

Table 1.1. Exercise. Collecting examples of good solutions

Year Created	Year Implemented	Idea

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Table 1.2. Exercise. Fill in a description of the methods that your organization has used for problem solving and for stimulating innovation. If you have gone back and forth from one method to another, draw arrows on the table to show the path. If you have tried TRIZ or a method related to TRIZ, list it under *Scientifically managed problem solving* and use arrows to show the path from other methods to TRIZ.

Trial and Error Methods	
Hard, rationalized model	Soft, humanized model
Scientifically managed problem solving	

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Table 3.1. Exercise. Examples of tradeoffs. Fill in the table with examples from your personal life and from your business experience.

Whenever THIS gets better	THIS gets worse
Whenever the size of the warehouse increases	The accuracy of the inventory gets worse
Whenever my family is happy with a vacation	It takes too much time from my work.

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Table 3.5. Exercise. Consider your own problem situation. Construct the model of tradeoffs.

1. Describe pairs of tools and objects
2. Select one pair. Explain, why just this tool and object are selected
3. Describe features of the selected system of a tool and an object. Describe conflicts in this system
4. Select one pair of conflicting features. Explain, why just this tradeoff is selected
5. Describe the tradeoff graphically and in words

Table 4.1. Exercise. Write down your ideas about how to resolve contradictions

<i>Problem</i>	<i>Ideas</i>
Tire reliability	
Plumbing parts	
Extra food	

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Table 4.2. Exercise. Adding examples of inherent contradiction

Study examples of the inherent contradiction. Add 3 more examples of your own. Try one each from your business life, your personal life, and your community.
1.
2.
3.

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Table 4.3. Exercise. Examples of intensified conflict.

Study examples of the intensified conflict. Add 3 more examples of your own. Try one each from your business life, your personal life, and your community. You can intensify, if possible, conflicts you have formulated in exercise 4.1, or add totally new examples.
1.
2.
3.

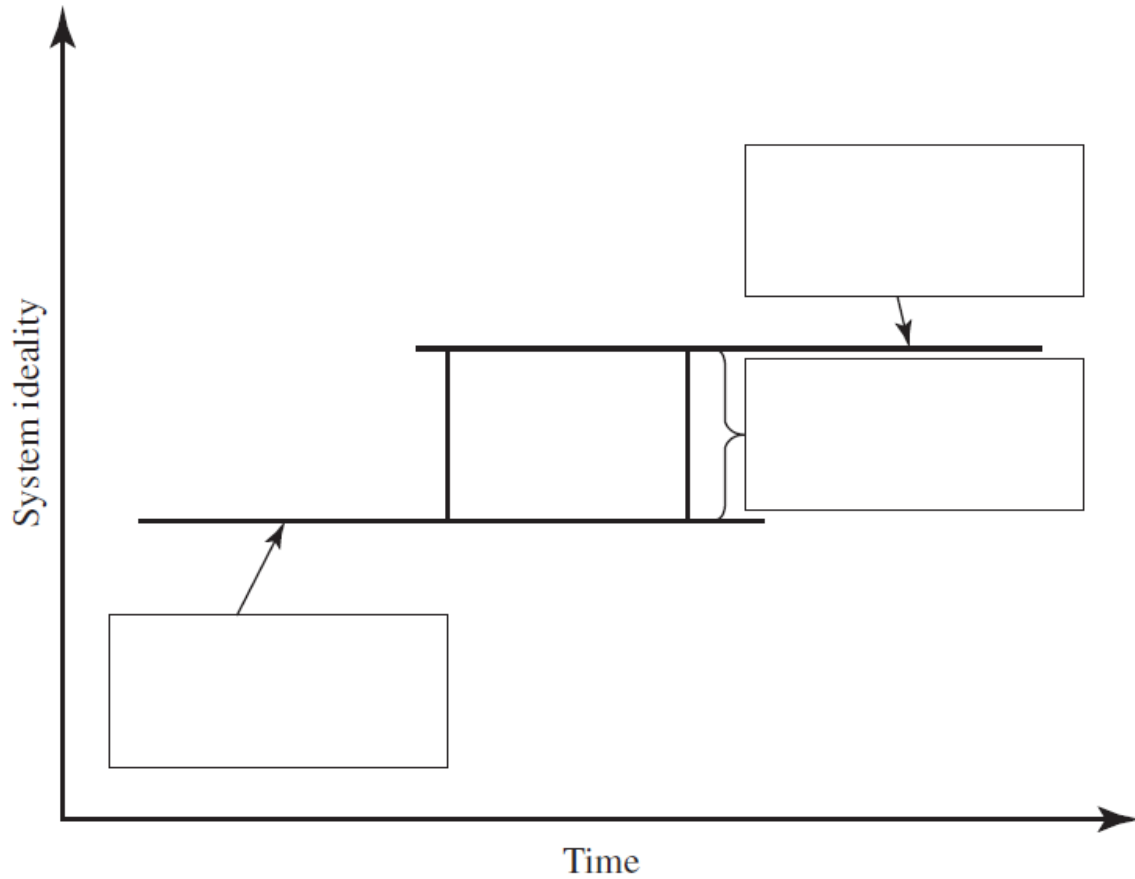
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Table 4.7. Exercise. A template for the study of your own problems.

