

Need to Simplify?

1. Is there a requirement to simplify?

Represent the System in Functional Form

1. Draw a Function Diagram of the System

2. Discover more functions by mapping the Life-Cycle Jobs

- Fabrication—Testing—Packaging—Mass Transport
- Mass Storage—Disposition for Sale—Order Purchase
- Customer Transport—Setup—Customer Testing—Fueling/Energizing—Use/Operation
- Protecting the System—Protecting Users—Protecting Bystanders
- Stowing—Storage—Maintenance—Fixing Messes—Failure—Repair
- Recycling—Disposal

3. Process map the offering

Identify Burdensome Functions and Elements

1. Identify Low Value Elements
2. Identify Time Burdensome Functions
3. Identify Functions that Waste Materials
4. Identify Functions that Directly Waste Money
5. Identify Functional Objects that Waste Space
6. Identify Functional Objects that Waste Space
7. Identify Functions that Waste Energy
8. Identify Harmful Functions
9. Identify Remedial or Preventative Functions
10. Identify Functions that Cause Human Burdens—**“Human Factors”**
 1. Experience or simulate the required actions
 - Mental demands—think, deciding, calculating, remembering looking and searching.
 - Physical Demand—pushing, pulling, turning, controlling and acting.
 - Temporal Demand—time pressure, pace
 - Effort—mental and physical
 - How successful was the task or goal?
 - Level of frustration— insecure, discouraged, irritated, stressed or annoyed.
 - Emotional Burden—Not Matching Market--Unaesthetic

Simplify by Removing Large Groups of Elements

1. Remove the need for burdensome functions or low value elements
2. Merge with the super-system
3. Change to passive control

Simplify by Idealizing Individual Functions

1. Pick the Functions to Idealize
 - Idealize Useful Functions
 - Idealize Informing Functions
 - Idealize Harmful Functions

Simplify by Eliminating Individual Elements

1. Remove Individual elements and take on their function
2. Reduce the Penalty of expensive parts by stealing functions

Simplify by Consolidating System Elements

- ASIT Parasite Tool
- Different functions on the same product
- Contiguous operations
- Similar structure
- Biased Tools
- Anti-Tools
- Closely associated elements
- Reduce space and mass
- Recursively draw

Modularize

Compelling Aesthetic Interface

Idealize Useful Functions (IFRs)



The Ideal Product for Useful Functions

1. Identify and Isolate the Main Modification
2. Remove Transmission Elements
3. Non-Existent Product
4. Modification Not Required
5. Comes that Way
6. Self- Service
7. Minimum Part
8. Natural Groupings of Similar Objects
9. Natural Groupings of Biased Products
10. Natural Groupings of Diverse Products
11. Summarize the Ideal Product

The Ideal Modification

1. Describe a Variety of Ideal Modifications
2. Consider an Ideal Inverse Modification
 - What is the Ideal Level of Modification?
 - What is the Ideal Sequence of the Function?
 - What is the Ideal Duration?
 - What is the Ideal Duty Cycle?
 - What is the ideal Adjustability?
 - Extreme
 - Environments
 - Different Products
 - Granularity of Adjustment
 - Continuous or Feedback
- When Should It Be Excluded? (The Zero Function)

Time for a New Physical Phenomenon?

- Evolutionary History
- System Maturity
 - Technical Parameter
 - Level of Invention
 - Patents in time
- Disruptive Technologies
- Time for New Phenomenon?
 - Specialized
 - Diminishing Return
 - Feedback
 - Multiple Conflicts
- Hybrid or Stand-alone?

The Ideal Physical Phenomenon

- Identify the Competitive Alternatives
- Observe Existing Products
- Internet Product Search
- Check for Disruptive Technologies
- Patent Searching and Study
- Intelligent Little People
- Evolution of Field Phenomena
- Library of Effects
- Analogous Products—Patents Outside Your Industry
- Analogous Products—Mega Trend
- Analogous Products—Bio-mimicry
- Merge or Interact With Multiplied Tools
- Hybrid Combination of Physical Phenomena
- Filter for Abundant Resources
- Filter for Inherent Harm (Contact)
- Filter for Multiple Functions

Discovering New Physical Phenomena

- Intelligent Little People
- Drive Measurement and Detection to the Extreme
- Natural Analogous Effect
- Drive Fields to the Extreme
- Drive Order to the Extreme
- Drive Attributes to the Extreme
- Chaining Physical Phenomena

The Ideal Tool for Useful Functions

- Parasite—Already Poorly Performed by Native Fields
- Parasite—Abundant Native Fields
- Parasite—Laundry List of Adjacent Elements
- Parasite—Use of Cheap Abundant Substances
 - Powders—Foams—Voids—
 - Water—Ice—Steam—Hydrates—
 - Air—Nitrogen—Carbon Dioxide—
 - Oxygen—Corrosion—Decay—
 - Sand—Soil—Rocks—Waste—
 - Waste Water—Sawdust—Waste
 - Glass—Waste Gases—Waste
 - Paper—Garbage—Yard Waste—
 - Industrial Wastes—Hybrid
 - Substances—Disassociated
 - Forms of Any of the Above—
 - Products of Interactions—
 - Starting Materials—Final
 - Products—Semi-Finished
 - Elements.
- Parasite—Nearby Similar Tool
- Parasite—Simplified Copy of the Current Tool
- Theft of Functions from Super-System
- Theft from Alternative or Competing Objects
- Theft—Boost Incidental Functions
- Theft—Steal Human Interactions
- Theft—Self Service

