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Directions for Future TRIZ Development and Applications

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What does it take to grow a business?

Key Findings:

Commit to Superior Customer Value

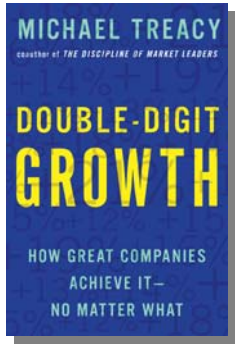
- **Quality & Price**
- **Innovation — Products & Services**

Focus on Five Sources of Revenue Growth

- **Base Retention**
- **Market Share Gain**
- **Market Position**
- **Adjacent Markets**
- **New Lines of Business**

Manage a Growth Portfolio

- **Hedge risks by investing in multiple initiatives**
- **Break the challenge into manageable pieces**



Focus on Five Sources of Revenue Growth

Base Retention	• **Keeping more of your current customers** • **"To grow we first have to stop shrinking"**
Share Gain	• **Use better value to take business directly from competitors** • **The toughest way to grow — to win, someone else must lose**
Market Positioning	• **Half of success is showing up where growth is going to happen** • **Find the new growth segments before anyone else**
Adjacent Markets	• **Attack neighboring markets** • **But, only when immediate and practical advantage is in hand**
New Lines of Business	• **Acquire in unrelated markets** • **But, only when management has superior investment skill**

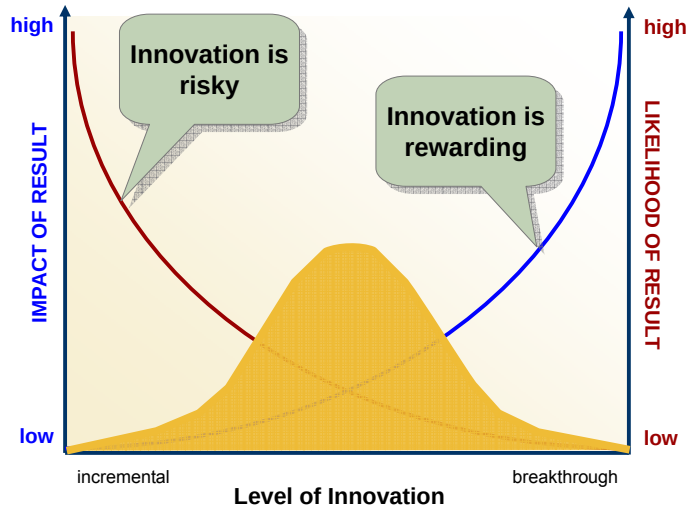
Diversified Approach: Companies Don't Know Where to Place the Big Bets

- Companies struggle to identify and prioritize opportunities for growth
- Companies don't know which ideas are winners – so they make many small bets
- Weak initiatives are difficult to kill

… many initiatives, few successes – high costs

Risk vs. Impactful Results

Ambition Imbalance:
Maximize the risk-adjusted return on innovation



Source: Tierney, "Innovation as a Last Resort," Harvard Business Review (July/August 2004)

Risk vs. Impactful Results

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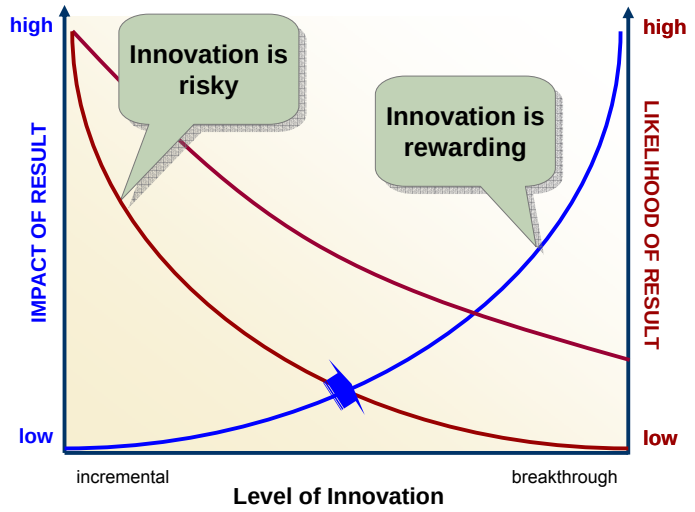
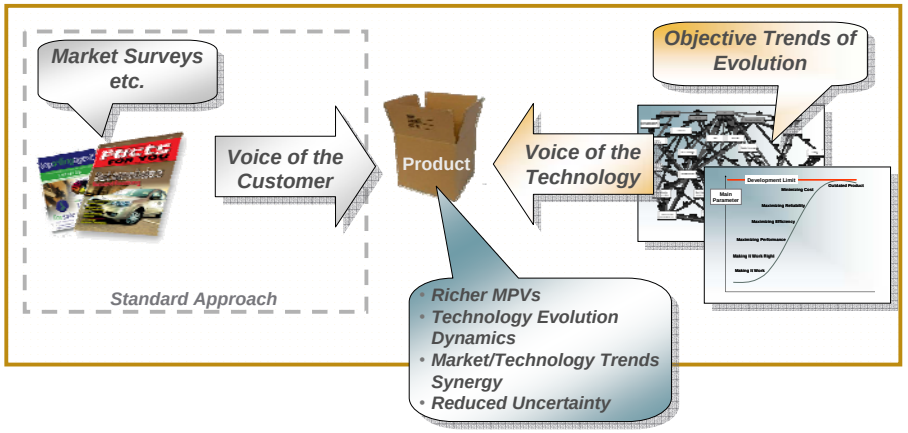


Opportunities Are Often Squandered Because …

- They go undiscovered
- Methods for prioritizing opportunities are faulty
- Opportunities are dynamic – they migrate over time
- Companies inherently focus on their core competencies, eventually making improvements when they are no longer needed

"They all look like opportunities to me!"

