Ongoing Discussion "Thought Piece"

Reliably Producing Breakthroughs

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Table of Contents

Part 1: Convergent and Divergent Problems 2
Two Steps to any Problem-Solving Process 2
When Studying the Problem Works 2
The Box 2
When Studying the Problem Does Not Work 4
Discover What Kind of Problem You Have 4
Establish the Importance of Solving the Problem 5
Part 2: Eight Principles for Producing Breakthroughs 5
1. Apply the method appropriate to the type of problem you are facing. 6
2. Generate a paradigm shift by distinguishing facts from assumptions (interpretations, opinions) 6
Solving a divergent problem requires a paradigm shift 6
Causing a paradigm shift 6
3. All participants agree on Success Criteria (the real Goal) expressed in objective, measurable terms. 7
Establish the Real Goal 7
Clarify and agree on the success criteria 7
4. Start with a Commitment for which the group has an unquenchable passion. 8
5. Separate creative thinking (brainstorming) from feasibility analysis. 9
6. Involve all stakeholders in the obstacle resolution process. 9
7. Use consensus for group decision-making. 9
8. Anticipate what could go wrong 10
Putting This Section into Action 10
Part 3: A Process for Producing Breakthroughs 11
Phase 1: Establish a Foundation for the Process 11
Phase 2: Get into the Future 12
Phase 3: Create a Solution from the Future 13
Phase 4: Support the Solution 14
Putting This Section into Action 14
Summary 15

Part 1: Convergent and Divergent Problems

Every organization has important problems for which there appear to be no solutions. Every suggestion and every study makes these problems seem more complex and less solvable. A major obstacle to solving such problems is the way we often view them:

- Studying the problem is assumed to be one of the steps, typically an early step, toward a solution.
- The problem-solvers focus on fixing a solution that didn't work rather than on accomplishing the real goal, or they work toward different goals.
- The importance of solving the problem is not clear to those who have been assigned to solve it.
- The problem-resolution process is not clear or not agreed to by the participants.

Two Steps to any Problem-Solving Process

There are two steps to any problem-solving process:

1. Find a feasible solution method
2. Execute the selected solution method

When Studying the Problem Works

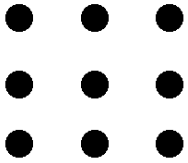
The following approach is typically used in solving problems:

1. Find a feasible solution method
    i. Define the problem.
    ii. Analyze the problem.
    iii. Develop solution methods, generally modifications of methods that have succeeded in the past.
    iv. Select a solution method.
2. Execute the selected solution method.

This approach works well on **convergent problems** — one of the two main classes of problems. The more you study convergent problems, the easier they are to solve. They are similar to problems solved in the past. Methods that solved past problems typically quickly generate at least one feasible solution. As analysis continues, the solution improves. Finding the fastest way from one location to another is an example of a convergent problem. You can use methods from the past — calling for directions, logging onto MapQuest, serendipitous searching — to plan your route.

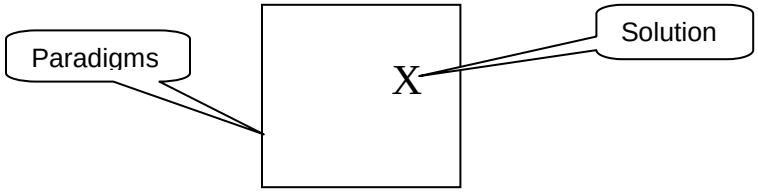
The Box

Surrounding every situation is a set of paradigms, assumptions that are considered truths. Many of such assumptions are "obvious", unconscious, or unexamined. For example, the famous nine dot puzzle is to connect all nine dots with no more than four straight lines (retracing counts as a line).



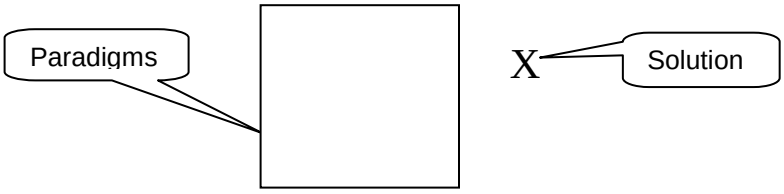
An example of such a paradigm is the assumption that all lines must begin and end on a dot, i.e., all lines must be contained within the "box" of the outer eight dots. This makes it impossible to solve the problem.

