results and returns for the least in resources committed. Possibly it will be a compromise of the best of several alternatives and will do the job better as a whole rather than individual alternatives will do in part.

5. "The choice of the alternative best able to achieve all the objectives represents the tentative decision."<sup>35</sup>

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<sup>35</sup>Ibid.

The decisions made for "The Butterfat Case were:

(a) The takeoff temperature was reduced immediately to 75 degrees F.

(b) Overtime was authorized to take up the slack in production caused by a slower flow of the butterfat.

(c) The palletizing procedure was changed, putting fewer bags in each pallet and leaving a one-inch space between the bags.

(d) A special test was made to determine that the preceding changes would correct the deviation.

(e) The manager at the customer's plant was called to explain the findings, and to describe the actions that were taken to eliminate the problem and prevent its recurrence in the future.

(f) Proper quality control procedures were spelled out for each plant.

6. "The tentative decision is explored for future possible adverse consequences."<sup>36</sup>

In "The Case of the Bad Butterfat" the decision was explored by way of testing the butterfat for its bacteria count. If the bacteria count was satisfactory, the problem was eliminated.

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<sup>36</sup> Ibid.

In more advanced cases other factors would need to be explored. As was mentioned before, men, money, materials, time, and power are factors that might need to be considered.

. "The effects of the final decision are controlled by taking other actions to prevent possible adverse consequences from becoming problems, and by making sure the actions decided on are carried out."<sup>3</sup>

In the case illustrated, the control of the decision was made by exactly stating the proper quality control procedures and then having those carrying out the procedures checked regularly.

The final stage of decision making is potential problem analysis which is critical to the whole procedure.

#### POTENTIAL PROBLEM ANALYSIS

According to the authors, Kepner and Tregoe, the most rewarding actions that any manager might take are those that are taken before any particular problem develops. This kind of action involves a technique of analyzing potential problems.

Basically, the systematic analysis of potential problems is a process of applying systematic forethought

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<sup>3</sup> Ibid., p. 50.

to the achievement of objectives. Without such forethought, managers are confined to the processes of systematic afterthought which is what the existing problem analysis involves.

Analysis of problem solving requires a different approach to the causes from those used in problem analysis. In problem analysis the cause has happened and the manager is looking for only one cause in order to take a corrective action. In potential problem analysis both the deviation and the cause are possibilities and the manager must decide what actions are going to keep those possible causes from occurring. One of the potential problems produced by any possible cause may wreck or jeopardize the action a manager must take.

The manager must systematically ask himself at least six questions. They are:

(1) What could go wrong? (2) What, specifically is each problem? (3) How risky is each problem? (4) What are the possible causes of each problem? (5) How probable is each possible cause? (6) How can a possible cause be prevented, or its effects be minimized?<sup>38</sup>

Answering, "what could go wrong?" requires a workable plan as to a series of "shoulds" and "what could happen." The "shoulds," or performance, points to what certain things are supposed to happen. Potential problems are examined to see where there could be elements of trouble. Such sources

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<sup>38</sup> Ibid., pp. 214-17.

of potential problems may be found in areas where something new or complex is tried, when deadlines are tight and scheduling is critical, when a sequence is critical and has impact on other happenings, when an alternative is missing or when things involve more than one person. The manager has no way of knowing when these things might come into existence. He is dealing with possibilities only.

By going over each possible cause and estimating how likely it is to occur if no action is taken, the manager discovers causes to which he should give the most attention. Techniques in determining the probability of each cause can be created by giving each possible cause a probability rating of zero to 100 per cent. Thus, by giving his attention to those areas of high probability he can take preventive action. After taking preventive action, he also needs to give the cause or the possible cause an additional rating after preventive action has been taken as to the residue probability. This also can be done by a numerical percentage rating of zero to 100 per cent.

Preventive actions will differ, of course, according to the seriousness or complications of the cause to be prevented. The manager then may consider possible causes of problems and explore them much in the way he did in problem analysis to make a decision for preventive action.

Whenever a manager has a potential problem that is so serious that he cannot take preventive action to remove the cause or to reduce its probability of occurrence significantly, there should be a planned program of contingency action that can be adopted immediately if the problem does occur.