Idealize Informing Functions (IFRs)



The Ideal Observer for Informing Functions

- The Ideal Observer Doesn't Need to Know

The Ideal Subject of Measurement

- Non-Existent Subject
- Measurement Not Required
- Direct Acting Sensors (Operation about Critical Points)
- Comes Pre-Measured
- The Minimum Part or Constituents
- Natural Groupings—Multiples
- Natural Groupings—Biased Subjects
- Natural Groupings—Diverse Subjects

The Ideal Modification for Informing Functions

- Describe Modification in a Variety of Ways—if I could snap my fingers
- Ideal Level
- Ideal Sequence
- Ideal Duration
- Ideal Duty Cycle
- Ideal Adjustability
- When Excluded?

Time for a New Physical Phenomenon?

- Evolutionary History
- Disruptive Technologies
- System Maturity
 - Technical Parameter
 - Level of Invention
 - Patents in Time
- Time for New Phenomenon?
 - Specialized
 - Diminishing Return
 - Feedback
 - Multiple Conflicts
- Hybrid or Stand-alone?


The Ideal Physical Phenomenon

- Competitive Alternatives
- Existing Products
- Internet Product Search
- Disruptive Technologies
- Patent Searching
- Intelligent Little People
- Evolution of Fields
- Library of Effects
- Patents Outside Industry
- Analog—Mega Trend
- Analog—Bio-mimicry
- Secondary Phenomena
- Copy or Facsimile
- Successive Detection
- Resonance
- Derivative Detection
- Multiple Subjects
- Internal Field Markers
- External Field Markers
- Attached Field Markers
- Detached Field Markers
- Internal Markers
- Attached Markers
- Detached Marker
- Intelligent Little People
- Evolution of Fields
- Interacting Multiples
- Hybrid Combination
- Filter—Abundant Resources
- Filter—Inherent Harm
- Filter—Multiple Functions
- Filter—Passive Control
- Filter—Function & Anti-Function

The Ideal Chain of Objects for Informing Functions

- Parasite—Already Poorly Performed by Native Fields
- Parasite—Abundant Native Fields
- Parasite—Laundry List of Adjacent Elements
- Parasite—Use of Cheap Abundant Substances
 - Powders—Foams—Voids—
 - Water—Ice—Steam—
 - Hydrates—Air—Nitrogen—
 - Carbon Dioxide—Oxygen—
 - Corrosion—Decay—Sand—
 - Soil—Rocks—Waste—Waste
 - Water—Sawdust—Waste
 - Glass—Waste Gases—Waste
 - Paper—Garbage—Yard
 - Waste—Industrial Wastes—
 - Hybrid Substances—
 - Disassociated Forms of Any of the Above—Products of Interactions—Starting Materials—Final Products—Semi-Finished Elements
- Parasite—Nearby Similar Measurement Device
- Simplified Copy
- Steal Human Service to System
- Theft— of Functions from Super-System (TRIZ Universality also ASIT Unification Tool)
- Theft— from Alternative or Competing Objects
- Theft—Boost Incidental Functions
- Theft—Steal Human Interactions

Idealize Harmful Functions (IFRs)



The Ideal Product for Harmful Functions

- Non-Existent Waste Product

The Ideal Modification for Harmful Functions

Make Useful

- Anti Function
- Reverse Fields or Action
- Reframing Harmful Functions as Useful Functions
- Work With
- Aesthetic Incorporation
- Make Adjustable
Fixed—Adjustable—Continuous—Feedback
- Perform Accurately—
- Intelligent Little People
- Harmonize Sequence
- Partial Modification
- Storage of Action
- Changing Speed

Preventative

- Add Preventative Function
- Redirect the Harm
- Fool the Harming Object

Diminishing

- Add Diminishing Function
- Mediator
Alien—Modified Tool or Product Substances—Void
- Internal additives
Ionized—Recombined—Dilution of constituents—Concentration of constituents—Change of Bulk Properties—Form structures at micro level—State of Matter—Chemically altered
Heat treatment
Electrification
Heated
Foam
Decomposed
Mobilized
- Counter Flow
- Absorb or Dissipate

Remedial

- Previously Placed Cushion
- Add Fixing Functions

The Ideal Tool for Harmful Functions

- Non-Existent Tool
- Harmful Tool Not Required

Table of Fields

Elastic Stress	Gravity	Friction	Adhesion
Buoyant Force	Hydrostatic Pressure	Jet Pressure	Surface Tension
Centrifugal Force	Inertial Force	Coriolis Force	
Oder & Taste	Diffusion	Osmosis	Chemical Fields
Sound	Vibrations & Oscillations	Ultrasound	Waves
Thermal Heating or Cooling		Thermal Shocks	Information
Corona Discharge	Current	Eddie Currents	Particle Beams
Nuclear Forces			
Electrostatic Fields	Magnetic Fields	Electromagnetic Fields	
Radio Waves	Micro Waves	Infrared	Visible Light
Ultraviolet	X-Ray	Cosmic	