Grabbing Lightning: Building a Capability for Breakthrough Innovation

Gina Colarelli O'Connor (oconng@rpi.edu)

Associate Professor

Director, Radical Innovation Research Program

A Little Bit of History…But Not Much

- RI Phase I: 1995-2000
- Longitudinal Study of 12 Radical Innovation Projects in Ten Mature Firms
- Definition of RI
- RI Lifecycle
- 4 dimensions of uncertainty, not 2
- 7 challenges
- RI Maturity

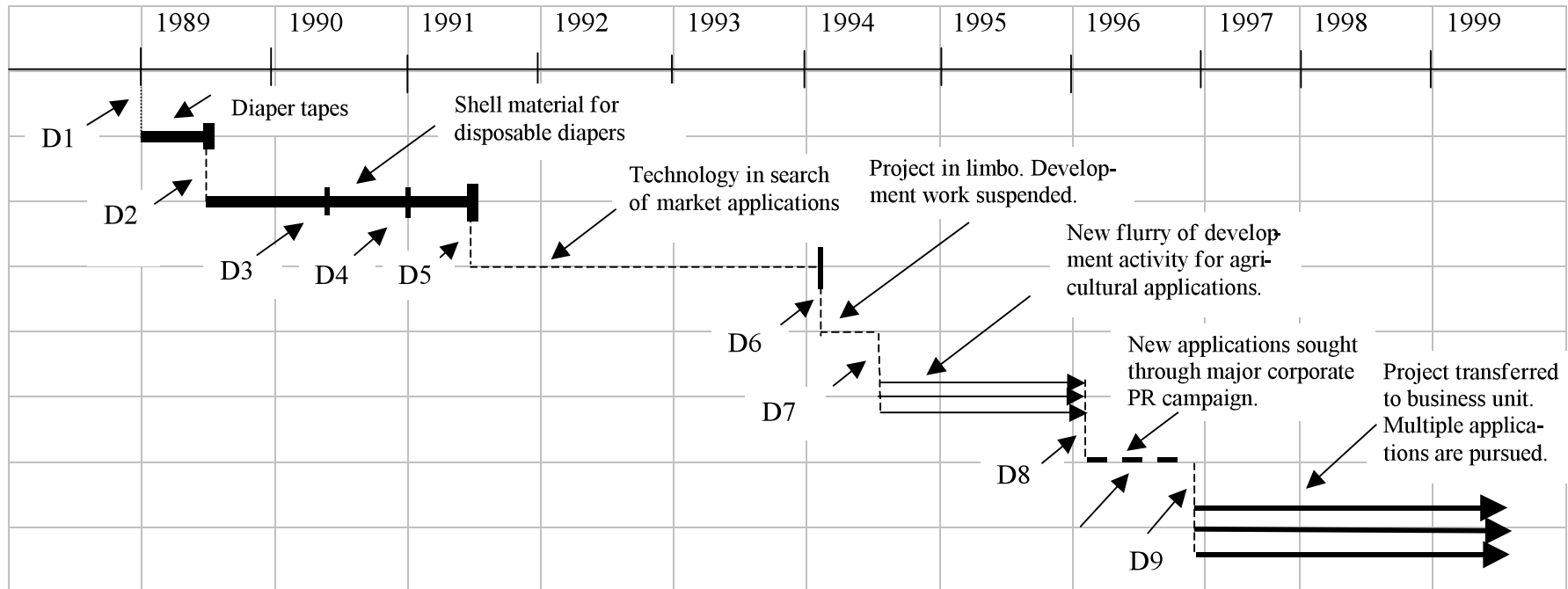**RADICAL INNOVATION:**