Actually, analysis of potential problems must originate by asking the what, where, when, and the extent of that problem. It is necessary to list the possible causes and the percentage of probability of those causes happening. Then preventive actions can be determined. A review should then be made as to the residue of probability of those causes or possible causes creating a potential problem. Then, and then only, should contingency actions be established.

A manager who has developed the capacities needed for the recognition of consequences and the analysis of potential problems, has moved into the select ranks of those who are competent to make and implement policy decisions about future operations. He has, in short, attained full stature as a rational manager.<sup>39</sup>

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<sup>39</sup> Ibid., p. 228.

## CHAPTER IV

### COMPARISON OF APPROACHES TO PROBLEM SOLVING AND DECISION MAKING

Kepner-Tregoe presents a pragmatic approach to problem solving and decision making and majors on the technique and the method of problem solving and decision making. The bulk of the material in existing textbooks surveyed, however, seemingly is concerned more with approaches to problem solving and decision making rather than the technique and the method itself.

For the sake of organization, comparisons will be made primarily identifying differences in approach along broad categories; namely, literature that embodies the intuitive approach, literature that embodies creative thinking or "brainstorming" and literature that involves more formal lines of reasoning.

Perhaps the greatest exponent of the intuitive approach to problem solving and decision making of the literature reviewed is in Gore's text, Administrative Decision-making: A Heuristic Model. He contends that there are essentially two decision making systems, the rational in which the Kepner-Tregoe approach would fall and the Heuristic. According to Gore, the rational system is conscious, logical, and planned; it usually is applied to

what is cut and dried and readily quantifiable. By contrast, the Heuristic system is held to be largely unconscious, intuitive, emotional, and unplanned. It applies to the intangible and is qualitative.

Though the adjective Heuristic ordinarily describes a method that stimulates individual investigation, Gore's Heuristic system is internal to the degree that terms cannot be sharply defined, the finding of the cause is neither possible nor useful, and the verification and testing of the explanation before taking action is unheard of and unnecessary. "The very essence of the Heuristic process is that the factors validating a decision are internal to the personality of the individual instead of external to it."<sup>1</sup> The dynamics of the personality are not those of logic but rather those of emotion. "Personality may be tamed to the imperatives of logic, but that is not its natural inclination."<sup>2</sup>

In regard to the setting down of specifics and very careful disciplined wording of problem analysis, the rational system of action is its verbal character. Although a rational system of action may move forward through discussion

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<sup>1</sup>William J. Gore, Administrative Decision Making: A Heuristic Model (New York: Jon Wiley & Sons, Inc., 1964), p. 12.

<sup>2</sup>Ibid.

including, from time to time, vaguely designed values or loosely cast projections of the future, it ultimately involves concrete, here-and-now arrangements that pertain to collective action.

Conversely, the Heuristic process may be activated as a result of some event that is a part of the immediate experience of people on the scene, but it soon becomes an almost completely verbal process reaching back into the memory, forward into the future, returning to that completely emotional climate where individuals retain a private place for their own uncollectivized life.<sup>3</sup>

Motivation in the intuitive decision making process is determined by goals buried deep within. The roles that a goal plays in the process of an organization are crucial and varied, but essentially they are the subtle unarticulate assumptions of an organization that make up the social structure as a positive force. Structure cannot cause action in the sense of initiating and energizing it, but structure always causes action in the sense that a collective impulse to act moves through its channels.

In its essence, the intuitive approach is in opposition to the rational, logical system as expounded by Dr. Kepner and Tregoe.

The "brainstorming" or creative problem solving approach expounded by Alex S. Osborn in his book, Applied Imagination, has enjoyed wide use in popularity in

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<sup>3</sup>Ibid., p. 13.

business circles. This is indicated in Osborn's statement in the case of brainstorming such evidence covers many fields. The most significant, perhaps, comes from large corporations. As to the use of brainstorming by business, here are a few cases among many: Aluminum Company of America, Armstrong Cork, Bristol-Meyers, . . . Dupont, Ethyl Corporation, General Electric . . . United States Steel.<sup>4</sup>

Essentially four basic principles are established in idea producing conferences. Namely,

