



Systems thinking



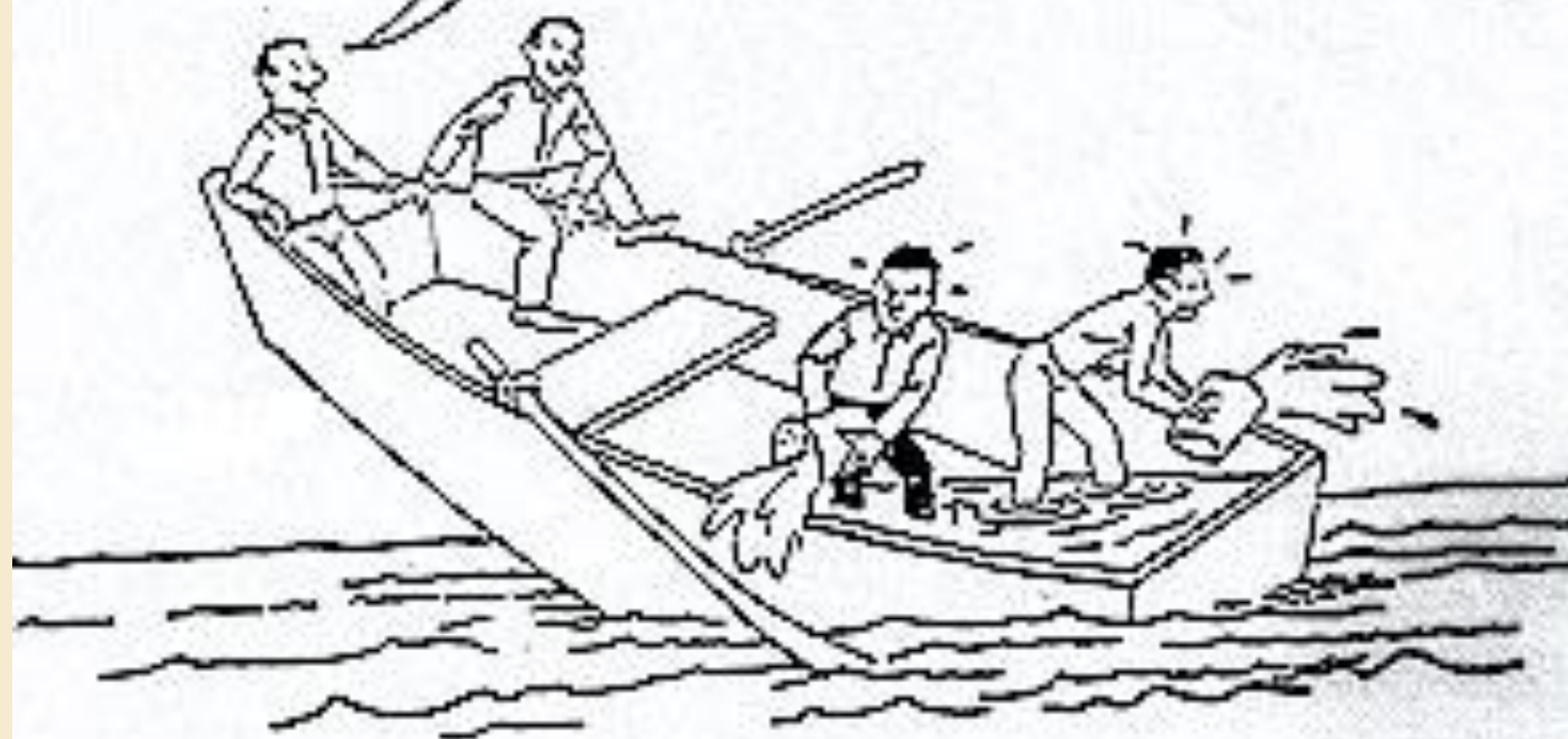
History

- ▶ Systems thinking was created in opposition to scientific reductionism
 - ▶ One of most brilliant specialists developing system thinking was Jay Forrester from MIT
 - ▶ This method was used by Donella and Dennis Meadows to prepare „Limits to growth” report
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Natural system thinkers