How Mature Companies Can Outsmart Upstarts
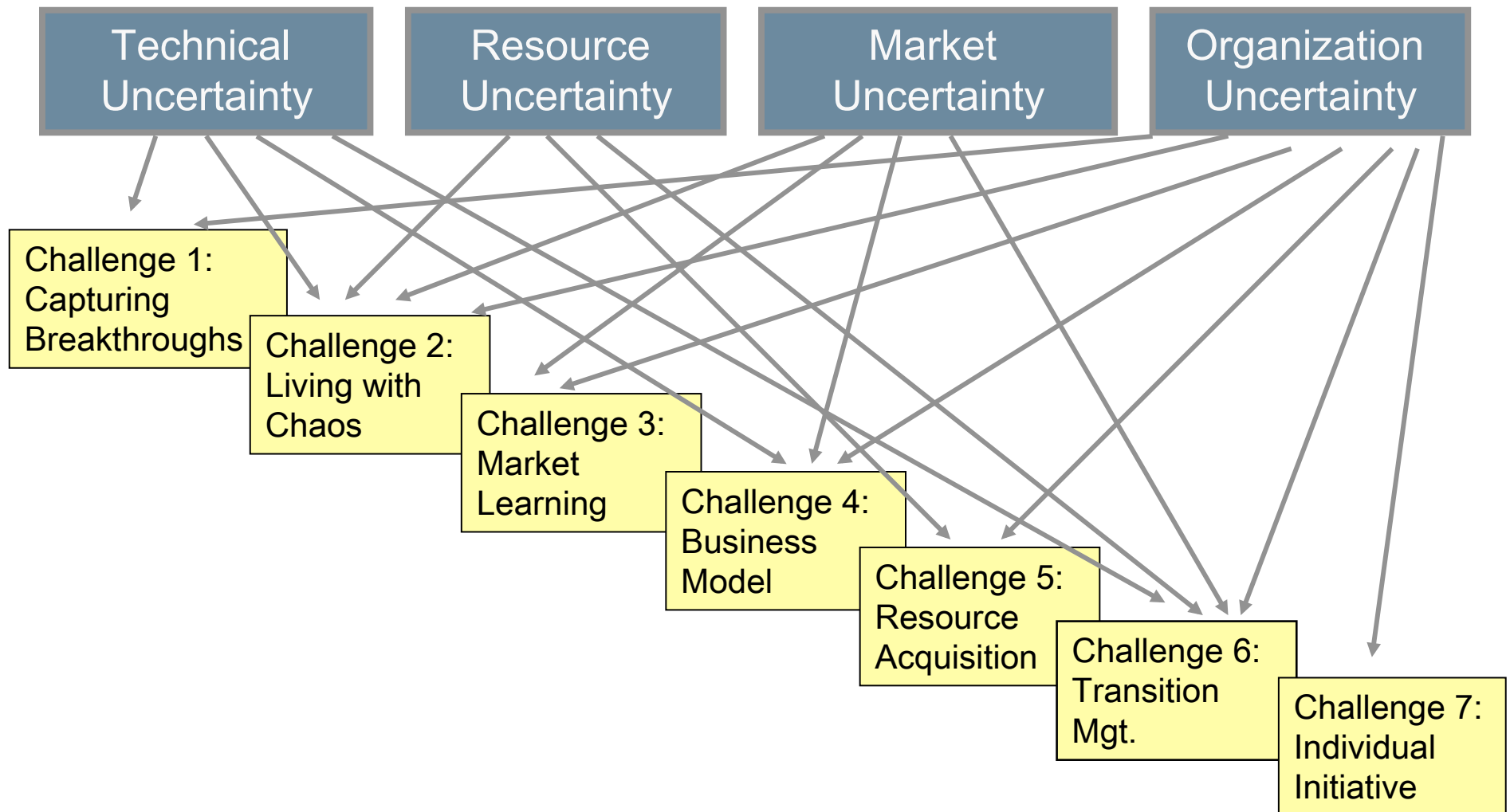
Radical Innovations: Qualifying Projects

The project was established -- with an identifiable team and funding. The company perceived that the innovation had the potential for significant strategic impact, via development of:

➢ new to the world performance features,

➢ 5-10X (or greater) performance improvement, or

➢ 30 - 50% (or greater) reduction in cost.