Another way of looking at convergent problems is "Those problems for which the solution is within the box." That is, the solution is consistent with our set of paradigms, what we have been taught (all of which is inside the box), etc.



As a result of our training and education, we tend to believe that <u>all</u> problems are convergent. In school, for example, we knew two things for certain about our homework assignments: there is a right answer for every question, and the answer or the method for finding it is in the assigned reading. Believing that all problems are convergent, we apply this approach to all problems – we study them.

However, there is another fundamental class of problems — **divergent problems**. Divergent problems could be said to be that class of problems for which the solution lies outside our box, outside and inconsistent with what we "know".



That is, the solution is inconsistent with some truth we believe about the situation. Thus, studying the problem (which is always done consistent with our truths), is fruitless.

Almost all political problems are divergent, yet diplomats continue to apply convergent problem solving methods, e.g., study, compromise, etc., with rare true solutions. In aerospace, "descope" is a common solution method, i.e., relax the constraints (of budget, time, and performance) until there is a feasible solution.

As a result, we fail at the first step of problem-solving, "Find a feasible solution method."

When Studying the Problem Does Not Work

Divergent problems don't yield to the convergent-problem approach. The more divergent problems are studied, the more complex and daunting they become. The more they are analyzed, the further away an acceptable solution seems. Whenever a solution is offered, someone generally responds, "Yes, but…." Whatever follows the "but" adds complexity to the problem. Such problems tend to seem completely different than anything encountered in the past. Political problems, conflicts, and "office politics" are examples of such problems.

Divergent problems are often big, complex, and unfamiliar. Typically, much is at stake in their resolution, and no acceptable feasible solution is known. Even seemingly simple divergent problems become complicated when analyzed. For instance, a salesperson tells a CFO that a client hasn't paid on time. The CFO says, "That's OK, we'll stop shipment on their next order." The salesperson objects, saying, "That's impossible because this client is the brother-in-law of our biggest client — and it will spread ill will."

Analyzing a divergent problem is the *worst* thing you can do. It makes the problem seem impossible to solve. For most people the idea that there is a class of problems *worsened* by study is crazy. That demonstrates how deeply we believe that every problem is convergent.

The US Congress, whose problems are almost all divergent, typically uses only convergent problem-solving techniques, such as establishing committees to make studies and submit reports. You evaluate their results.

Discover What Kind of Problem You Have

In about 10 minutes you can tell whether your problem is convergent or divergent. Just start asking questions or making suggestions. If the path to a solution becomes clearer as you go, you probably have a convergent problem. If

questions mount and complexity increases, the problem is probably divergent. Stop studying the problem and take a completely different approach.[1]

Not understanding the difference between convergent and divergent problems, and thus inappropriately applying convergent problem-solving methodologies (which always involving analyzing) to divergent problems is a major impediment to solving divergent problems.

Establish the Importance of Solving the Problem

The group assigned to solve a problem may not be clear about its importance to them, the classic, "What's in it for me?" Often a problem is stated in terms of its importance to management, and the viewpoint is often global, such as in efforts to raise the company's stock price or to reduce costs. When the group charged with solving a problem does not see a clear benefit to themselves,[2] their creativity and effort are inhibited.

For example, a group was given a tight deadline for creating and implementing a solution to a problem with a machine. They met the deadline, but the machine was then left unused for six months, causing the group members to wonder why the urgency had been imposed. The group met subsequent requests for problem-solving with skepticism and resistance, particularly with regard to deadlines. Not explained to the group was that the original urgency had been due to the limited availability of an expert that had been made available to them as a consultant.

Management must ensure that problem solvers see the importance of their assignment and understand the benefits they and the organization will accrue from achieving a solution. Sometimes that can be accomplished simply by explaining the importance in terms relevant to them, relieving them of some other responsibilities (demonstrating the importance of solving the problem), and/or by making it clear that their hard work and creativity will be acknowledged.