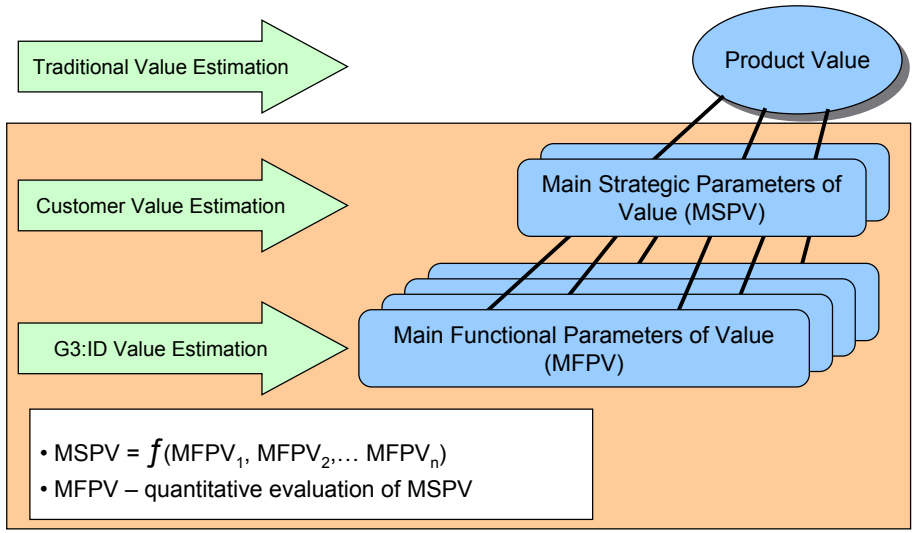
Innovation Approach: **Opportunities get Discovered and Prioritized**



Main Parameters of Value – Definitions and General Logic

- Main Strategic Parameters of Value (MSPV) are the Product attributes that define Customer behavior on the market
- Main Functional Parameters of Value (MFPV) are objective technical (physical, chemical, geometrical, biological, *etc*.) parameters that are responsible for MSPV
- Traditional parameters (like Performance, Convenience, Safety, Styling, Indulgence, Cost, etc.) are too general, and are not instrumental for innovation
- Not all these parameters are equally important to customers (usually, only 2-3 SPV are really MSPV)
- There are some latent parameters that are not even recognized by the market as MSPV. Process the Voice of the Customer – do not take it literally.
- For different market segments, MSPV are different

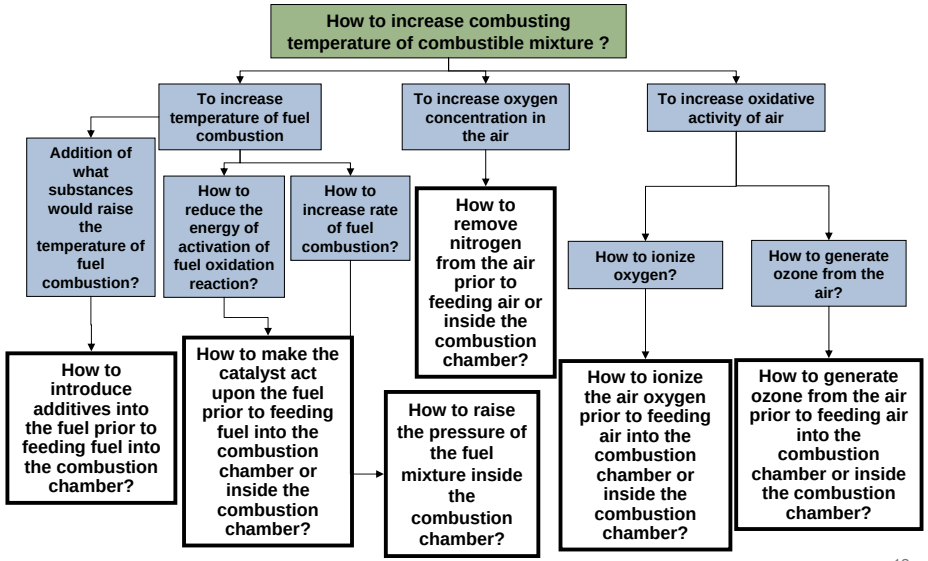
MPV Analysis



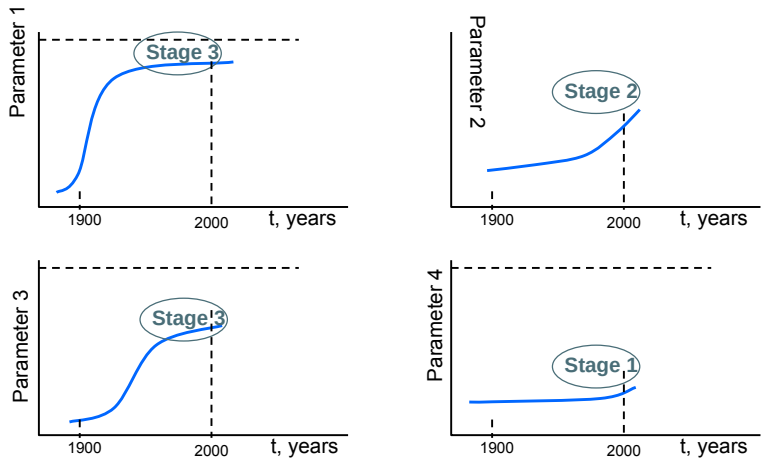
Main Parameters of Value – General approach

Strategic MPV	1 Level MPV	2 Level MPV	3 Level MPV (MFPV)
Fuel Economy	Aerodynamic drag	• Form drag • Resistance from friction against external surfaces • Resistance generated by protruding parts of the car • Turbulence resistance	• Air density • Air viscosity • Air temperature • Area of the largest cross-section of the car • Car speed • Shape (size) of cabin, fairings, trailer • Material surface energy • Van-der-Waals forces (forces of mutual attraction of molecules)
	Cost effectiveness of engine	Engine efficiency	• Combusting temperature of combustible mixture • Combustible mixture density • Size (arrangement) of piston-rod group • Size of particles of atomized fuel • Air temperature • Uniformity of fuel mixture spray • Excessive air coefficient
	Rolling resistance	• Structure (composition) of road surface • Truck weight • Weight of cargo carried • Quality and number of rolling contact bearings	• Unevenness of road surface • Unevenness of tire surface • Shape (relief) of tire protector • Mechanical parameters (rigidity, elasticity) of tire • Metal density • Size of point of contact between wheel and road pavement • Load on one axis of truck • Optimality of load-bearing structure