Comprehensive Framework for Managing Radical Innovation

Technical Uncertainty	Resource Uncertainty	Market Uncertainty	Organization Uncertainty

Challenge 1: Capturing Breakthroughs

Challenge 2: Living with Chaos

Challenge 3: Market Learning

Challenge 4: Business Model

Challenge 5: Resource Acquisition

Challenge 6: Transition Mgt.

Challenge 7: Individual Initiative

Early vs. Mature RI Capacity: Our Point of Departure

Early	Mature
Executives act as provocateurs, patrons, and champions to compensate for lack of supportive culture.	The firm's leadership sets expectations, develops RI culture, establishes facilitating organizational mechanisms (hubs) and develops goals & reward systems.
Mavericks try to catch the attention of patrons. There is a lack of infrastructure and systematic approach.	RI idea hunters seek opportunities. Hubs establish effective evaluation boards. Non-traditional marketing & business creation personnel work with RI technical teams to develop business models. There is a learning orientation to project management
Acquisition of resources is ad hoc. Project teams often expect a budget allocation for funding.	Individual managers with authority to provide seed funding and internal VC organizations provide multiple sources of capital for RI. The firm adopts a portfolio approach to funding RI projects.
Completion of RI tasks, project staffing and champions rely on individual initiative.	RI hubs work with HR to develop a strategy for identifying, selecting, rewarding and retaining RI champions, experts and team members.
Communication difficulty makes transition difficult, often flounders and relies heavily on intervention of senior management.	Transition team established with funding and senior mgmt support continues development until uncertainty reduced for successful transition.

The Radical Innovation Learning Curve

Radical innovation _maturity_ is defined as the degree to which the organization has embedded a system for initiating, supporting and <u>sustaining</u> RI activities
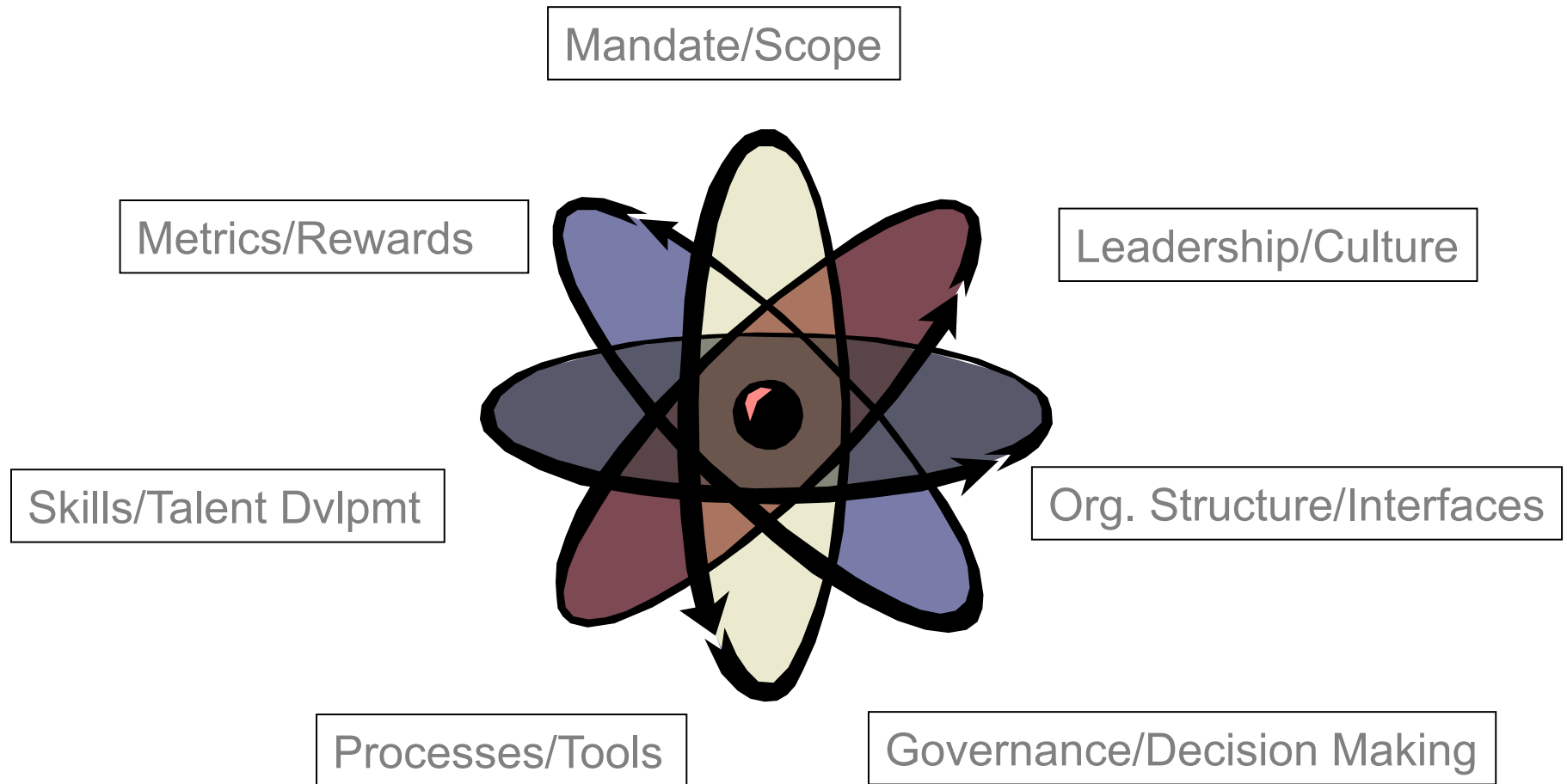
Average Life Expectancy of an RI system: 4 years