Part 2: Eight Principles for Producing Breakthroughs

Part 1 described divergent problems, a class of problems that get more and more difficult the more you study them. Because it looks so impossible and difficult to achieve, a solution to a divergent problem is often considered a breakthrough.

This section presents the eight principles underlying a process[3] that Frontier Associates and its clients have been using for over 10 years to reliably produce breakthroughs that have resolved the toughest problems. The Producing Breakthroughs process has a better than 95% success rate at producing feasible solutions to such problems in 20 hours of meeting time or less.[4]

1. Apply the method appropriate to the type of problem you are facing.

As was discussed in Part 1, first determine the type of problem you have, and don't apply convergent methods to divergent obstacles.

2. Generate a paradigm shift by distinguishing facts from assumptions (interpretations, opinions).

Solving a divergent problem requires a paradigm shift

Solving a divergent problem typically requires producing a breakthrough. A fundamental characteristic of a breakthrough is that something is suddenly seen as being clearly possible when it was previously believed to be impossible.[5] People saw the impossibility as a "clear and obvious truth." Such a belief, one that occurs as "The Truth", is called a "paradigm." Because any solution is inconsistent with what people believe to be "The Truth," the paradigm is the obstacle to finding a solution to the problem.

A shift in perception that allows people to see one of their paradigms as a "possible truth" — as an assumption rather than as "The Truth" — is called a paradigm shift. Once people can see that their beliefs about the situation are not in fact "The Truth," they can see other "possible truths," they can investigate assumptions previously kept from consideration by the paradigm, and a breakthrough can occur.

Causing a paradigm shift

To avoid generating resistance, causing a paradigm shift must be done without challenging the validity of the belief. The process is based on having the participants distinguish facts from their assumptions (interpretations, opinions). That is, the paradigms that are causing the problem to be unsolvable usually occur as facts, the obvious truth, to participants.

We define a fact as something that anyone observing it (and thus it must be observable) would have to agree that the fact is accurate and that all participants agree that it is accurate. For example, that Bill was wearing a blue colored shirt on a certain date at a certain time is a potential fact (pending agreement on accuracy). That the shirt is attractive is clearly an interpretation, not a fact. While the method for doing this can be taught and is highly reliable, it does require a level of rigor and skill.[6]

3. All participants agree on Success Criteria (the real Goal) expressed in objective, measurable terms.

Establish the Real Goal

Before trying to solve any problem, ensure that there is agreement on the real problem to be solved. These two situations often inhibit problem-solving:

- A focus on fixing a solution that failed in the past
- Working on achieving different (and possibly incompatible) goals

Here's an example of trying to fix a solution that hasn't worked before. I say to my boss, "I can't make my sales quota this month. I'm new on the job and my Rolodex® just isn't big enough." My boss reacts, as many managers would, by giving me more names to call — that is, by fixing a solution (call many names) that has already failed to achieve my goal. My real goal, however, is not to have a bigger Rolodex®. It's to meet my sales quota. Perhaps making more calls is part of the solution, but once the real goal of meeting quota has been clarified, many other solutions suggest themselves. For example, I might be calling at the wrong time of day, my delivery might be weak, I might be giving up at the first sign of resistance, or I might be focusing on the wrong subset of names.

Even more common, the individual members of a problem-solving group may be working toward different goals. This may result from people incorrectly assuming that they are working toward the same goal, or from hidden — or not-so-hidden — agendas. For example, in dealing with a customer complaint, some members of the group may try to satisfy the customer while others try to satisfy their boss.

Clarify and agree on the success criteria

We call the set of conditions that define a real goal the "success criteria." They are the answer to the question: "If this problem were successfully resolved, what would be the characteristics of the solution?" In the case above, a possible set of success criteria is:

- Starting with the current month, I meet or exceed my sales quota for the rest of my career.
- As of no more than four months from now, all the members of my family say they are happy with the time (quality and quantity) we spend together.
- As of no more than three months from now, I authentically say that I am typically relaxed, not unduly stressed.
- Starting with the 2005 annual 360 reviews, the other members of my sales team say to the sales team leader that I am a good contributor to the team's success.