Main Parameters of Value – General approach

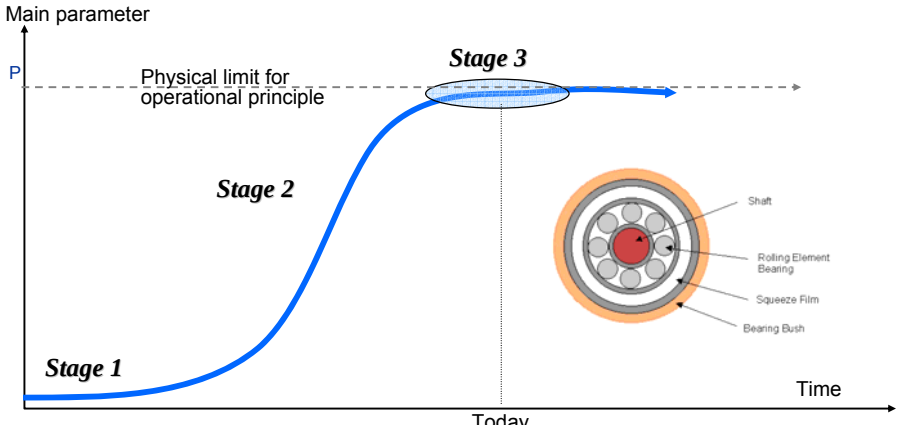


S-Curve Analysis for Different MPVs

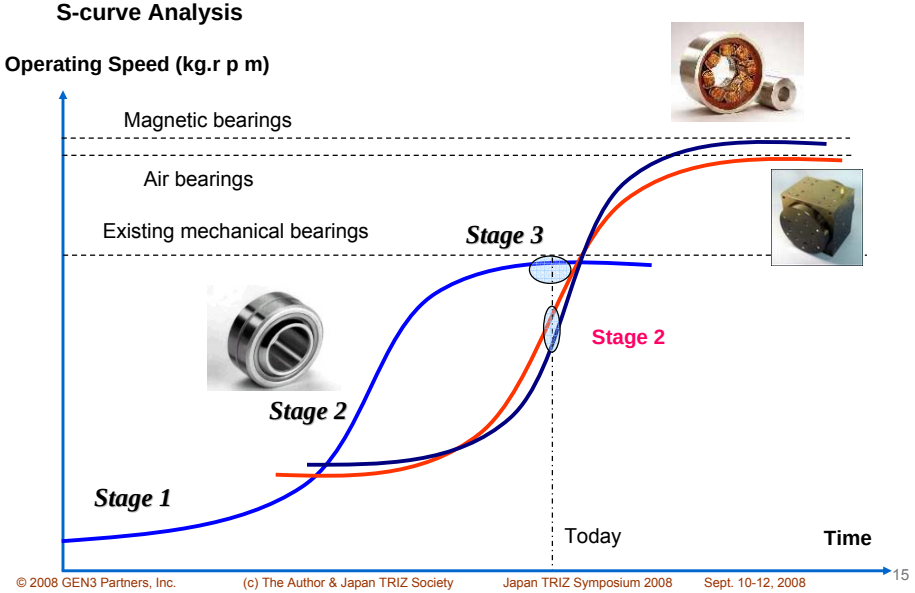


Main Parameters of Value. S-curve Analysis

The main parameters of an engineering system change as the system evolves over time, forming S-shaped curves



Main Parameters of Value. S-curve Analysis



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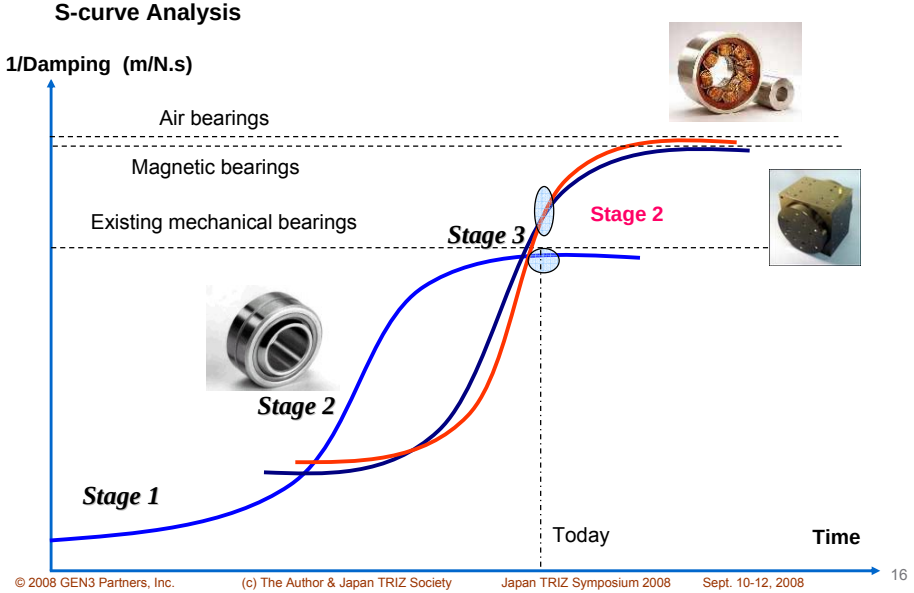