Corporate Competency Development for the Management of Radical Innovation

- Objective: To understand how organizations can systematically develop, evolve and sustain their radical innovation competencies.

- Ten academics, different disciplines.

- Industrial Research Institute.

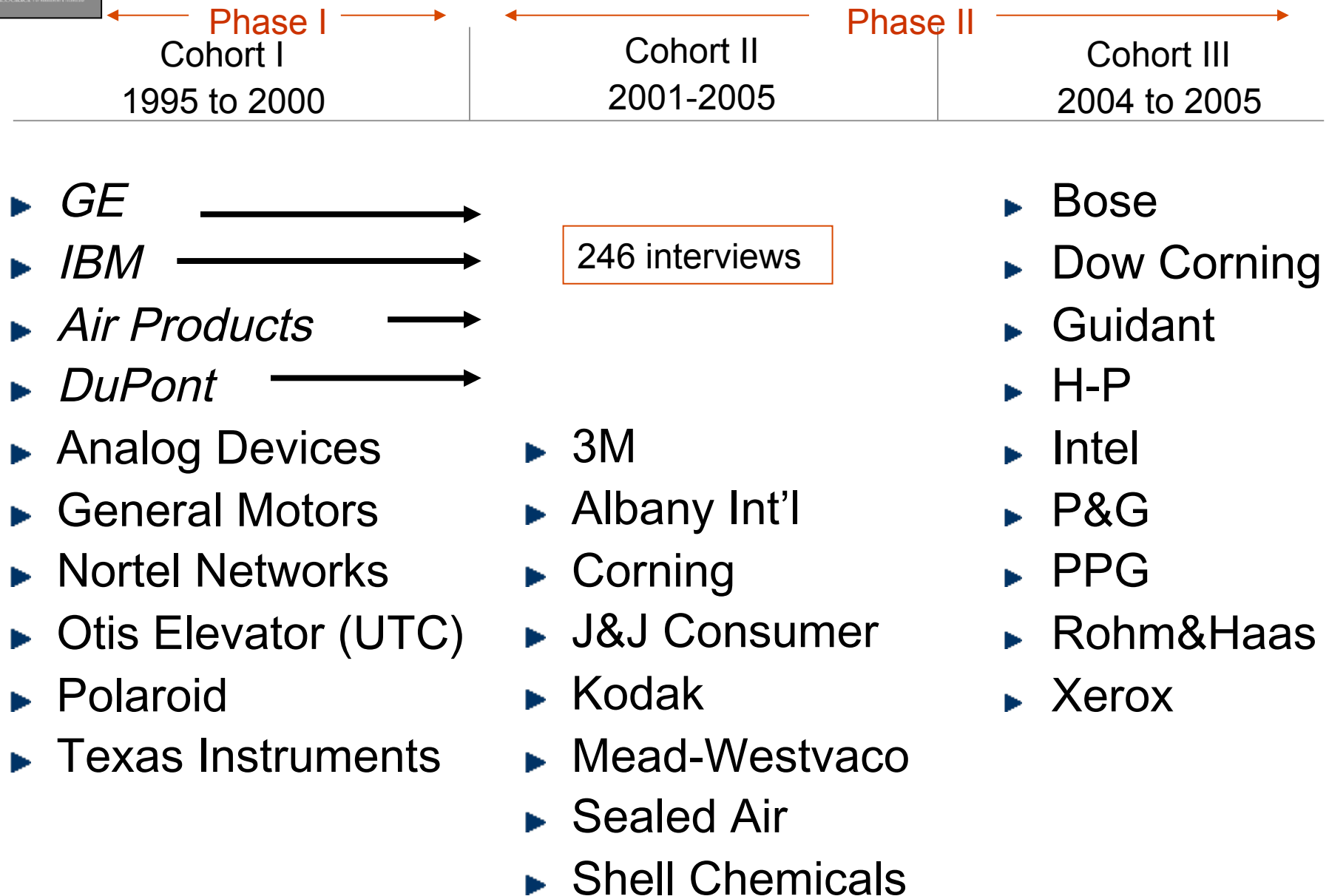- Twelve + Nine companies.