(1) Criticism is ruled out. Adverse judgement of ideas must be withheld until later. (2) 'Free-wheeling' is welcomed. The wilder the idea, the better; it is easier to tame down than to think up. (3) Quantity is wanted. The greater the number of ideas, the more the likelihood of winners. (4) Combination and improvement are sought. In addition to contributing ideas of their own, participants should suggest how ideas of others can be turned into better ideas; or how two or more ideas can be joined into still another idea.<sup>5</sup>

The nature of the problem to be brainstormed should help to determine the type of guests invited. In some instances female guests are included on brainstorming panels primarily with the idea in mind that if the problem is of female nature at least half of the participants should be women. One of the essentials of a brainstorming panel is that the leader should be trained in advance for his function. While he does not stifle ideas nor superimpose his ideas on

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<sup>4</sup>Alex F. Osborn, Ph. M., Applied Imagination (New York: Charles Scribner's Sons, 1957), p. 230.

<sup>5</sup>Ibid., p. 84.

the group, the panel leader should, in advance of every session, have his own list of selected solutions to the problem to essentially guide and stimulate thinking along specific lines.

Osborn states that "the leader should also be prepared to suggest leads by way of certain classifications or categories. For example, a chairman may say,

'Let's look for ideas on this problem in such-and-such an area.' For the purpose of thus pointing out directions in which to look for ideas, the leader's first job in setting up a session is to process the problem. The objective should be to make sure that it is particular, not general.<sup>6</sup>

Brainstorming sessions can be held at almost anytime and any place. Some well known corporations choose wholly brainstorming sessions immediately following a lunch. After a light meal there is a warm-up period wherein the participants are encouraged into a relaxed atmosphere which accordingly is conducive to successful brainstorming.

In such sessions, a large placard on the wall displays four basic rules. In front of the chairman is an old fashion school bell and the chairman explains that the ringing of this bell indicates that a panelist has violated one of the rules. The leader, then, calls for suggestions in the solution of the assigned problem and quickly recognizes any

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<sup>6</sup>Ibid., p. 238.

hand that may be raised to offer an idea. Participants are never allowed to read from lists of ideas they may have brought to a meeting, only that which has been spontaneous and creative at the time.

These ideas are then transferred to large sheets of paper and listed numerically. At times when the ideas are free-flowing, it may be better to have a secretary available or even a tape recorder to record every idea so that at a later point a list of ideas can be checked as to their accuracy.

No idea is identified by name of the suggester. A particular idea may be the one that has been suggested a few minutes previously or it may be the direct result of a suggestion, with a new thought added, from a previous idea. According to Osborn, "the need for group congeniality far outweighs the good of granting individual credit."<sup>7</sup> In contrast, in the Kepner-Tregoe approach a devil's advocate is used to express the idea that "I don't care why you are not with us, but you are not."<sup>8</sup>

Essentially, the technique is not analytical, as is the Kepner-Tregoe method, and is simply a search for new

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<sup>7</sup>Ibid., p. 243.

<sup>8</sup>Mr. William Schoppenhorst, personal interview.

action. The aim is to generate as many ideas for action as possible on the assumption that of the many ideas that will be found, a few will be relevant and valuable.

Brainstorming, or Applied Imagination, is valuable as a means of uncovering information, but its worth as a problem solving method is open to serious question.

As indicated, it is more properly classified as a method for generating alternative actions. It does not lead to an understanding of precisely what is wrong, how things got that way, and what is the most economical way of correcting the trouble as offered in the Kepner-Tregoe method and technique.

Creative problem solving begs the question of how one can possibly select the best most rational action for correcting a problem when the problem and its cause are unknown or obscure. It makes the assumption that the characteristics of the problem and its cause are unimportant. It leaps to "We have to do something, so let's go this way" giving little heed to the what, when, where, and to what extent that impels the action in the first place. While creative problem solving may, at times, be useful as a means of developing alternatives, it should not be confused with the process of problem analysis and decision making. By definition, creative problem solving is not problem solving at all.

The approach of those who employ a more formal basis of reasoning, namely that which may be classified as rational is exemplified in at least three different areas of emphasis. Those who represent that approach are closely akin and obviously add or complement much of the Kepner-Tregoe method and technique. Maier offers valuable assistance in his use of conferences as the tool for management in problem solving. He concentrates on leadership of problem solving discussions through conferences as the key variable to success.