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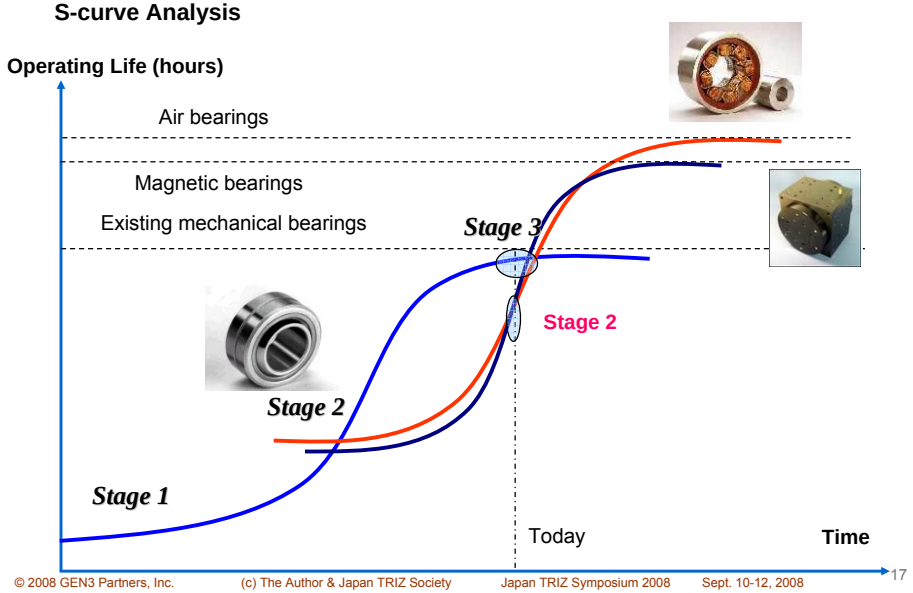
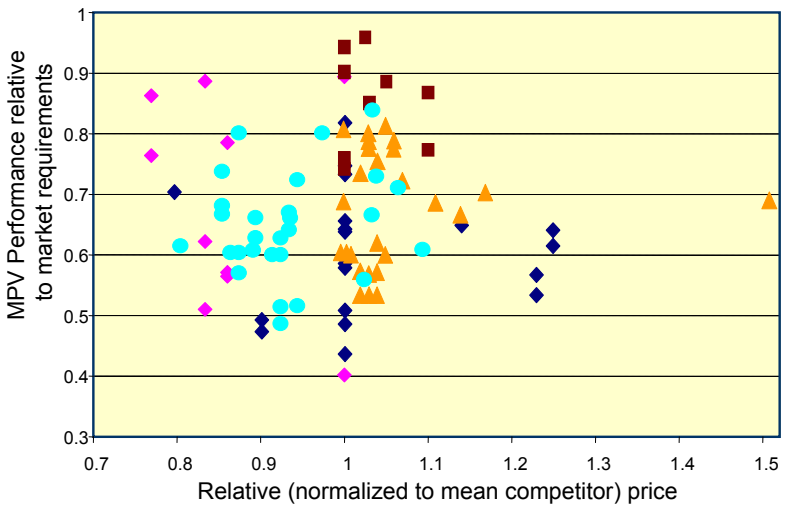


Opportunity Mapping (Main Parameters of Value)

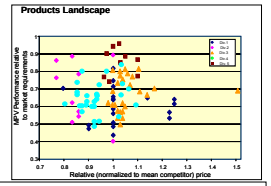
Portfolio Value Landscaping
MPV Performance-Price Landscape



Products Landscape

- **Products Landscape shows:**

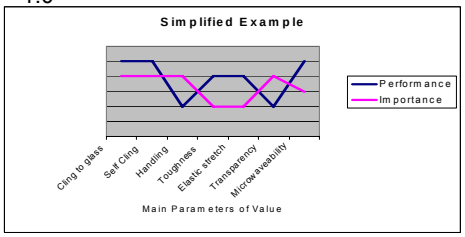
1) **How products in the portfolio perform relative to market requirements**
2) **How products are priced relative to competitors**

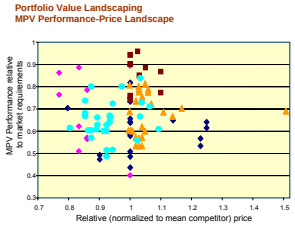


- Market requirements are expressed in terms of Main Parameters of Value — attributes of a product seen as valuable by the customer
- For each product family, an estimate is made with regard to:
  - **Customer requirements for each Main Parameter of Value (MPV)**
  - **The actual performance of product with respect to each MPV**
- MPV Performance is the single measure of the extent to which a product achieves customer requirements (see definition and example on next page)
- The gap between actual performance and customer requirements is a measure of scope for improving the performance of a product
- Relative Price is the ratio of the Client's pricing to average pricing by competitors
- Both of these elements will be used as foundation to derive various perspectives on the product portfolio

Portfolio Value Landscaping
MPV Performance-Price Landscape

- MPV Performance (*P*) is the average of performance relative to each MPV, weighted by the importance of each MPV. A perfect score is 1.0





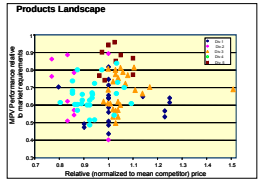
$$P = \frac{1}{10}\sum_{i=1}^{N} \alpha_i p_i; \quad \sum \alpha_i = 1; \quad p_i \in \langle 1..10 \rangle, \quad N = number\ of\ MPV$$

p_i = performance relative to MPV_i

α_i = importance of MPV_i

Definition — Relative Price

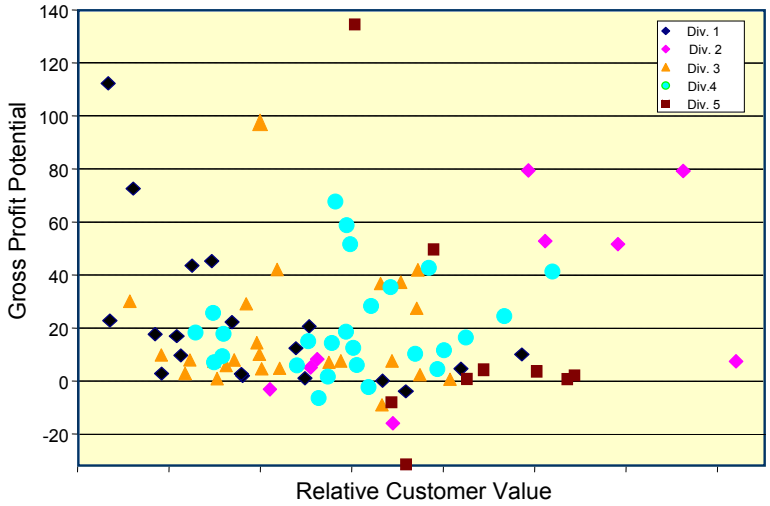
- **Relative Price is the ratio of the Client's price to the average price of competitors**