- Four years.

Management System Elements

Mandate/Scope

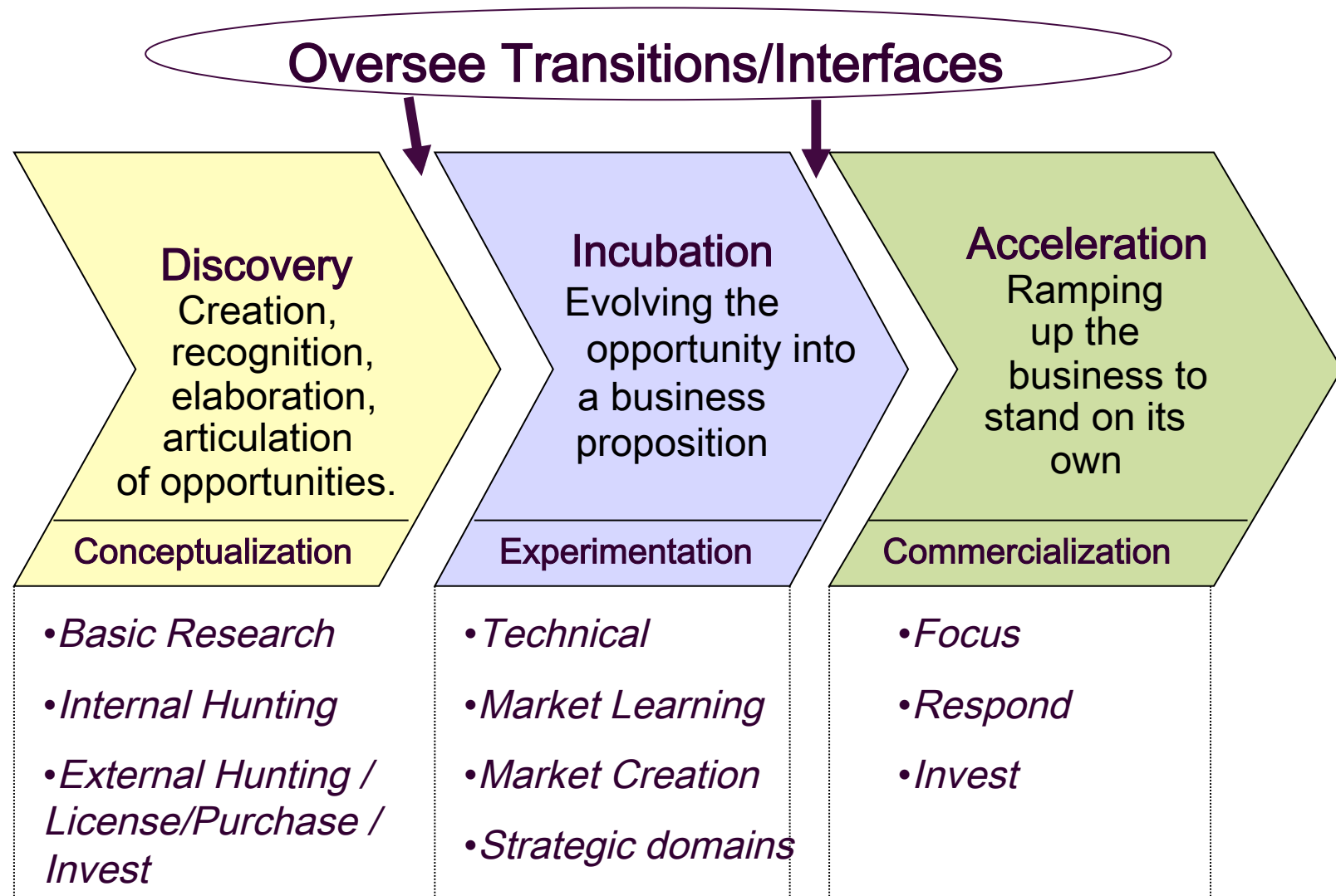Metrics/Rewards

Leadership/Culture

Skills/Talent Dvlpmt

Org. Structure/Interfaces

Processes/Tools

Governance/Decision Making

Companies in the Study

Cohort I 1995 to 2000	Cohort II 2001-2005	Cohort III 2004 to 2005

- *GE*
- *IBM*
- *Air Products*
- *DuPont*
- Analog Devices
- General Motors
- Nortel Networks
- Otis Elevator (UTC)
- Polaroid
- Texas Instruments

246 interviews

- 3M
- Albany Int'l
- Corning
- J&J Consumer
- Kodak
- Mead-Westvaco
- Sealed Air
- Shell Chemicals