Maier emphasizes the importance of the location of a problem and the analysis of it in detail. By definition his problem is specified as an obstacle or obstacles influencing the thinking process.<sup>9</sup> He proceeds to locate the obstacle that needs to be overcome and suggests that the best way of locating the obstacle is by group discussion and group decision. The problem or obstacle, has two phases to it: namely, that of quality and that of acceptance. As he states in his book, Problem Solving Discussions and Conferences,

two different dimensions seem to be relevant in appraising a decision's potential effectiveness. One of these is the objective or impersonal quality of

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<sup>9</sup>Norman F. Maier, Problem-solving Discussions and Conferences (New York: McGraw-Hill, 1963), pp. 1-3.

the decision; the other has to do with its acceptance or the way the person who must execute the decision feels about it.<sup>10</sup>

It is important, in this approach, to choose not only that solution which will yield the best results, but that will also satisfy people who will have to implement it. He transfers the idea of a correct decision or a successful decision into terms of effective decision and implies that effective decisions are the results of both quality goals and operational goals. The best decision quality wise may not be the best decision acceptable by those who are affected by it and who must implement it. Therefore, it may not be the most effective decision at all. He states that

the usual conception of effective decisions have emphasized the quality dimension. This approach leads to a careful consideration of the facts of the case. The advice is to 'get the facts; weigh and consider them; then decide.' It is this emphasis that causes one to assume that there is a correct answer to a problem, a right decision to be made.<sup>11</sup>

Although this position is sound in technological matters that do not involve people, one cannot assume that it is universally sound. It is this position that causes us to concentrate on getting more information and to assume that when decisions do not work out there must have been some oversight . . . . It is quite possible that any number of plans would be adequate if they received international acceptance. As soon as the behavior of people is involved, opinions and feelings introduce a second dimension.<sup>12</sup>

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<sup>10</sup>Ibid., p. 3.

<sup>11</sup>Ibid., p. 3-4.

<sup>12</sup>Ibid., p. 4.

Decisions may have varying degrees of acceptance by the group which must execute them; and it follows that, quality remaining constant, the effectiveness of decisions will be a function of the degree to which the executors of the decision like and believe in them.<sup>13</sup>

Thus it is observed that the acceptability of any decision and its desirability by those who must implement the plan plays a psychological part of this approach as attention to the problem itself.

It is putting problem solving into a democratic framework and it suggests that a solution to a problem is determined by putting it to a voting process regardless of the truth or its correctness.

While Maier's book compares with Kepner Tregoe's book in choosing the best result for decision making, Maier takes into account the acceptance of those who must carry out the decision. Kepner-Tregoe make no provisions for the feelings of those included and this seems to be the only weakness of the Kepner-Tregoe approach to problem solving and decision making.

Following somewhat along the psychological line but with more emphasis on the sociological aspects of management, Blake and Mouton indicate in their book, The Managerial Grid, that real problem solving and good decision making is a

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<sup>13</sup>  
Ibid.

result of a creation of a culture and a climate existing within an organization that allows for free and objective use of information.

The manager is to construct such a climate so that his subordinates will have concern for purpose, namely production and people. The manager does this by example and training. Problem solving and decision making is the team-work performance as it deals with real life problems.

Critically, while Blake and Mouton provide ideas relevant to good work group operations, it is not a text on problem solving per se since it is more preoccupied with an efficient group operation than attacking and solving problems specifically. Their point is well taken regarding the necessity for good communications and people oriented in management. Little is contributed, however, regarding any system, technique or method for defining problems and working toward their solutions and subsequent decisions regarding the correcting of a problem as does Kepner-Tregoe's book.

The total implication is that if the right managerial employee relations are maintained and conditions and climate for creative thinking exist, problems in themselves will be resolved.

One of the formal approaches mentioned in Chapter II to problem solving and decision making is the mathematical

approach. With the advent of high speed electronic computers, researchers have begun to give the decision making process a scientific base akin to established methods that have long been used in physics, biology, and chemistry. This highly sophisticated mathematical approach to problem solving essentially embodies the reduction of problem solving and decision making to singling out critical issues which require executive appraisal and analysis, and providing factual bases to support and guide executive judgement.