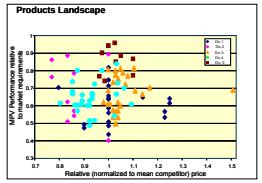
$$Price_{relative} = \frac{\$Price_{client's}}{\$\langle Price_{comp} \rangle}$$

$\langle Price_{comp} \rangle$ = Average of Competitor Price

Products Landscape



Products Gross Profit Potential

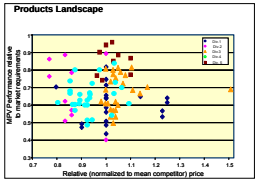


- **Products Gross Profit Potential maps:**

1) **The value products in the portfolio deliver to customers**
2) **The aggregate profit potential from each product category**

- The vertical axis represents the total profit pool available to participants in the market. It is the theoretical maximum profit to be gained from a player with 100% market share. Products to the north have the greatest financial potential
- The horizontal axis represents the value delivered to the customer. Products to the west have the lowest value delivered to customer requirements. Products to the east are delivering high value to customers
- Note: Other determinants of market share will be introduced in later stages of the Innovation Agenda process

Gross Profit Potential

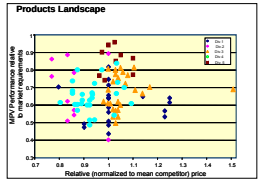


- **Gross Profit Potential (GPP) is the projected market size (current market size adjusted for three years of compound growth) multiplied by the projected gross margin percentage**

$$GPP = M \times (1+\Delta M)^3 \times GM$$

M = Current market size (millions)
ΔM = Rate of market growth
GM = Gross Margin

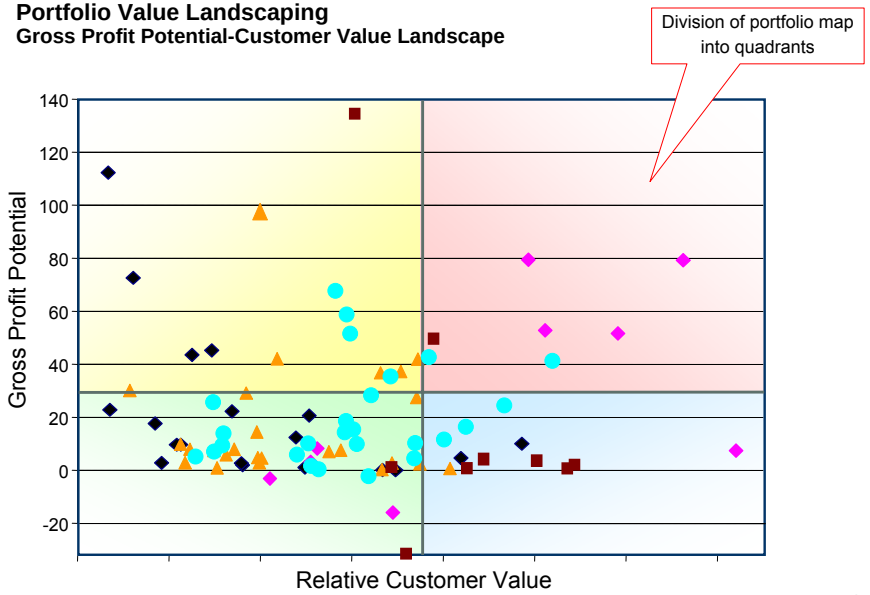
Customer Value



- **Customer Value is the MPV Performance of Client's product divided by relative price**

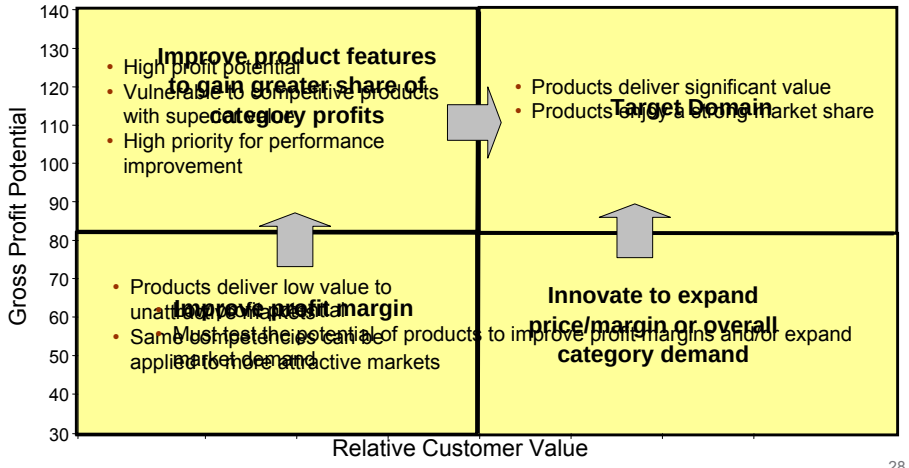
$$Value = \frac{Performance_{Client's}}{Price_{relative}}$$