- ▶ Albert Einstein
 - ▶ Garret Hardin
 - ▶ E.F. Schumacher
 - ▶ Václav Havel
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*I'm sure glad the
hole isn't in our end...*




Systems thinking as a fifth discipline

5 disciplines of learning organization:

1. Personal mastery
 2. Mental models
 3. Building shared vision
 4. Team learning
 5. Systems thinking – The Fifth Discipline that integrates the other 4.
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System

- ▶ A system is an interconnected set of elements that is coherently organised in a way that achieves something.
 - ▶ System is more than the sum of its parts. It may exhibit adaptive, dynamic, goal-seeking, self-preserving and sometimes evolutionary behavior.
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System

- ▶ Optimisation of parts does not improve system
- ▶ System is dynamic


System is dynamic

Managers are not confronted with problems that are independent of each other, but with dynamic situations that consist of complex systems of changing problems that interact with each other. I call such situations **messes** ... managers do not solve problems, they manages **messes**.

Russel Ackoff



Leverage points

- ▶ Leverage points – are the places in a complex system where a small change can produce big change in whole system
 - ▶ Leverage points are counter-intuitive, they are not intuitive
 - ▶ The harder you push, the harder the system pushes back
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Laws of the Fifth Discipline



1) Today's problems come from yesterday's "solutions."

- ▶ e.g. clients are unsatisfied because they have to wait very long for the product supply. This could be the “solution” of high storage costs.

2) The harder you push, the harder the system pushes back

- ▶ When well-intentioned interventions call for responses from the system that offset the benefits of the intervention.
- ▶ This is a phenomenon in Systems Thinking called 'compensating feedback'.

- ▶ e.g. food help for African countries usually leads to bigger demand for support. Because the mortality rate is smaller so there are more people waiting for international help.

3) Behavior will grow better before it grows worse.

- ▶ Wrong intervention cures the symptoms, there's improvement or maybe even the problem has gone away. It may be two, three or four years before the problem returns, or some new, worse problem arrives.

4) The easy way out usually leads back in

- ▶ We all find comfort applying familiar solutions to problems, sticking to what we know best. Pushing harder and harder on familiar solutions while **fundamental problems persist or worsen**, is a realiable indicator of nonsystemic thinking
- ▶ It's like looking for a needle

5) The cure can be worse than the disease

- ▶ The long-term consequence of applying non-systemic solutions is increased need for more and more of the solution.

6) Faster is slower

- ▶ For most business people the best rate of growth is fast, faster, fastest. Yet virtually, all natural systems, from ecosystem to animals to organizations, have intrinsically optimal rates of growth. The optimal rate is far less than the fastest possible growth.

7) Cause and effect are not closely related in time and space.

- ▶ This is a fundamental characteristic of complex human systems: cause and effect are not close in time and space.
- ▶ It can be seen very clearly in environmental issues where sometimes it's difficult to detect the cause of a problem