Oftentimes referred to as operations research, it has meant different things to different people. Essentially it is what its name implies, research and operation and operations are considered as an entity. "The subject matter studied is not the equipment used nor the morale of the participants nor the physical properties of the output; it is the combination of these in total as an economic process."<sup>14</sup>

When operations are so conceived and are subject to analysis by mental processes and methodologies which have come to be associated with the research work of physicists and biologists, there has evolved what is known as the scientific method.

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<sup>14</sup>Edward C. Bursk and John F. Chapman, New Decision-making Tools for Managers (Cambridge, Massachusetts: Harvard University Press, 1963), pp. 2-3.

There are four concepts in the practice of operations research. They are "(a) the model, (b) the measure of effectiveness, (c) the necessity for decision, and (d) the role of experimentation."<sup>15</sup>

The term model can be used in several different ways, such as the actual model of the object, an airplane to investigate its various physical properties, or a form represented on paper indicating the flow and the services of a particular business enterprise or that type of model which can be used in physics with a demonstration of the relationship of molecules in tri-dimensional demonstrations. The real essence of models, particularly in research models, where those are put into mathematical form, is "a set of equations relating significant variables in the operation to the outcome."<sup>16</sup>

While mathematical models and mathematical decision making deals with a large number of variables, problem solving, which deals with uncertainty and finding the relationships that apply between the problem and its cause, seems to go begging. Mathematical approaches to decision making have their value but the analysis of the problem

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<sup>15</sup> Ibid., p. 6.

<sup>16</sup> Ibid., p. 7.

seemingly is obscured by the mathematical niceties. The world of the manager has not yet settled into specifications of this type.

It would appear that with the use of any mathematical model the determination of the cause would be restricted by those intrinsic values put into the system. While there is much to be said for the reduction of statements into a scientific process, much of the mental processes in rational problem solving and decision making cannot be fitted into a formula. Kepner-Tregoe make no mention of computer use for identifying problems or for making decisions.

It would seem that while there is some comparison of the systems listed, there really is little similarity to the Kepner-Tregoe approach to problem solving and decision making. While in the other books surveyed there are suggestions about problem solving and decision making, none of them give a practical step-by-step way to follow a process as does Kepner-Tregoe in their book, The Rational Manager.

## CHAPTER V

### INTERVIEW

In order to fortify the validity of the Kepner-Tregoe approach to problem solving and decision making, an interview was made with a corporate manager of an international company.

#### BACKGROUND INFORMATION OF THE INTERVIEWEE

Mr. William Schoppenhorst is a Corporate Manager of Manpower Development for the Emerson Electric Company, with its main office in St. Louis, Missouri. He was previously associated with the West Virginia Pulp and Paper Company, Covington, West Virginia, and was employed by Emerson Electric Company two years ago. He first heard about the Kepner-Tregoe method from a friend who worked for General Motors. He told Mr. Schoppenhorst that General Motors had come in contact with Kepner-Tregoe, Inc., Princeton, New Jersey. He said that Kepner-Tregoe provided the first interesting and practical course that General Motors had found. It was the first type of training provided for tough line production managers; those people that think the only place to be educated is on the job over a twenty-five year period. The tough line production managers also felt that degrees were useless. General Motors had presented the Kepner-Tregoe training to their tough line production managers and they had

thought it was extremely practical and could see the face validity of the training immediately. The training had gone over very well at General Motors and General Motors was going to use it in the institute. This led Mr. Schoppenhorst to look into the theory for the West Virginia Pulp and Paper Company. There were public courses offered approximately every four months. Mr. Schoppenhorst went to Minneapolis, Minnesota and attended a public course. He became interested in the Kepner-Tregoe approach and came back to secure the approval of his management for its use in the company. After his management quickly agreed, Kepner-Tregoe training was begun. The Kepner-Tregoe method was then used heavily in the West Virginia Pulp and Paper Company. It was six years ago when the training started at the Paper Company and there were four years of extensive use of the theory when Mr. Schoppenhorst terminated his employment. It takes a maximum of two years to get enough people trained to successfully use the theory in a large company.