Modeling steps	Your Example
Visible drawback	
Tradeoff: the conflict between two features	
Inherent contradiction	
Intensified inherent contradiction (if it can be intensified)	

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Figure 5.4. Exercise. Make your own example of how resources appear and will be used.



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Table 5.1. Exercise. List 3 examples where the *tool* was used as a resource to solve a problem.

Problem	Tool	Object	Solution
1			
2			
3			

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Table 5.2. Exercise. List 3 examples where the *object* was used as a resource to solve a problem.

Problem	Tool	Object	Solution
1			
2			
3			

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Table 6.1. Exercise. List examples illustrating increasing ideality in systems that you are familiar with.

Initial System	
Improved System	
What Changed?	
Benefits Improved	
Cost Reduced	
Harm Removed	

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Table 6.8. Ideal final result: Study your own system.

Primary resource with the inherent contradiction:
Auxiliary resources:
Features of the ideal final result:

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Table 7.1. Exercise. Functional Statements. Capture a few functional statements of your own.

<i>Subject (tool)</i>	<i>Action (function)</i>	<i>Object (recipient)</i>

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Table 8.6. The evaluation table. For your own examples, first describe the problem, the TRIZ solution, and the best conventional solution:

- My problem _____
- My TRIZ solution _____
- Best conventional solutions _____

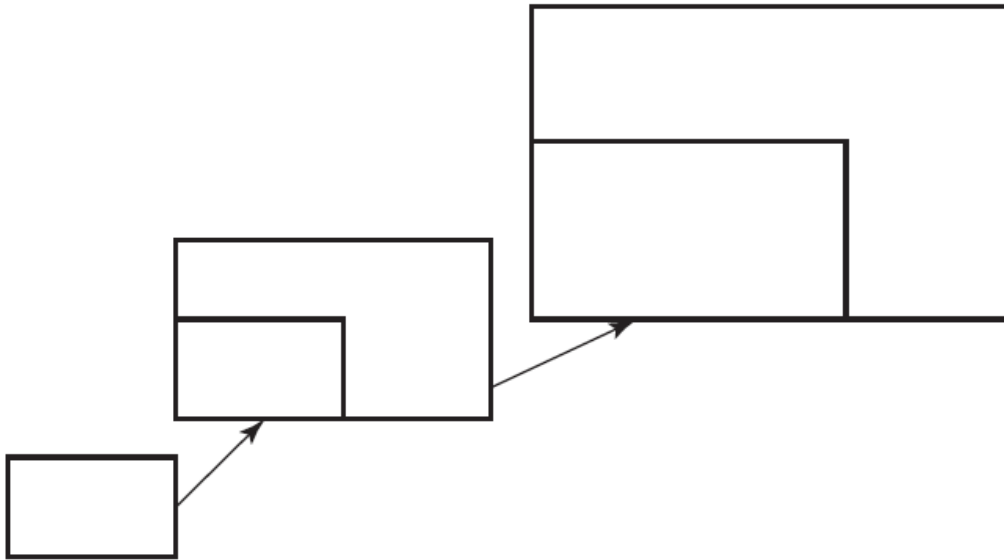
Then fill in the evaluation table below.

Criteria	The comparison with the known solution
1. Do the harmful features disappear?	
2. Are the useful features retained? Will new benefits appear?	
3. Will new harmful features appear?	
4. Does the system become more complex?	
5. Is the inherent, primary contradiction resolved?	
6. Are idle, easily available, earlier ignored resources used?	
7. Other criteria:	

Table 9.3. A short agenda for problem solving.