The test for a true success criterion is to ask, "If I had a solution that did everything else I wanted, but didn't meet this proposed success criterion, would that be OK?" If the answer is "yes," then the proposed criterion is not a true requirement for the solution to your problem. If the answer is "no," then the proposed criterion is required, and therefore is a member of the set of true success criteria. One of the early steps in any problem-solving should be to achieve agreement on a set of success criteria. Setting success criteria is not analyzing the problem; it is defining what would be different if the problem were solved.

Each success criterion needs to be specific, measurable, and have a time by which it is to be met. When stakeholders agree on the success criteria, they are in alignment on the entire scope of the problem they intend to solve. The success criteria are used to analyze the feasibility of any solution that is proposed later in the process.

4. Start with a Commitment for which the group has an unquenchable passion.

Actions are what we do, such as clean the floor. Goals are the desirable results of our actions, such as having our children live in a clean environment. Commitments are the passionate statements that provide the basis for our goals, such as being committed that our children be healthy.

People relate to goals and commitments differently. Goals are often re-thought and revised when obstacles occur; commitments are not. Continuing with the above example, while a parent may let the housecleaning go for the time being if other things become more important, he or she would most likely never give up on the commitment that his or her children be healthy. To keep that commitment, parents will overcome whatever obstacles arise.

Goals, which can be altered, are insufficient to produce a breakthrough and overcome the seemingly impossible task of solving a divergent problem. By contrast, clarity about the commitment behind the success criteria provides the passion and drive required to produce a breakthrough. That is, the success criteria express a goal that forwards the commitment.

For example, a robotic mission team dealing with the problem of an apparently insufficient project budget developed the commitment, "Forward the search for life elsewhere." The success criteria were in terms of the data the scientists would receive on the ground (which had to do with detecting life on planets around other stars), not the mission scenario. As a result they had a breakthrough in spacecraft function and design (permitting reducing the number from 3 to 2 with no reduction in scientific data) that not only brought them within budget, but was a better (more reliable, easier to build) mission design than the original approach.

5. Separate creative thinking (brainstorming) from feasibility analysis.

Brainstorming is a creative process for generating the ideas crucial for solving a divergent problem. For most of us creativity is a fragile state. The slightest hint of analysis ("That won't work because…") often brings creative thought to a screeching halt. To promote the level of creativity needed to produce a breakthrough, rigorously separate brainstorming — the creation of new ideas — from the discussion needed to analyze their feasibility.

One of the mistakes of brainstorming is people ask "How are we going to accomplish the goal?". This puts people into the present with the limitations of the past, current, and projected situations.

Instead, start with the commitment and its success criteria and work backwards. Assume the success criteria have been accomplished (eliminating any question of feasibility) and ask "How did we do it?" As with any brainstorming, any answer is OK. Answers do not have to be feasible (it's good if some are clearly not).

6. Involve all stakeholders in the obstacle resolution process.

Major company-wide problems are typically addressed at a senior managers' retreat. The executives may have a great insight, a paradigm shift, and all agree on a winning solution. Then they come back and announce it to the troops. But now a new problem arises. The excitement of their great insight is met with skepticism. The troops find problems with the solution. Because they have not undergone a paradigm shift as well, the workforce sees the proposed solution as inconsistent with their "Truth," and thus believes the new ideas are patently stupid and will never work. So what's the chance of success? Near zero.

For a paradigm shift to be successfully implemented, it's essential that all stakeholders be part of the process. As used here, a stakeholder is defined as anyone who believes he or she is a stakeholder. If the problem has many stakeholders, a set of participants who are viewed as the most influential can be selected. When these pivotal people have undergone a paradigm shift, they are in a strong position to enroll the rest in supporting and implementing the resulting solution. Participants should include all important influencers relative to the issue being addressed.

7. Use consensus for group decision-making.

To reach a solution to a problem, it is at least useful, and often essential, to clarify and agree on the problem-solving process to be used. Will the group make decisions by consensus, compromise, majority vote, last man standing, or some other method? The chosen method will have a significant impact on how

the group operates.[7] Last man standing encourages people to dig in to their positions and be inflexible. Consensus encourages people to be creative and to listen to other's needs.

