Ecosystems Approach to Disruptive Innovation

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Ceramatec Overview

- Founded 1976
- Advanced R&D Company
- 100% Privately Owned
- Self Sustaining Business Unit
- Concept to commercialization
  - R&D --> prototype --> pilot scale fabrication
- Core competencies:
  - electrochemistry, ionic conducting ceramics, & advanced materials
- Customers
  - 50% Fortune 100/500 Companies
  - 50% Govt.
Innovations

DISRUPTIVE
Market Creating

INCREMENTAL
Sustaining
Efficiency
A **disruptive innovation** is an **innovation** that helps create a **new market** and **value network**, and eventually **disrupts an existing market** and value network (over a few years or decades), displacing an earlier technology.
Disruptive Innovations

- Resets and produces new markets
- Engine for robust organic growth and jobs
- Vital for future competitiveness and leadership in markets
- High Capital Requirement
- Typically High Risk, High Payoff
- Opportunity to improve lives around the world
- Military strength and deterrence implications
“If I had asked people what they wanted, they would have said faster horses.”

—Henry Ford
Disruptive Innovations
Ceramic Based Innovations

Ion Transport Membranes

Sensors

Space Shuttle Tiles

Medical Devices

Body Armor
“If we don’t cannibalize our own products someone else will.”

- S. Jobs
Stage Gate Process good for Disruptive Innovation?

Formal Gates: Idea Killers Dream??

Source: Cooper (1994)
Idea Killers-- Beware

• This will never work…..
• We tried this before…..
• Let’s do full economics
  – Very beginning of research
• Business Units
  - We could use that $ now and make $ quickly

Idea Killers are all around.....................
Six key **ingredients** and **enablers** to create Disruptive Innovations

*Six “Ps”*
1st Key: PEOPLE

- It is all about good people
- Visionary Leaders
- Hiring: most important business decision
- Strategic competitive advantage
- Invest in good people to make them great
1st Key: PEOPLE

- Competence
- Imaginative
- Energy
- Attitude
- Driven
- Focused
- Wired Differently
- Cross functional

Willing to take Risks, Fail and Succeed
2nd Key: PESOS Money!!!!

CASH IS KING

• Without $$, No Disruptive Innovation
• $$ Commitment Long Term
• Set aside $$ for High Risk, High Payoff technologies
2nd Key: PESOS Money!!!!

- Long term investment $ must be protected
- Beware of Business Units & CFO
  - Grab for $$
- Senior Leader Commitment
- Have a clear $$ baseline

Dr. Clay Christensen’s article in HBR 2008
3rd Key: PASSION

PAS*SION

• *noun* \ˈpa-shən\: a strong feeling of enthusiasm or excitement for something or about doing something

“Passion is the genesis of genius.”
- Galileo Galilei
"The two most important days in your life are the day you are born and the day you find out why."

Mark Twain
3rd Key: PASSION

- Passion for work
- Passion for overcoming challenges
- Passion reaching milestones
- Passion working with team or individual
- Passion for changing the world
per·sist·ence

noun: persistence

• firm or obstinate continuance in a course of action in spite of difficulty or opposition
“It isn’t about how hard you can hit. Its about how hard you can get hit, and how much you can take, and keep moving forward.”

- Rocky Balboa Quote From The Rocky Balboa Movie.
4th Key: PERSISTENCE

- Focused
- Determined
- Energy
- Relentless
- Alternative strategies
- Celebrate failures and learn
5th Key: PATIENCE

- patience
  noun: patience
- the capacity to accept or tolerate delay, trouble, or suffering without getting angry or upset.
5th Key: PATIENCE

- Ability to accept failure as a learning opportunity
- Bigger the risks…more failures
- Envision a pathway to overcome
Partnership: The coming together of dissimilar entities with similar goals and expectations.
6th Key: PARTNERSHIPS

- Customers
- Internal Company
- Strategic Suppliers
- Consultants

*It takes a village........!!*

“In this new wave of technology, you can't do it all yourself, you have to form alliances.”
- Carlos Slim Helu
Partnerships

Example **APCI and Ceramatec**

- 1992
- Bring together strengths of both organization
- Top Leadership Commitment
- Trust at all levels in both organizations
- Good Communication
- Six “P”s

Ion Transport Membranes
Six “Ps” + One: CULTURE

- Culture is THE BINDING Agent
- BINDING Agent must not be rigid
- Culture: Key enabler and barometer
- Chipping away of Innovation Culture will lead to the House of Cards (Six Ps) falling down
- Culture set by CEO
Organization Structure to Promote DI

- CEO un-wavering commitment to DI Group
- DI Group
  - Separate from Business Units
  - Separate from Conventional R&D Group
- Freedom to operate within DI Group

Disruptive Innovation (DI) Group

R&D Group Stage Gate

Business Unit

Business Unit
Example: Tesla Motors

- People: Visionary Leader with conviction
- Pesos
- Passion
- Patience
- Persistence
- Partnerships
- Implemented “Can Do” Culture
Example: Office of Naval Research

✓ People: Visionary Leader, Protected by CNO
✓ Pesos: Set aside funds
✓ Passion
✓ Patience
✓ Persistence
✓ Partnerships
✓ Research Culture

Shipboard Laser Weapons
Innovation:

Enjoy the Journey!

Thank you!