When Mr. Schoppenhorst became affiliated with Emerson Electric Company two years ago, Emerson had never used the theory. Immediately Mr. Schoppenhorst began to make plans with some of the top level management to take the Kepner-Tregoe course. Instead of taking the leaders to a public course, they had Kepner-Tregoe representatives come to them. Mr. Schoppenhorst made all the necessary contacts. Emerson rents a lodge and those taking the course stay at the

lodge for five days and nights. Usually twenty men take the course at one time, one out of each department. One of the Kepner-Tregoe instructors can work effectively with twenty people. It would be better, of course, if a whole department could be trained at one time, but it would be impossible to destaff a plant for that purpose.

The theory was implemented at Emerson Electric two years ago and there are now two hundred employees from Emerson who have gone through the training. They offer at least one course every quarter. There are approximately fifteen different instructors who have had business experience and who understand the language used in a production oriented business.

#### ACCEPTANCE OF THE KEPNER-TREGOE THEORY

The theory is accepted by those who have taken the training. The face validity is good.

It sells rapidly; it sells to the less sophisticated person because he can see direct applications of it. It sells to the sophisticated person because the theory is good, it is sound.<sup>1</sup>

It coincides with some of the most classic theories.

There are two times when people accept the theory and are able to put it into use. Within the first fifteen days

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<sup>1</sup>Statement by Mr. William Schoppenhorst, personal interview.

after they graduate from the course it is accepted with enthusiasm. If the system is fostered and nurtured it continues; if not, it is extinguished. If it is not extinguished, it is diminished and those who have been trained probably will use it for personal problems such as a situation of a furnace which was not working properly. After defining the problem concerning the furnace, it is easy to make a decision as to how to correct the problem. Then, if a person is moved to another department where cooperation is received, "he finds it easy to become a part of the theory's use and it becomes reinforced and will again become a part of his work habit."<sup>2</sup>

#### CONDITIONS WHERE THE THEORY WORKS WELL

The most success with the theory has been on quality maintenance or quality control in a production situation. "The theory lends itself to that."<sup>3</sup> It is also very successful in customer relations situations where quality has been a problem. Mr. Schoppenhorst believes it is best for problems of production, purchasing, distribution and applied research.

After the people have been trained they speak a language pertinent to the system. They have a lot of

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<sup>2</sup>Ibid.

<sup>3</sup>Ibid.

motivation to try the system, but when they return and try it in their original work environment they have two problems. First they have difficulty communicating what they have learned. Secondly they have difficulty getting other people to adapt the system; for this reason, it is important that enough people in one department are trained in order to get full value from the system. Emerson tried to train a plant manager and his decision-making staff, the people who decide what actions must be taken to make dollars. This way no one feels left out and the theory works well.

The theory is best used on a group basis rather than on an individual basis. A person using the theory needs discipline to keep from deviating from each step that is necessary in specifying a problem. This is the purpose of the devil's advocate; to "lead you down the lane."<sup>4</sup> The only part of the theory that can be done on an individual basis is in potential problem analysis.

#### CONDITIONS WHEN THE THEORY IS LESS SATISFACTORY

Those areas in which Mr. Schoppenhorst believes the theory has its least value are in Research and Development and in financial areas.

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<sup>4</sup>Ibid.

In Research and Development and in financial areas, the problems are futuristic. Consequently it is difficult to secure reliable quantitative data. Mathematical based theories are used in these areas at Emerson Electric. In some areas of Industrial relation, where there are purely human problems, the Kepner-Tregoe theory does not work well because it is difficult to quantify.

#### OTHER THEORIES USED IN EMERSON ELECTRIC COMPANY

The analytical and mathematical theories are used in Research and Development, long range planning, and the financial area. These theories apply only at high intelligent levels. These theories involve building mathematical models, translating information into a mathematical language. Mathematical models are usually not understood by those people chosen to work in the production areas. Mr. Schoppenhorst says of production managers using mathematical models, "If he were capable of it, he would get laughed out of his place of business."<sup>5</sup> Even if a person in the production area were of the higher intelligent level and understood the mathematical models, he would not convert

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<sup>5</sup>Ibid.

the information concerning a problem to the mathematical language and try to solve the problem using a computer.

Brainstorming is not used in its pure sense because it presumes a luxury of time that is not available. A type of controlled brainstorming is used however. In controlled brainstorming, information concerning the subject of concern is distributed to those people who will be involved. After they have had time to give a subject consideration, a session will be called in which there will be unstructured discussion.