In the three most common methods of decision-making[8] — autocratic, voting (majority rule), and compromise — someone always gets less than what they want, undermining the creativity needed to produce a breakthrough. Decision-making by consensus[9] — where there is no solution unless everyone agrees that the same alternative is the best solution with no compromise — supports the needed creativity.

While consensus is the method that clearly produces the best result — everyone "wins" — it is rarely used because of concerns about the time it will take. In hundreds of cases, our experience is that consensus actually takes less time than other methods if the following pre-conditions are met:[10]

- Everyone in the process has to prefer a solution to the status quo.
- The group must have time to build its own ability to create consensus (the Producing Breakthroughs process has these opportunities built in).
- For more than five participants and/or where there are opposing points of view, a facilitator skilled in managing consensus is required.
- Rather than being an observer ready to veto the group solution with his or her "better judgment," the owner of the problem must operate as a group member.

8. Anticipate what could go wrong

Respondents to our informal surveys estimate that on average people do what they originally said they would do less than 50% of the time. Engaging in a "What if?" conversation raises potential obstacles on purpose and in advance, so that they can be worked out thoughtfully rather than surprise people later on and cause fires that require immediate attention.

Putting This Section into Action

Each of the eight principles appears to be crucial for producing breakthroughs. Many are highly useful in other types of problem-solving as well. Some lessons learned from applying these principles include:

- When a paradigm shift is required, arguing with evidence and trying to convince is unlikely to be successful.
- In addressing many significant organizational issues, include considerations of implementation early. Implementation is considerably eased when the most influential stakeholders are part of the problem-solving process. While it may make the problem-solving

more difficult, it makes the implementation considerably easier. Sometime it is the crucial aspect that makes implementation possible.
- Consensus could be used much more than currently, yielding greater alignment, better solutions, and more probability of successful implementation.
- Specifying success criteria ensures that everyone is working toward the real goal.
- The power of commitment could be used to significantly improve productivity and problem-solving in many organizations.
- To avoid stifling creativity, enforce a rigorous separation of creativity from analysis.
- After selecting a course of action, engage in a "What if?" inquiry to anticipate problems and plan their resolution in advance.

Part 3: A Process for Producing Breakthroughs

Part 1 described divergent problems, a class of problems that get more and more difficult the more you study them. Because it looks impossible to achieve, a solution to a divergent problem is often considered a breakthrough.

If you asked people at most organizations how they produce breakthroughs, they would probably reply that they get a bunch of smart people together in a room and hope something happens. *Part 2: Eight Principles for Producing Breakthroughs* presented the concepts underlying a process that Frontier Associates and its clients have been using for over 10 years to reliably resolve the toughest problems. This section describes the steps of that process, which has a better than 95% success rate at producing breakthroughs in 20 hours of meeting time or less.[11]

The process consists of 13 steps divided into four phases, and is typically implemented as a series of 3-4 facilitated meetings that take place over the course of 1-4 months. The primary deliverable of the Producing Breakthroughs Process is an action plan that all participants[12] agree
- Will accomplish the goal or solve the problem at hand, and
- Has no further barriers to implementation.

A caution: while this article describes each of the steps, most people require some training before they can successfully facilitate the process, particularly for groups larger than five or for complex, contentious, issues.

Phase 1: Establish a Foundation for the Process

1. *Briefly specify the situation*
   The owner of the problem or goal (the person who has the primary concern that it be solved or accomplished) describes the desired outcome in two or three sentences. The intention is to give participants the general goal without imposing the owner's paradigms.[13]

2. *Validate people's preference for a solution*
   To generate the creativity needed for producing a breakthrough, it is critical that all participants agree that they prefer a solution or accomplishing the goal rather than the status quo.[14]

3. *Establish process guidelines*
   During this step the participants agree on the ground rules under which they will operate. Suggested guidelines in addition to those for normal group interactions include the following:
   - To support the needed creativity, decisions must be made by consensus.[15] In consensus there is no decision unless everyone chooses the same alternative as being the best alternative, no compromise. When consensus is reached, everyone owns the result as if he or she originated it.
   - No one is added to the conversation after the first day without group agreement.
   - Being in the entire process is so important that anyone leaving the conversation loses the right to be the only holdout. No one can leave for most of the conversation, then come in at end and insist that everyone start over.