Portfolio Value Landscaping
Gross Profit Potential-Customer Value Landscape

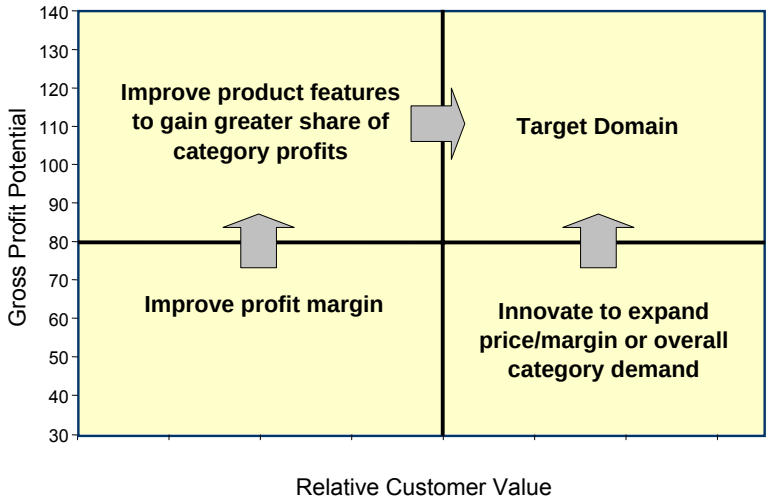


Different Innovation Strategies for Different Products

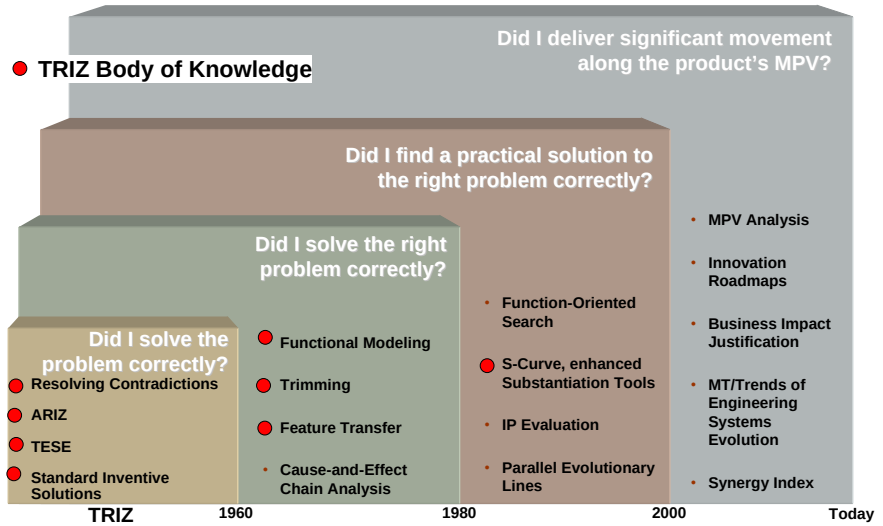
- **The appropriate innovation strategy for a given product depends on its position on the Portfolio Map**



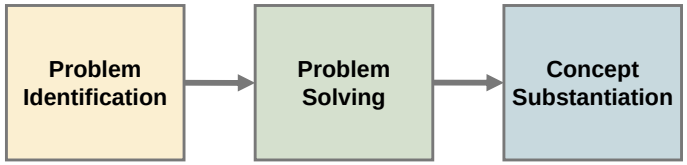
Portfolio Value Landscaping
Gross Profit Potential-Customer Value Landscape



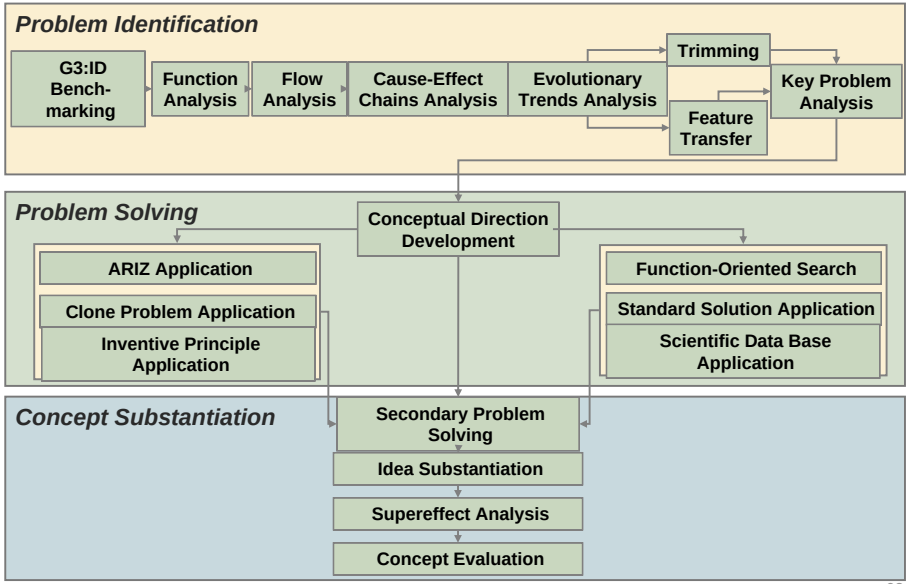
Evolution of Science of Innovation



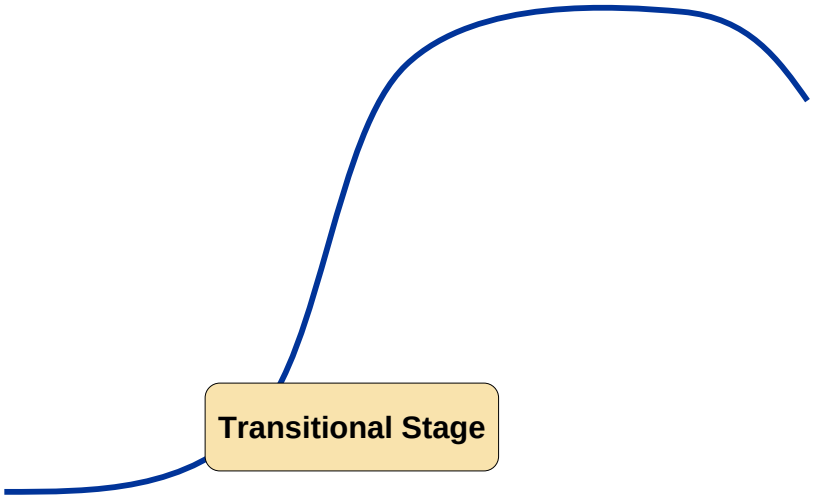
Cornerstones of G3:ID Product Innovation



