

Kepner-Tregoe Problem Solving: an Overview

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Agenda

- What is it?
- Key characteristics of KT
 - What KT means to me.....
- The Kepner-Tregoe four basic steps:
 - Situation Appraisal (SA)
 - Problem Analysis (PA)
 - Decision Analysis (DA)
 - Potential Problem Analysis (PPA)
- Additional Learning

Kepner-Tregoe: what is it?

- Fact-based approach to systematically rule out possible causes and identify the true cause. Adds rational thought to “human” situations
- Consulting company founded in 1958 by former RAND Corporation researchers Dr. Charles Kepner and Dr. Benjamin Tregoe.
 - <http://www.kepner-tregoe.com/>
- Kepner And Tregoe observed, while working at the RAND Corporation on improving the US Air Defense, that some people made better decisions than others, and endeavored to study and explain the decision making process to help people improve decisions.
- Together wrote the book "The Rational Manager" published in 1965 and "The New Rational Manager" published in 1981.
- The Kepner-Tregoe Matrix comprises four basic steps:
 - Situation Appraisal – identify concerns and outline the priorities of the work environment.
 - Problem Analysis – describe the exact problem or issue and identifying and evaluating the causes.
 - Decision Analysis – identify and evaluate alternatives by performing a risk analysis for each and then make a final decision.
 - Potential Problem Analysis – evaluate the final decision for risk and identify the contingencies and preventive actions necessary to minimize that risk.
- Kepner-Tregoe Matrix was used by NASA to troubleshoot the Apollo 13 “deviation”

Key Characteristics (aka, “Why I love KT”)

- Makes EXPLICIT analysis discipline and decision making that is often done less consciously
- Context of the problem (situation) very specifically in focus
 - Promotes a discipline that avoids “firefighting”
- Necessary and desired outcomes (decision) specifically considered
- Emphasis to define problem thoroughly BEFORE you try to solve it
 - Builds a robust “Problem Specification” to test ideas, hypothesis’, potential solutions against
 - “Is/Is-not” both sides of the coin
 - Avoids the “jump to cause”
- Special emphasis and consideration on “extent” of the problem
 - Critical to containment as well as root cause identification

Think of a Problem

One that you are currently experiencing in your job
or one that you have experienced in the past.

Write it down. Keep it in mind.



SITUATION APPRAISAL

Identify Concerns

List concerns
Separate and clarify concerns
Create action statements

Set Priority

Consider current impact,
future impact and time frame

Plan Next Steps

Determine resolution approach

Plan Involvement

Determine help needed

PROBLEM ANALYSIS

Describe Problem

State the problem
Specify the problem

Identify Possible Causes

Use knowledge and experience

Evaluate Possible Causes

Test possible causes
Determine most probable cause

Confirm True Cause

Verify assumptions, observe,
experiment, or try a fix
and monitor



DECISION ANALYSIS

Clarify Purpose

State the decision
Develop objectives
Classify objectives into MUSTs and WANTS
Weigh the WANTS

Evaluate Alternatives

Generate alternatives
Screen alternatives through the MUSTs
Compare alternatives against the WANTS

Assess Risks

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Make the choice



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Problem Solving and Decision Making

Powered by **KT** Clear Thinking

Situation Appraisal

- Identify Concerns
 - Survey the work environment for threats and opportunities
 - What problems are occurring?
 - What decisions need to be made?
 - What plans should be implemented?
 - What changes are anticipated?
 - What opportunities exist?
- Concerns can be multiple, and different from different people's perspectives
- Know where you are, be aware, see the big picture, no silo

Situation Appraisal

- *Separate and Clarify Concerns*
 - What do we mean by . . . ?
 - What exactly is . . . ?
 - What else concerns us about . . . ?
 - What evidence do we have . . . ?
 - What different deviations, decisions, or plans are part of this concern?
- Separate complex concerns into sub-concerns that could compromise the entire situation
- Assure specificity

Situation Appraisal

- Set Priority
 - Which concern should we work on first?
 - Consider the current impact
 - What is the current impact on people, safety, cost, customers/stakeholders, productivity, reputation, etc?
 - Who is concerned?
 - What evidence do you have?
 - Which concern is most serious?
 - Consider the future impact
 - If left unresolved, how and when will the seriousness change, or will it?
 - What is the trend?
 - What evidence do you have?
 - Which concern is getting worse quicker?