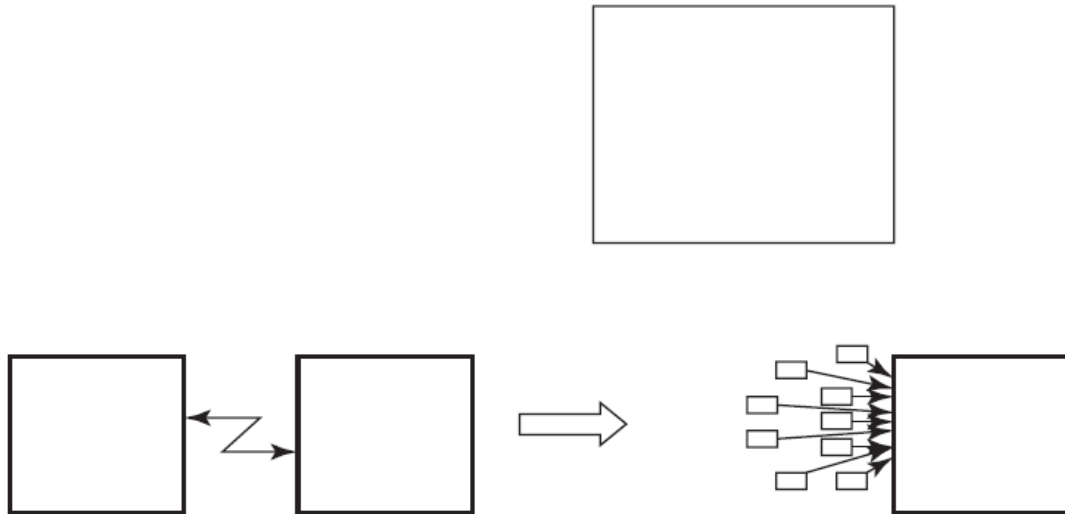
<p>1 DESCRIBE CONTRADICTIONS (Chapters 3-4)</p> <p>1.1 Describe the contradictions that make up the problem. There may be several on different system levels and in different stages of the life cycle of the product or process or system.</p> <p>1.2 Select one contradiction to resolve.</p> <p>1.3 Intensify the contradiction</p>
<p>2 MAP RESOURCES (Chapter 5)</p> <p>2.1 List resources of the tool and object</p> <p>2.2 List resources of the environment</p> <p>2.3 List resources on the higher system level (macro-level) and micro-level</p>
<p>3 DEFINE THE IDEAL FINAL RESULT (Chapters 6 and 8)</p> <p>3.1 Remove the contradiction using resources</p> <p>3.2 Evaluate the solution</p> <p>3.3 Improve the solution</p>

Figure 10.5. Exercise. Illustrate the transition to the macrolevel with your own example.



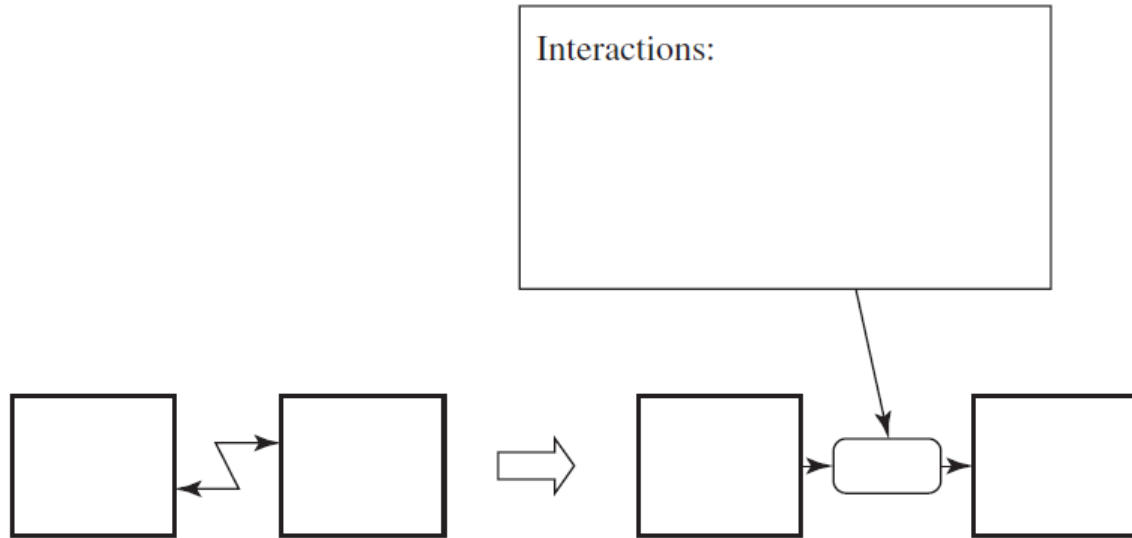
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Figure 10.7. Exercise. Illustrate with your own example the transition to the microlevel.