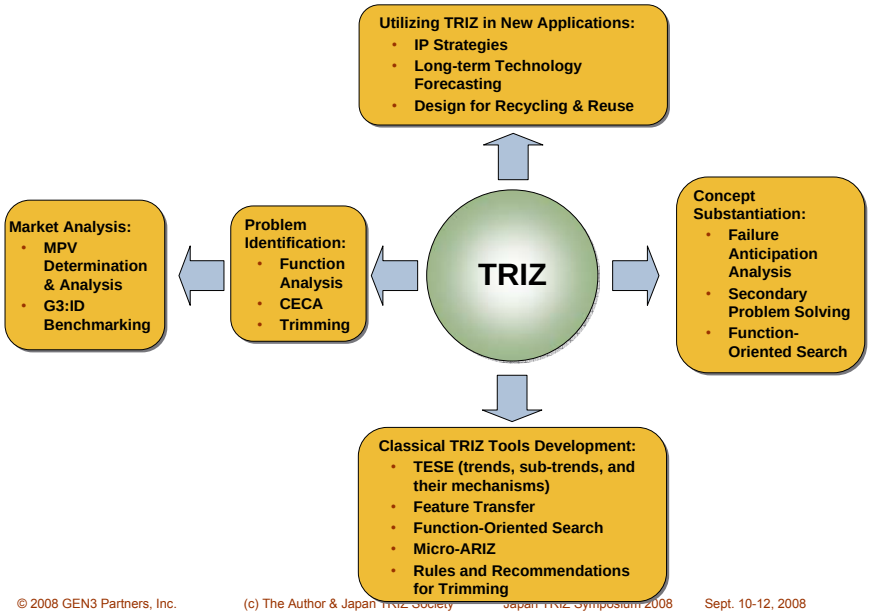
The G3:ID Product Innovation Roadmap



TRIZ Position on the S-Curve

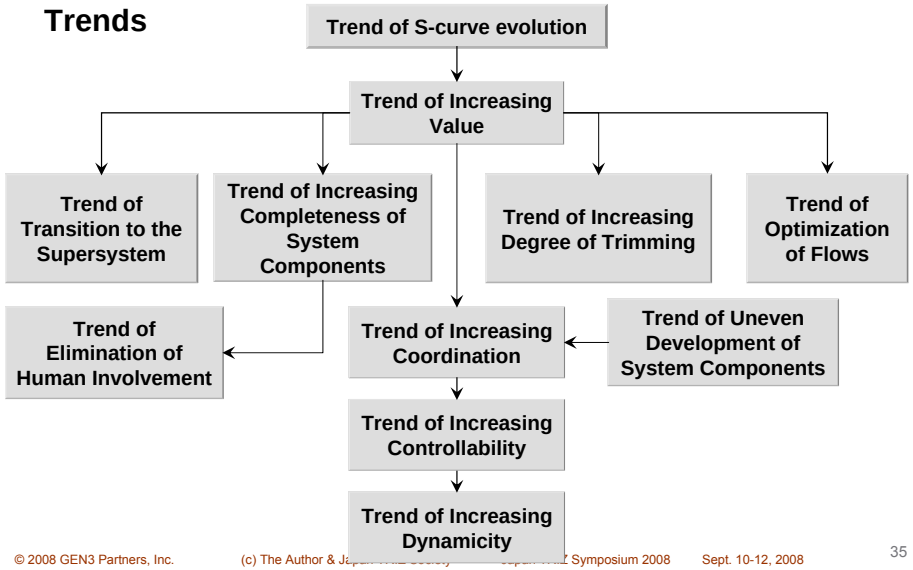


Going Beyond Classical TRIZ



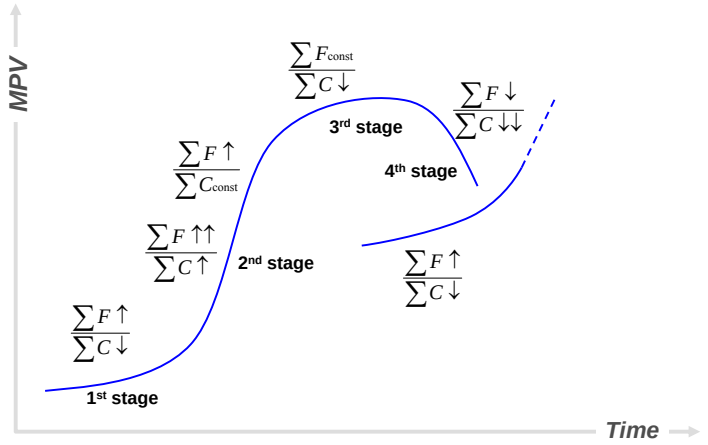
Trends of Engineering System Evolution

- **Hierarchy of Trends**



Trends of Engineering System Evolution

- **Trend of Increasing Value and S-Curve Evolution**

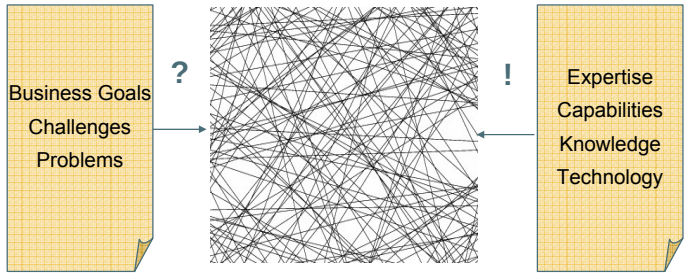


Some Directions of TRIZ Future Development

1. **Pragmatic S-Curve Analysis – the time axis.**
2. **Trends of Engineering System Evolution – mechanisms and algorithms.**
3. **Open Innovation.**