Situation Appraisal

- Set Priority
 - Which concern should we work on first?
 - Consider the time frame
 - What is the deadline for taking action?
 - When do we need to start?
 - When would resolution become difficult, expensive, impossible, or meaningless?
 - What evidence do you have?
 - Which concern will be the hardest to resolve later?

Situation Appraisal

- Plan next Steps
 - Do I need to know cause of a deviation?
 - Do I need to make a choice?
 - Do I need to implement an action or plan?
 - Does a choice need to be made among alternatives?
 - Are creative, disruptive, out-of-the-box, revolutionary, rule-breaking, innovative solutions needed?
 - Is someone else making a change that could affect us?
- Plan involvement
 - Who needs to be involved for:
 - Information, data, analysis, creativity, commitment, leadership, approval, implementation, training,...

Situation Appraisal

- Planning for Successful Resolution
 - If you need to find the cause of deviation:
 - Use Problem Analysis
 - If you need to pick an action:
 - Use Decision Analysis
 - If you need to protect, or institutionalize an action or plan:
 - Use Potential Problem (Opportunity) Analysis
- The need for ANALYTIC QUALITY, COMMITMENT, and TIME is imperative.



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Problem Analysis

- Problem Analysis
 - Do we have a deviation?
 - Is the cause unknown?
 - Is it important to know the cause to take effective action?
- If the answer is YES to ALL three, you have a problem.

Problem Analysis

- Biggest obstacles to successful problem resolution
 - Jumping to conclusions, “jumping to ‘cause’”
 - Failure to define the problem
 - Action overkill

Problem Analysis - Describe the Problem

- What is the Problem?
 - What object (or group of objects) has the deviation?
 - What deviation does it have?
 - What do we see, hear, feel, taste, or smell that tells us there is a deviation?
- Then ask - What, Where, When, and to what Extent?
 - Ask a series of “Is/Is not” questions
 - The resulting answers/facts become your “Problem Specification” used to test possible causes and solutions against

Problem Analysis - What

- Is:

- What specific object(s) has the deviation?
- What is the specific deviation?

- Is not:

- What similar object(s) could reasonably have the deviation, but does not?
- What other deviations could be reasonably observed, but are not?

Problem Analysis - Where

- Is:

- Where is the object when the deviation is observed? (geographically)
- Where is the deviation on the object?

- Is not:

- Where else could the object be when the deviation is observed, but is not?
- Where else could the deviation be located on the object, but is not?

Problem Analysis - When

- Is:

- When was the deviation observed first (clock and calendar time)?
- When since that time has the deviation been observed? Is there a pattern?
- When, in the object's history or life cycle, was the deviation observed first?

- Is not:

- When else could the deviation have been observed first, but was not?
- When since that time could the deviation have been observed but was not?
- When else, in the object's history or life cycle, could the deviation have been observed first, but was not?

Problem Analysis - Extent

- Is:
 - How many objects have the deviation?
 - What is the size of a single deviation?
 - How many deviations are on each object?
 - What is the trend?
 - Occurrences?
 - Size?
 - Rate?
- Is not:
 - How many objects could have the deviation, but don't?
 - What other size could a deviation be, but isn't?
 - How many deviations could there be on each object, but are not?
 - What could be the trend, but isn't?
 - Occurrences?
 - Size?
 - Rate?

Problem Analysis - Identify Possible Causes

- Use knowledge and experience to develop possible cause statements
 - From experience, what could have caused the deviation?
- Use distinctions and changes to develop possible cause statements
 - What is different, odd, special, or unique about an IS compared to an IS NOT?
 - What was changed in, on, around, or about each distinction?
 - When did the change occur?
 - How could each change have caused this deviation?
 - How could a change plus a distinction have caused the deviation?
 - How could a change plus a change have caused the deviation?

Problem Analysis - Evaluate Possible Causes

- Test possible causes against the IS and IS NOT specification
 - If _____ is the true cause of _____, how does it explain both the IS and IS NOT information?
 - What assumptions have to be made to make the cause fit the problem specification?
- Determine the most probable cause
 - Which possible cause best explains the IS and IS NOT information?
 - Which possible cause has the fewest, simplest, and most reasonable assumptions?