#### IMPROVEMENTS OF THE THEORY

Emerson Electric has not tried to improve the Kepner-Tregoe theory in any way. Two companies, General Motors and Kimberly Clark, think they have made some improvement in the system. Two other companies have diluted the theory and shortened the training time, but found it did not bring about any behavioral change as did the five-day training, and therefore the theory has been dropped all together.

#### ADDITIONAL TRAINING

Kepner-Tregoe does not provide any refresher courses at this time. If any of the men who have taken the training have need for additional training, they are sent to

Washington University, St. Louis, Missouri. The courses offered at Washington University are more lecture bound and less case oriented, therefore, the material is presented in a less vivid manner.

#### RECOMMENDATION FOR THE THEORY'S USE

The theory is recommended for any company that is production oriented rather than service oriented. The size of the company makes little difference. The larger the company, however, the more difficult to completely implement the theory. Emerson Electric has forty nine plants in the United States, Puerto Rico, and overseas. Personnel in the Emerson Company are being trained on a plant by plant basis. As more people per plant are trained, the more effective the theory becomes because there are more people who understand the theory.

Information for the public courses may be secured from Kepner-Tregoe, Inc., Princeton, New Jersey. The public courses take sixty hours work over a five-day period and the cost for the course is \$500. Emerson Electric trains only in the Apex course because it involves cases of top level management with cases dealing with two or three million dollars. The managers of Emerson Electric like to work with problems in that range. Emerson Electric has not sent

people to either the Vertex course, which is for sales people, or the Genco course, which is for the production supervisor on the floor.

## CHAPTER VI

### SUMMARY

Kepner-Tregoe and Associates have developed a theory based on fourteen concepts for problem solving and decision making and six concepts for potential problem analysis.

In the book, The Rational Manager by Kepner and Tregoe, a systematic approach to problem solving and decision making and to potential problem analysis, is explained step by step in a very clear manner. The book has examples of charts or forms to use in aiding the manager in following the system.

The systematic method of problem solving and decision making requires very strict discipline on the part of the manager so that he may follow closely each step of the system in the correct order.

Kepner-Tregoe and Associates have developed training courses which are given at specified times all over the world. The different training courses also are explained in the book.

It was difficult to make a comparison of problem solving and decision making from the literature reviewed. One reason for this was because of the purposeful effort to review unrelated approaches.

Three broad categories were compared with the Kepner-Tregoe approach to problem solving and decision making, the intuitive approach, the creative thinking or "brainstorming" approach, and the more formal reasoning approach.

It was found that there was little similarity between the intuitive or the creative thinking approach with the more formal or systematic approach to problem solving and decision making of the Kepner-Tregoe approach. There was some similarity between the mathematical model and the Kepner-Tregoe approach in that they are both rational, logical, and systematic.

In the interview with Mr. William Schoppenhorst of Emerson Electric Company, it was found that the Kepner-Tregoe approach to problem solving and decision making had been very successfully used.

It also was found that Kepner-Tregoe representatives were brought to Emerson for at least one training session each quarter.

The theory was accepted very well by those who had had any exposure to the system.

Mr. Schoppenhorst stated that Kepner-Tregoe was the first organization that had presented a systematic approach to problem solving and decision making in such an interesting, practical way.

Mr. Schoppenhorst stated that the theory was easily accepted by both the sophisticated thinking person and the less sophisticated thinking person. He said that the theory was used more on a group basis than on an individual basis because of the need for others, such as the devil's advocate, to assure "sticking to the problem at hand."<sup>1</sup>

The theory was recommended highly for any size company that was production oriented rather than service oriented. It was also suggested that the theory worked well in the production, purchasing, distribution and applied research areas. While others may not agree, Mr. Schoppenhorst feels that the theory is less satisfactory in such areas as finance and pure research.

#### CONCLUSIONS

1. The Kepner-Tregoe approach to problem solving and decision making is a practical and applicable approach.
2. The Kepner-Tregoe approach to problem solving and decision making can be understood and used by both the sophisticated person and the less sophisticated person.
3. The Kepner-Tregoe approach to problem solving and decision making is used best in a production oriented business.

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<sup>1</sup>Statement by Mr. William Schoppenhorst, personal interview.

4. The Kepner-Tregoe approach to problem solving and decision making is readily accepted by those called upon to use the method when enough people in that department are familiar with the approach.