4. *Establish success criteria for the solution*[16]
   Success criteria are the criteria for the process being a success, and are used in *Step 9: Analyze feasibility* to evaluate the output of *Step 8: Create possible solutions*. Success criteria should be clear, objective, measurable, and in time. Example: "We will increase production of Product Y 80% by November 30 with no increase in overtime and with no changes in standards or increase in rejects or returns for quality issues."

   When a candidate Success Criteria has been formulated, ask, "If all the Success Criteria established so far were satisfied, as well as anything else you wanted, but the solution didn't satisfy this particular candidate Success Criteria, would that be OK?" If the answer is "no," then the candidate Success Criteria <u>is</u> a Success Criteria, because regardless of what else it does, a solution must meet this requirement. If the answer is "yes," then it is <u>not</u> a Success Criteria, because there is an acceptable solution that does not meet this requirement.

Phase 2: Get into the Future

5. *List interpretations*[17]
   Simply list, without analysis or censuring, participants' opinions, assumptions, feelings, beliefs, attitudes, understandings, conclusions, psychological reactions, and stories about the situation. Ask participants to speak in sound bites of 7-10 words each. Do not permit discussion, explanation, or a lecture.

The purpose is not to get the "right list." Most of the speakers consider most of their statements to be "the truth," not just one opinion among several. Buried in the list are the paradigms[18] that prevent the issue from being resolved.

6. *List facts*
   For the purposes of this process, we define a fact as something independent of the observer. To be a fact, a statement must meet all three of the following criteria:
   - The contents of the statement are observable. They can be recorded with a video camera, a spectroscope, or some other recording or measuring device.
   - Anyone looking at the videotape or other recording or measurement would unequivocally have to agree with the validity of the statement.
   - Everyone agrees that the statement is true.

   Take a suggested fact and process it using the above criteria. Most statements are revealed as opinions or interpretations, not unequivocal facts. Generally, once about one-tenth of the suggested facts have been processed this way, there is a paradigm shift, and the group sees all the statements in the list as interpretations rather than facts. At this point the group is ready to "think out of the box."

7. *Create a commitment*[19]
   After having distinguished what a commitment is[20], conduct a brainstorming process to identify a powerful commitment that is the "why" behind the desire to fulfill the success criteria.

Phase 3: Create a Solution from the Future

8. *Create possible solutions*[21]
   From the perspective of a future where the breakthrough has been made, look back to the present and brainstorm on the question, "What are all the possible ways we could have fulfilled the success criteria, the goal?" To generate creativity and urgency, it often helps to specify a time limit for this phase of the process.

9. *Analyze feasibility*
   Evaluate the possibilities generated in Step 8 using the Success Criteria generated in Step 4. Ask, "For each possibility, what are the advantages and disadvantages relative to producing the success criteria?" Since the number of possibilities is typically quite large, this is usually done in an iterative fashion. After grouping the possibilities by topic, teams do a brief analysis and report 2-3 alternatives for each topic area. The large group then formulates the major components of an action plan that will achieve the success criteria, thereby producing the breakthrough. New teams then perform detailed analyses, considering resources, timing, and other feasibility

questions, and present their recommendations to the larger group. This group works the recommendations until they have reached consensus on a plan that everyone agrees will inevitably satisfy the Success Criteria and is feasible.

10. *Make promises for actions and accountabilities*
    Once the plan has been adopted people take on specific accountabilities and make specific promises for action to implement the plan.

Phase 4: Support the Solution

11. *Resolve potential obstacles*[22]
    When actions have been requested and promised, insure that there is a sufficient structure of support so that the promises will be kept. Ask: "What might happen that would make you not keep your promise?" Then resolve each potential obstacle. This step ends when all obstacles to keeping all promises have been satisfactorily resolved and all promisers are confident of their ability to keep their promises.

12. *Establish follow-up mechanisms*[23]
    Establish a structure to determine next steps after promises have been kept or not kept. Typical questions include:
    - "How will we know if the promise was kept or not?"
    - "What will be done next when the promise is kept?"
    - "What will be done next if the promise is not kept?"