Problem Analysis - Confirm True Cause

- Verify assumptions made in testing; Conduct observation; Try fix and check result
 - What can be done to verify any assumptions made in testing this cause?
 - How can this cause be observed at work?
 - How can we demonstrate the cause-and-effect relationship?
 - When corrective action is taken, how will results be checked?



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Decision Analysis

- Common Pitfalls in decision making
 - We consider possible choices before clarifying what we hope to achieve.
 - We focus on our favorite alternative - bias.
 - We ignore the consequences of a particular choice.
 - We base the decision on inadequate information
- Due to:
 - Pressure to make a decision quickly
 - Decision is made by a group with widely-differing viewpoints
 - It is unclear to the people making the decision what information is necessary
 - The information is spread out among many people

Decision Analysis

- Prepare decision statement
 - State purpose of the decision
 - Determine authority to make the decision
- Develop Goals
 - What short/long term results should be achieved?
 - What resources can be used or conserved?
 - What constraints influence this choice?
 - What are the objectives in relationship to:
 - People, organization, customers, products, competition, productivity, policies, regulation, legal, cost, time, etc.
 - Which objectives need to be further clarified to make them specific?
- Classify Objectives
 - What are the mandatory “MUST” objectives? Can limits be defined?
 - What are the “WANT” objectives?
 - What are the relative weights of the “WANT” objectives?

Decision Analysis

- Generate alternatives
 - List potential courses of action/decisions
- Score each alternative
 - Eliminate any alternative that does not fit the “MUST” limits.
 - Going through each alternative one by one, rate it against each “WANT” on a scale of 1 to 10.
 - Next, multiply the weight of the objective by the satisfaction score to come up with the weighted score.

OBJECTIVE	WEIGHT	ALTERNATIVE 1 SATISFACTION SCORE	WEIGHTED SCORE
Want A	6	4	24
Want B	4	6	24
Want C	7	6	42
Want D	2	7	14

Total weighted score for Alternative 1 104

- Repeat this for each alternative

Decision Analysis

- Assess Risks
 - What are the adverse consequences?
 - What are the implications of being *close to* a “MUST” limit?
 - What are the implications if your data is wrong?
 - What could go wrong short term/long term?
 - Assess threats
 - What is the probability/likelihood of adverse consequences?
 - What would be the seriousness/severity if it does occur
- Make decision
 - What alternative provides the best result (hits the “MUSTS”, provides most “WANTS” with acceptable risk?

Decision Analysis

- Choose the top two or three alternatives and consider potential problems or negative effects of each
- Consider each alternative against all of the negative effects
 - One at a time again, rate alternatives against adverse effects, scoring for probability and significance

ADVERSE EFFECT	PROBABILITY	SIGNIFICANCE	WEIGHTED SCORE
A	4	7	28
B	3	2	6
C	6	5	30

Adversity Rating for Alternative 1 64

- Analyze the weighted score versus the adversity rating for each
- Consider the winning option against each negative consequence and suggest a plan of action to minimize the adverse effects



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Potential Problem Analysis

- Implementing the Decision, and making it stick
 - Systematically identifying and mitigating the risks to implementation of a plan or decision
 - Identify things that might go wrong in implementation
 - Take Preventive/mitigating action
 - Develop contingencies if things do go wrong

Potential Problem (Opportunity) Analysis

- Identify Potential Problems (Opportunities)
 - State action: what is the end result to be achieved?
 - Develop plan: what actions will need to be taken to achieve the end result?
 - What are the potential problems?
 - What are the potential opportunities?
 - What is the probability/likelihood and seriousness/severity of these problems/opportunities occurring?
- Identify Likely Causes
 - What are the possible causes for the potential problem?
 - What are the possible causes for the potential opportunity?

Potential Problem (Opportunity) Analysis

- Take Preventative (Promoting) Action
 - What actions do we need to take to address (encourage) likely causes?
- Plan Contingent (Capitalizing) Action and Set Triggers
 - What actions do we need to prepare to reduce (enhance) likely effects?
 - What triggers do we need to set for contingent (capitalizing) actions?



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- Kepner-Tregoe 3-day course:
 - <http://www.kepner-tregoe.com/training-workshops/our-training-workshops/problem-solving-decision-making/>
- YouTube
 - <https://www.youtube.com/user/KepnerTregoe>
- Decision Making Confidence:
 - <http://www.decision-making-confidence.com/>
- Mind Tools:
 - <http://www.mindtools.com/>