5. The Kepner-Tregoe approach to problem solving and decision making is based on a pragmatic approach that is formal and rational.

6. It does not, however, take into its scope that human beings are not always rational in their thinking. The Kepner-Tregoe approach makes no allowance for the human feelings in their systematic rational problem solving approach.

7. The Kepner-Tregoe approach to problem solving and decision making can be adapted to any size business if enough personnel are trained in the use of the approach.

8. The Kepner-Tregoe approach to problem solving and decision making has proved to be very successful in its use in the Emerson Electric Company.

#### RECOMMENDATIONS

1. That a study be made of another company which has implemented the Kepner-Tregoe approach to problem solving and decision making to see if further improvements have been made in the approach as used within that company.

2. That another study be made of the Kepner-Tregoe approach to problem solving and decision making in another large firm to compare the views of company officials with those of Mr. William Schoppenhorst of Emerson Electric Company in regard to the effectiveness of the Kepner-Tregoe approach.

3. That another study be made of the Kepner-Tregoe approach to problem solving and decision making to determine the reaction to the approach in a different department within Emerson Electric Company.

4. That a study be made of the Synergetics program concerning problem solving and decision making to see how it compares to the Kepner-Tregoe approach.

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APPENDIX

## APPENDIX

### A SUMMARY OF A CASE AT THE WEST VIRGINIA PULP AND PAPER COMPANY WHERE THE KEPNER-TREGOE WAS USED

The West Virginia Pulp and Paper Company used the Kepner-Tregoe theory for four years after Mr. William Schoppenhorst implemented the theory. There were many people, by this time, who had taken the training and a lot of interest had been generated in the company.

In one of the company's large plants, plans were being made for a new steam boiler to be installed. The boiler was to produce enough steam "to generate power for a city of fifty thousand."<sup>1</sup> The installation was to entail an expenditure of eight million dollars.

Consulting engineers had given much information to the company and had made specifications, but "nothing had been done in potential problem analysis."<sup>2</sup>

The company had to decide between coal, which was the cheapest to install and maintain, oil, which was the next cheapest, but could be cut off in the winter because of a higher priority (schools) and it required a great deal of storage space underground, and gas which was the most

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<sup>1</sup>Mr. William Schoppenhorst, personal interview.

<sup>2</sup>Ibid.

expensive to burn but the cheapest one to originally install. Gas, would be even more likely to be cut off than oil. The company had about twelve different options to choose from.

When an installation is made, the future must be taken into consideration as well as the aspect of the immediate installation and cost factors.

A group of men were called for problem solving, decision making and potential problem analysis. The group consisted of the department manager in charge of the department and six of his people as well as two outsiders who would be the devil's advocates. All of the people who would take part in the problem analysis knew the Kepner-Tregoe system. Mr. Schoppenhorst was one of this group. The group worked on the problem for two days. The system became extremely important when the potential problem analysis was done. During the potential problem analysis, "enough very important information was brought up that they changed the recommendation from going to a coal fired and they went to a gas which, in the long run, was the most expensive dollar wise."<sup>3</sup> They got enough salient points from the potential problem analysis that "they went to the Board of Directors and secured another million and a half dollars for the installation."<sup>4</sup>

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<sup>3</sup>Ibid.

<sup>4</sup>Ibid.

Mr. Schoppenhorst is not with the company any longer, but he has heard that the decision has proved to be a good one. West Virginia Pulp and Paper Company has received the Good Housekeeping seal of approval from the state of Virginia because the gas installation has not polluted the air; it hasn't contaminated the streams, etc. There is also more space to be used for production. Storage facilities on the grounds are not necessary as it would have been had oil been installed.

The installation has been very pleasing to the Paper Company because they are not receiving the public criticism that many companies have for contamination.

If the company had not gone through the Kepner-Tregoe system, they could have argued the points that were presented to the Board of Directors, but they "could not have put it on as systematical a basis so that the board would have agreed."<sup>5</sup>

Only two days were spent on the system, but there were several secretaries and engineers available to secure any needed information immediately. The decision making and the potential problem analysis took most of the time.

Had there been a "brainstorming session, we would have been there three months."<sup>6</sup>

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<sup>5</sup>Ibid.

<sup>6</sup>Ibid.