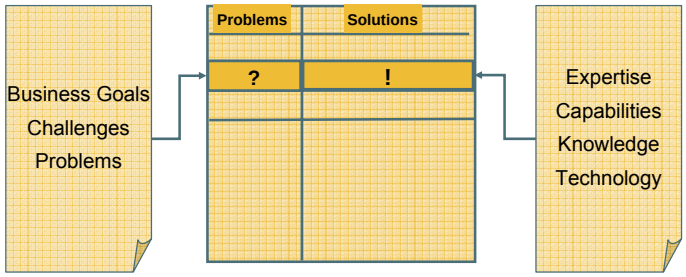
Open Innovation

Open Innovation, as it is approached now, is difficult to implement, since world of challenges is weakly connected to the world of existing expertise, capabilities, knowledge, and technologies

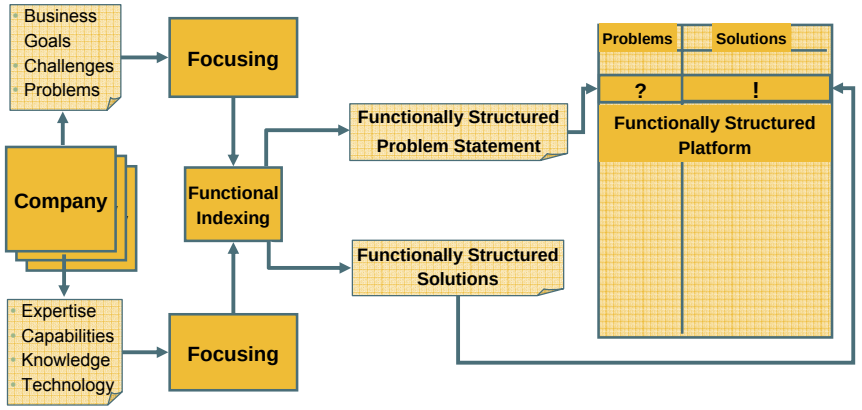


Open Innovation

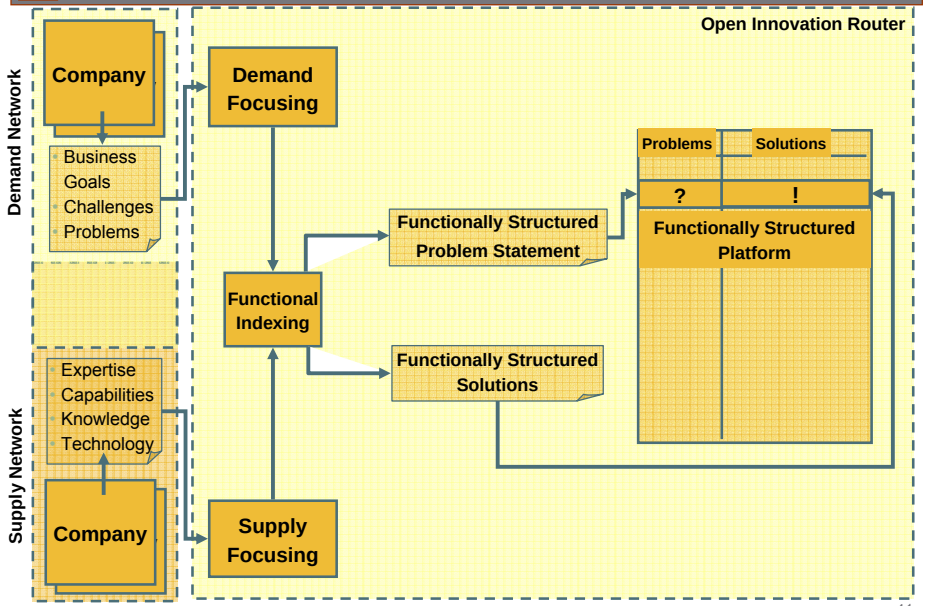
Open Innovation becomes straightforward in a Functionally Structured World



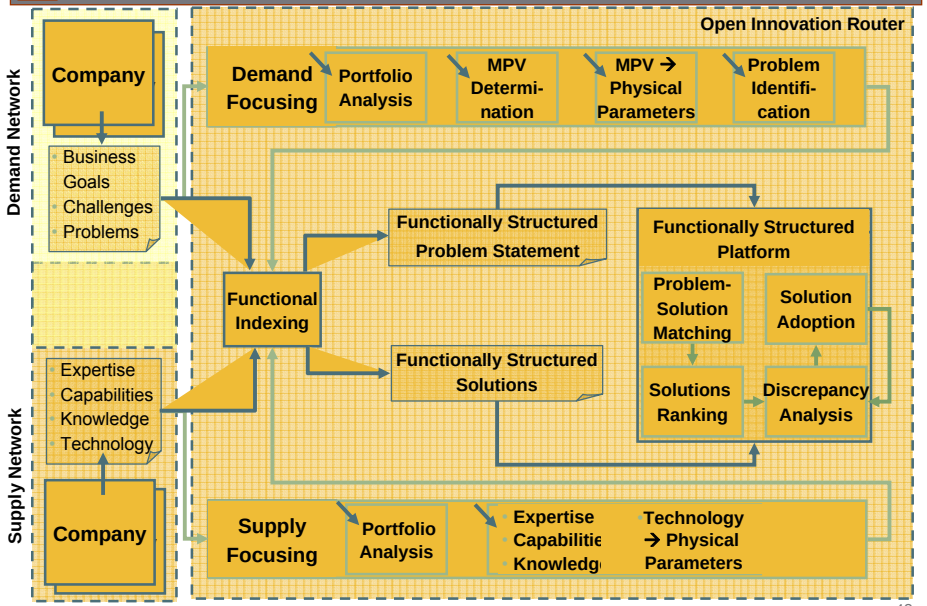
Open Innovation



Open Innovation



Open Innovation



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Directions for Future TRIZ Development and Applications

Thank you!

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