Overcoming Innovation Barriers

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Innovation
It is about doing things BETTER than it was done before.

It is about SATISFACTION.

“Innovation is not invention. It is a term of economics rather than technology.”

Peter Drucker
WHAT'S NEXT?
Organizations know that “what’s next” is all about...

1. Thinking differently
2. How to create compelling customer value
3. How to flow that value through streamlined processes
4. Embedding a real discipline around pursuit of perfection
Conventional Approach is Inefficient

The Innovation Challenge

- 3,000 Raw Ideas (Unwritten)
- 300 Ideas Submitted
- 125 Small Projects
- 9 Early Stage Development
- 4 Major Development
- 1.7 Launches
- 1 Success

Innovation is cumbersome

Improving Existing Systems
(99% of problems)

- Eliminate Disadvantage of System
- Increase Main Useful Function of System
- Reduce Weight, Dimension and Resource Consumption
- Add New Useful Function

Synthesis of New Systems
(1% of problems)
1. Project constraints

2. Psychological Inertia

3. Limited breadth of knowledge

4. Giving up and/or compromising too easily and too early

5. Not invented here syndrome

6. Unable to forecast the future

7. Solving the wrong problem
six
nine
"Horizontal double-bubble"
TRIZ
Theory of Inventive Problem Solving
TRIZ Roadmap

- Functional Analysis:
  - Identifies and evaluates the functions performed by the components

- Component Analysis:
  - Identifies components of the system

- Function Modeling:
  - Identifies interaction between the components

- Interaction Analysis:
  - Identifies interaction between the components
Component Analysis

Top Level

2nd Level

3rd Level

4th Level

- Electrolyte
- Electrodes
- Battery casing
- Battery terminals
Interaction Analysis

Identify all the interactions between the components and whether it is positive or negative or neutral.
Function Modeling

This is a stage which describes the functions, their usefulness and performance level, i.e. an action performed by one component on another.
Conditions for existence of function

1. Both, “function carrier” and “object of the function” are components.

2. Function carrier “interacts” with the object of the function.

3. Parameters of object of function either “affected or maintained.”
Element – Parameter – Value; The (EPV) Concept
The EPV Model

1. Good innovators are adept in identifying difference characteristics of any given object.

2. They view the object from multiple dimensions.

3. Element - Parameter - (Opposing) Values of that parameter.
ELEMENT of the EPV Model

- Element is the **WHOLE** or **PART** of the object
PARAMETER of the EPV Model

- Parameter is the characteristic defining the object
- It can be changed
- For e.g.
  - Length
  - Weight
  - Diameter
  - Color
  - Temperature
VALUES of the EPV Model

• Opposing values for each parameter

• Consider
  • Height: Low-High
  • Numerical: 0-Infinity
  • Weight: Heavy-Light
  • Temperature: Hot-Cold
  • Hardness: Hard-Soft
Writing the EPV

Element

Parameter

Value 1
(Desired)

Opposite Value 2
(Not desired)
Writing the EPV

- Fire
- Temperature
  - 125°C (Desired)
  - 25°C (Not desired)
Writing the EPV
Rules for defining a MUF

1. The ACTION MUST CHANGE a parameter of the object

2. The SUBJECT/ACTION/OBJECT MUST BE PRESENT

3. Avoid AMBIGUOUS ACTIONS, for e.g. Protects, Cleans
Think of the following

- To protect the head
- To save the soldier
- Not allow the bullet to penetrate

- HELMET DEFLECTS/STOPS THE BULLET

Main Useful Function
MUF Definition

KEEP

CHANGE

to

INCREASE

DECREASE

which parameter from to
Innovations thrive on resolving Contradictions
Representing the contradiction

• The written form for a Contradiction is

IF <the wings of the plane are large>
THEN <the plane can fly>
BUT <will occupy more parking space>
IF <the wings of the plane are small>
THEN <will occupy less parking space>
BUT <the plane cannot fly>

The plane should have large wings such that it can have a stable flight, but also not take much parking space when on ground.
1. Physical

2. Technical
Contradictions occur when improving one characteristic leads to deterioration of another. For e.g.

- Improved crash-worthiness $\rightarrow$ Increased weight of car
- Increased audit samples $\rightarrow$ Increased time for completing assignment
- More experienced audit team $\rightarrow$ Increased cost of engagement
2. Technical

Two justified opposite requirements are placed upon a single physical parameter of an object.
For e.g.
- Hammer should be **heavy and light**

These cause conflicting requirements.
Innovative solutions RESOLVE contradictions and NOT settle for a compromise or trade-off.
Resolving Physical Contradiction

1. Separating contradictory demands
   - Space
   - Time
   - Relation
   - System Level

2. Satisfying contradictory demands

3. Bypassing contradictory demands

4. Apply inventive principles
You will never stand out if you try to look like everyone else.

Innovation is not imitation.
THINK OUTSIDE THE
THANK YOU
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