13. *Acknowledge and appreciate*
    Acknowledge if a breakthrough was or was not produced. Give people time to speak what they learned from the experience and how they will use that learning. Insure that everyone experiences being appreciated and acknowledged for the work they did.

Putting This Section into Action

For issues that involve no conflict, such as, "We are all agreed that we want to double sales, and none of us know how to do it," it is possible for someone to facilitate the Breakthrough Process with as little as four hours of training, although a full day is desirable to be able to include coaching. A trained and skilled facilitator is required when there are five or more participants and/or when the issue to be resolved is contentious. Given the clear definition of each step, plus the written guidelines and training available from Frontier Associates, any member of a company's workforce can learn how to facilitate the process, thus making use of the Breakthrough Process easily available within an organization.

The steps of this process may also be useful for solving problems that don't require a breakthrough. For example, it is beneficial to identify the success

criteria early in any solution process, as well as to identify the commitment that makes solving the problem important.

Summary

Every organization has a set of important problems for which there seems to be no feasible solution. We have suggested that the way we view these problems is a major obstacle to their solution:

- For a particular class of problems called divergent problems, studying the problem is one of the worst things to do. Instead, problem-solution methods specialized for divergent problems should be used.
- Rather than focusing on fixing a solution that didn't work or on achieving different goals, ensure that the group is aligned in working toward the real goal.
- The group needs to understand the importance of solving a problem in terms that are personally relevant and important.
- The group needs to reach clarity and agreement on a problem-resolution process, including how to unite around a solution when the process does not yield one.

Being able to solve highly difficult problems is key to organizational success. Such problems can be classified as divergent problems, which get worse the more you study them. Solving a divergent problem requires producing a breakthrough — generating a paradigm shift, radically changing the perception of what is possible and of what was seen as the "only right way" of doing something. There is at least one step-by-step process for reliably resolving divergent problems. The success of this process rests on implementing eight fundamental principles, including having all stakeholders represented and making decisions by consensus.

We outlined a 13-step process for implementing the Eight Principles for Producing Breakthroughs. The process is well-defined and has a 95% success rate in producing breakthroughs. With sufficient training, anyone can learn how to facilitate the process.

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[1] See *Producing Results #13: Principles for Producing Breakthroughs* and *Producing Results #14: A Process for Producing Breakthroughs*.

[2] For example, many solutions to lowering costs may be seen as contrary to employees' interests, such as laying-off people, reducing salaries, or cutting expenditures on resources needed to get their jobs done.

[3] See *Producing Results #14: A Process for Producing Breakthroughs*.

[4] Our confidence in this process is so high that we facilitate the process with a money-back guarantee – the client pays nothing if a feasible plan for accomplishing the breakthrough is not produced.

[5] See *Producing Results #9: What Really is a Breakthrough?*.

[6] See steps 5 and 6 of the process described in *Producing Breakthroughs #14: A Process for Producing Breakthroughs*.

[7] See *Effective Meetings #6: Selecting a Group Decision Making Process.* It is also important to establish what will happen if the group does not reach a decision when required. We have

found this to be a useful principle: If the group does not reach a decision when required, the leader decides and the group makes that the right decision. That is, regardless of their opinions during the discussion, group members ensure that the decision works out to be the right solution. Just having this principle puts pressure on the group to reach a collective decision.

[8] See *Effective Meetings #6: Selecting a Group Decision Making Process*.

[9] See *Effective Meetings #7: Consensus - Creativity and Win-Win.*

[10] See *Effective Meetings #8: Effectively Using Consensus.*

[11] Our confidence in this process is so high that we facilitate the process with a money-back guarantee – the client pays nothing if a feasible plan for accomplishing the breakthrough is not produced.

[12] See Principle #2, "Include all stakeholders or their representative" in *Producing Results #13: Seven Principles for Producing Breakthroughs.*

[13] See description of paradigms in *Producing Results #6:The Results Tree*.

[14] This is consistent with the suggestion to "Establish the Importance of Solving the Problem" in *Producing Results #12: Problems with Problem-Solving*. This is also a requirement for consensus to work, a required operational guideline.