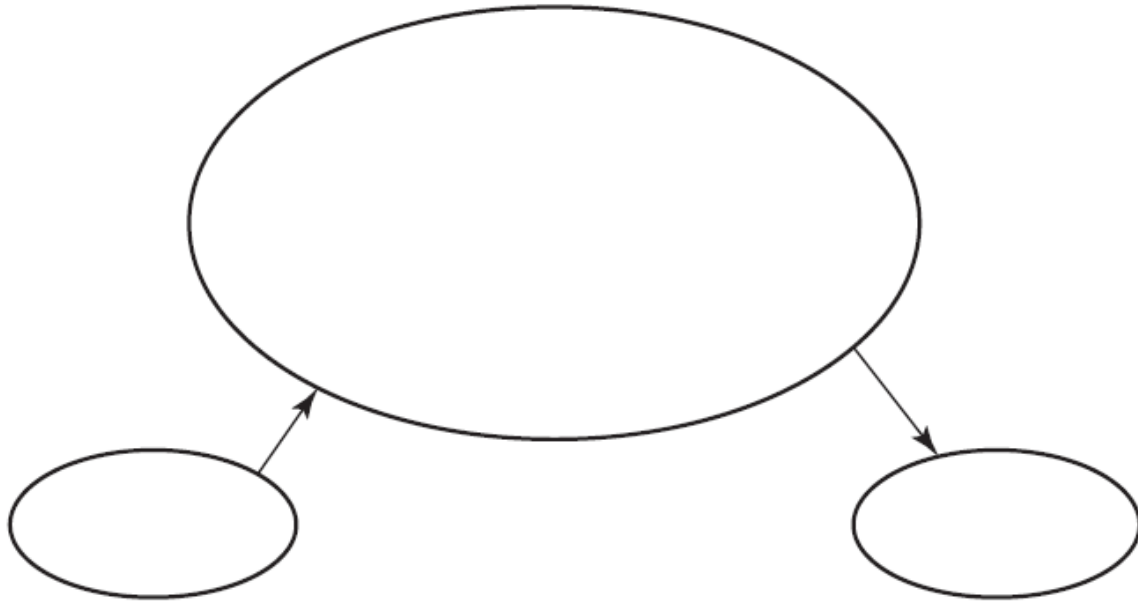
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Figure 10.11. Exercise. Illustrate increasing interactions by your own example.



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Figure 10.13. Exercise. Illustrate expansion and trimming by your own examples.



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Table 10.6. Exercise. Select one of your problems and apply the patterns to it.

Pattern	How to apply to the system
Uneven evolution of the system	
Transition to macro-level	
Transition to micro-level	
The increase of interactions	
Expansion and trimming	
Summary: increasing of ideality	

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Chapter 11. Exercise. Create your own examples for the 40 principles.

	Principle	Concept
1	Segmentation	
2	Separation, Taking out	
3	Local Quality	
4	Symmetry Change, Asymmetry	
5	Merging	
6	Multi-functionality, Universality	
7	"Nested Doll"	
8	Weight Compensation, Anti-weight	
9	Preliminary counteraction	
10	Preliminary action	
11	Beforehand compensation	
12	Equipotentiality, same level	
13	Other way around, Do it in reverse	
14	Curvature increase, Spherodality	
15	Dynamic parts, Dynamics	
16	Partial or excessive action	
17	Dimensionality change, Another dimension	
18	Mechanical vibration	
19	Periodic action	

20	Continuity of action	
21	Hurrying, Skipping	
22	Blessing in disguise, convert harm to benefit	
23	Feedback	
24	Intermediary, mediator	
25	Self-service	
26	Copying	
27	Cheap disposables	
28	Mechanical interaction substitution (use fields)	
29	Pneumatics and hydraulics	
30	Flexible shells & thin films	
31	Porous materials	
32	Optical property changes, Color change	
33	Homogeneity	
34	Discard & recover	
35	Parameter change, property change	
36	Phase transitions	
37	Thermal expansion	
38	Strong oxidants	
39	Inert atmosphere	
40	Composite materials	

Table 11.6. Exercise. Apply innovative principles to your own problem.