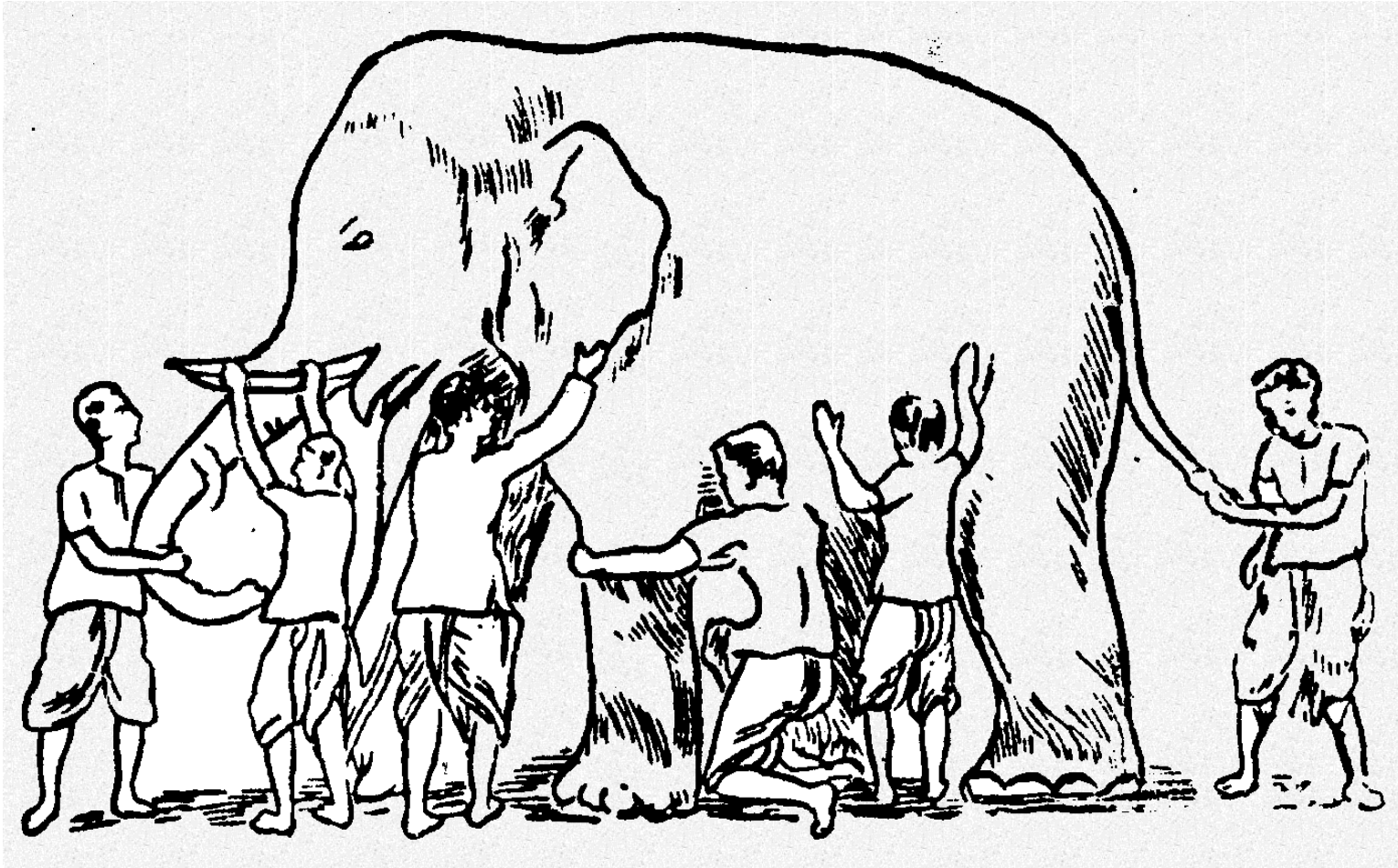
8) Small changes can produce big results...but the areas of highest leverage are often the least obvious.

- ▶ Systems Thinking shows that small, well-focused actions can sometimes produce significant, enduring improvements, if they're in the right place.

9) You can have your cake and eat it too – but not all at once

- ▶ Many apparent dilemmas are by-products of static thinking. They only appear as rigid “either-or” choices, because we think of what is possible at a fixed point in time. The real leverage lies in a whole new light once you think consciously of change over time and seeing how both can improve over time.

10) Dividing an elephant in half does not produce two small elephants



Living systems have integrity.

11) There is no blame

- ▶ We tend to blame outside circumstances for our problems. “Someone else” did it to us. Systems thinking shows us that there is no outside; that you and the cause of your problems are part of a single system. The cure lies in your relationship with your “enemy”.