[15] See Principle #3, "Decision-making by consensus" in *Producing Results #13: Seven Principles for Producing Breakthroughs.* Articles on consensus decision-making include *Effective Meetings #6: Selecting a Group Decision Making Process, Effective Meetings #7: Consensus - Creativity and Win-Win, and Effective Meetings #8: Effectively Using Consensus.*

[16] See Principle #4, "Clarify and agree on success criteria" in *Producing Results #13: Seven Principles for Producing Breakthroughs* and "Establish the Real Goal" in *Producing Results #12: Problems with Problem-Solving.*

[17] See Principle #1, "Solving a divergent problem requires a paradigm shift" in *Producing Results #13: Seven Principles for Producing Breakthroughs.* Steps 5 and 6 of this process generate the needed paradigm shift, i.e., to see one's "truths" as interpretations.

[18] See footnote 3 above.

[19] See Principle #5, "The importance of commitment" in *Producing Results #13: Seven Principles for Producing Breakthroughs.*

[20] See *Producing Results #2: Promises Goals and Commitment*, *Producing Results #3: The Power of Commitment*, and *Producing Results #5: How to Create Group Commitments.*

[21] See Principle #6, "Separate brainstorming and analysis" in *Producing Results #13: Seven Principles for Producing Breakthroughs.*

[22] See Principle #7, "Anticipate what could go wrong" in *Producing Results #13: Seven Principles for Producing Breakthroughs.*

[23] Ibid.

BIOGRAPHY

IVAN M. ROSENBERG, the President and CEO of Frontier Associates, Inc., has over 30 years experience as a management consultant and change agent, supporting organizations in which the leadership is committed to achieving breakthrough results in organizational performance.

He received Bachelor and Masters degrees in Electrical Engineering and Computer Science from Cornell University and M.S. and Ph.D. degrees in Management from the University of Rochester. While an assistant professor at Rochester Institute of Technology and CalPoly San Luis Obispo, he assisted a variety of organizations, including the State of California, in improving business IT systems.

In 1981, Dr. Rosenberg founded Distinctive Solutions Corporation, which develops commercial finance software for banks and other financial institutions. Under his leadership, the company raised over $5 million in venture capital, and became a national leader in its field. After 25 years of operation, the company was sold in 2006.

After being elected Chairman of the Board of Distinctive Solutions Corporation in 1988, Dr. Rosenberg became Vice President of E.K. Williams & Co., at the time the world's largest small business accounting and consulting company. During his years with the company he led the implementation of a company culture change, resulting in returning the company to profitability and the establishment of effective internal management and production systems.

With Frontier Associates, Dr. Rosenberg consults with companies to produce sales, efficiency, and profitability results far beyond what might be predictable by past performance. His engagements include organizational culture changes, strategic planning, breakthrough problem solving, team and partner building, innovative sales training, and training and coaching senior executives. His clients include Amgen, Microsoft, NASA Jet Propulsion Laboratory, NASA Langley Research Center, NASA Goddard Space Flight Center, Johnson & Johnson, Good Samaritan Hospital, Deluxe Laboratories, qLogic Corporation, Viewsonic, the W.M. Keck Observatory, the Gemini Observatory, the Canada-France-Hawaii Telescope, the Space Telescope Science Institute, the Giant Magellan Telescope, the ALMA telescope, Ball Aerospace & Technologies Corp., and Warner Bros. He has directly consulted 19 robotic space missions. Dr. Rosenberg is a highly-rated public speaker and the author of over 130 published articles.

In 2010 Dr. Rosenberg co-founded The Aerospace & Defense Forum, a global community of over 700 individuals and four chapters. He served on the City Council and the Planning Commission of the City of Morro Bay. In addition to Distinctive Solutions Corporation, his Board membership has included Legacy Software, Inc. (NASDAQ, subsequently merged), Interex (the international Hewlett-Packard users group), the non-profit Technology for Results in

Elementary Education, the Association for Strategic Planning, The Country School, the Los Angeles Venture Association (LAVA), the Southern California Chapter of the Institute for Management Consultants, and the California Wildlife Center. He has been President of LAVA and of a local council of the Boy Scouts of America. Currently he serves on the Boards of CyberNet Communications and Exceptional Minds.

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