What is the contradiction?	
If this contradiction is in Contradiction Matrix, which principles are suggested?	
If this is an inherent contradiction, which principles might help?	
What ideas did you get from each principle?	
<i>Principle</i>	<i>Idea</i>
Browse through all the principles. What additional ideas did you get?	

Section 12.3. Exercise. Utilizing Principles 24 and 30, see if you can solve the sapphire tip breakage problem before reading the elegantly simple solution that was actually developed.

Hint: The heating chamber could also be accessed from the inside during the maintenance procedure.

Principle 24 – Intermediary

Use an intermediary carrier article or intermediary process
Merge one object temporarily with another (which can be easily removed)

Ideas:

Principle 30 – Flexible Shells and Thin Films

Use flexible shells and thin films instead of three-dimensional structures
Isolate the object from the external environment using flexible shells and thin films

Ideas:

Section 13.2. Exercise. What other applications can you think of?

Structural electronics (electronics embedded in load-bearing structures) are one of the important technological developments in our century. What pattern or principle does this represent and how can it be expanded further?

Pattern or Principle _____

Additional application options _____

Wind-turbine noise can be decreased by copying the structure of owl feathers and applying it to the turbine blades, a solution that illustrates the transfer of technology across industries, including technologies invented by nature (biomimetics). Altshuller was a big proponent of using the designs in nature to solve our problems. What other applications of biomimetics can you think of?

“Natural system” donor _____

Application ideas _____

Table 13.1. Exercise. What other mergers of “home appliances” and microelectronics can you think of?

System:	Transition:
Hammer (example)	Read out that reports striking force and angle
Faucet (example)	Input that allows choice of water temperature and readout that shows current temperature and flow rate
Window	
Vacuum Cleaner	
Others?	

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Table 13.2. Exercise. What other applications of Principle 14 (curvature increase) to luggage can you think of?

System:	Transition:
Luggage (example)	Put wheels on suitcase
Luggage wheels (example)	Replace wheels with ball roller
Luggage ball rollers (example)	Put ball rollers on swivels
Luggage handle (example)	Create adjustable curved ergonomic handle
Luggage structure (example)	Create curved ribbed structure that is rigid when luggage is opened and allows flexibility (stuff sack) when closed
Luggage shape	
Luggage size	
Others?	

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Table 13.3. Exercise. What other medical applications of the pattern of increasing interaction to smart phones can you think of?

Table 13.3 - Application of Pattern of Inc. Interaction to Smart Phones (medical)	
System:	Transition:
Smart Phone Application (example)	Integrate breathing monitoring
Smart Phone Application (example)	Integrate eye sight testing
Smart Phone Application (example)	Integrate blood sugar level testing
Smart Phone Application?	
Smart Phone Connectivity (example)	Like a hard drive on-line back-up system, have smart phone regularly upload data to on-line medical records
Smart Phone Connectivity?	
Others?	

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Table 13.4. Exercise. What other applications of Principle 33 (homogeneity) can you think of?

System:	Transition:
Food packaging (example)	Create food packaging out of food based materials
Roadway and Tires (example)	Make tires out of asphalt or roadways out of synthetic rubber
Bandages (example)	Like "cat gut" sutures, make bandages out of natural materials which are ultimately absorbed by the skin
Garbage bags	
Window screens	
Contact lens	
Others?	

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Table 14.1 Exercise. Evaluation of the model for problem solving.

<p>1 Which concepts, models and tools are most valid and useful for my work?</p> <hr/> <hr/> <hr/>
<p>2 Which points may require further development?</p> <hr/> <hr/> <hr/>
<p>3 Other thoughts</p> <hr/> <hr/> <hr/>

Table 15.2. A worksheet for TRIZ implementation.

Use this worksheet to begin planning your TRIZ implementation.

In my organization, who would be a good

champion? _____

Will that person need a higher-level management sponsor? Yes___ No___

If “yes,” who would be a good sponsor? _____

What will be the obstacles in my organization? _____

What are the organization’s strengths that TRIZ will increase?

What are the organization’s weaknesses that TRIZ will help overcome?

Will we have to gather information about other organizations’ successes with TRIZ to convince people that it can work in our company? Yes___ No___ . If “yes,” who will do the work of getting this information? Name: _____

(See Reference 2 for resources)