- Bose
- Dow Corning
- Guidant
- H-P
- Intel
- P&G
- PPG
- Rohm&Haas
- Xerox

BUILDING A CAPABILITY FOR
BREAKTHROUGH INNOVATION

GRABBING
LIGHTNING

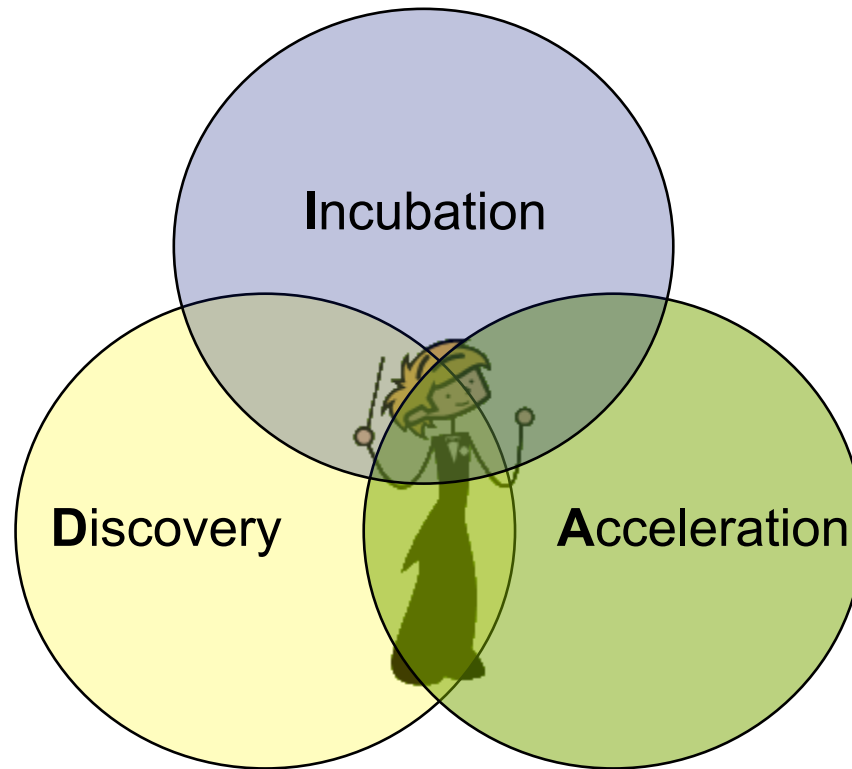GINA COLARELLI O'CONNOR, RICHARD LEIFER,
ALBERT S. PAULSON & LOIS S. PETERS

Not just one competency….but 3

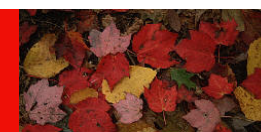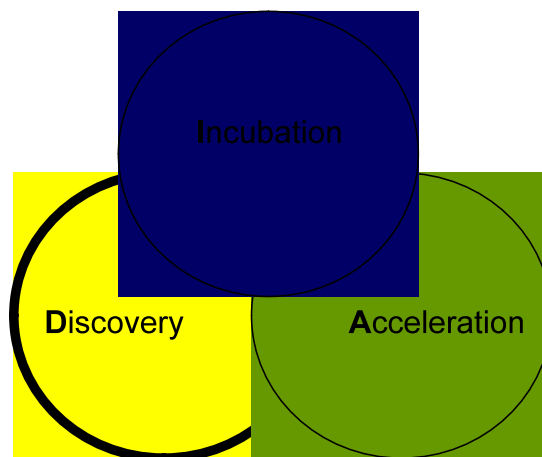## Oversee Transitions/Interfaces

Discovery
Creation, recognition, elaboration, articulation of opportunities.

Conceptualization

- *Basic Research*
- *Internal Hunting*
- *External Hunting / License/Purchase / Invest*

Incubation
Evolving the opportunity into a business proposition

Experimentation

- *Technical*
- *Market Learning*
- *Market Creation*
- *Strategic domains*

Acceleration
Ramping up the business to stand on its own

Commercialization

- *Focus*
- *Respond*
- *Invest*

DIA isn't Linear

Three RI Competencies

The Discovery Competency

Describing Discovery

- The creation and identification of opportunities that may have major impact in the marketplace, either through the delivery of new performance benefits or greatly improved performance.
  - Can be originated by technology push or clear market need.
    - One company indicated that they had a 50/50 split
  - Can be originated from inside the company or external.
    - Open Innovation model practiced in nearly every one of our companies.
- Discovery ≠ Invention
  - Can discover phenomena in the world around you that are used in another capacities.
  - Invention is to create something new.
- Discovery ≠ R&D
  - A story: Scientist knew he had something. *I could've done what scientists typically do….ask for more money and a bigger lab. But the fact is, I wouldn't have known which direction to go with this on Monday morning….I got forced out of the research lab because I didn't know who my customer was (so which BU could take this). So I wandered down the hall and talked with Laura about it…and she started asking some really interesting questions.*
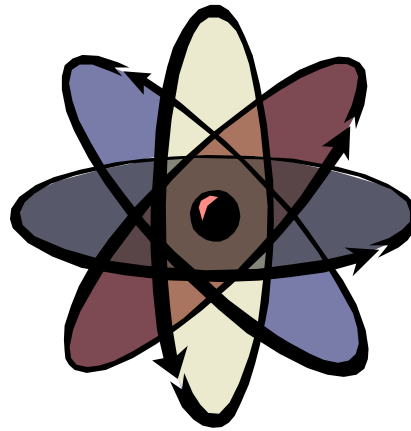
Discovery Activities

Three Broad Categories:

Scientific
Work

Opportunity
Articulation

Opportunity
Generation
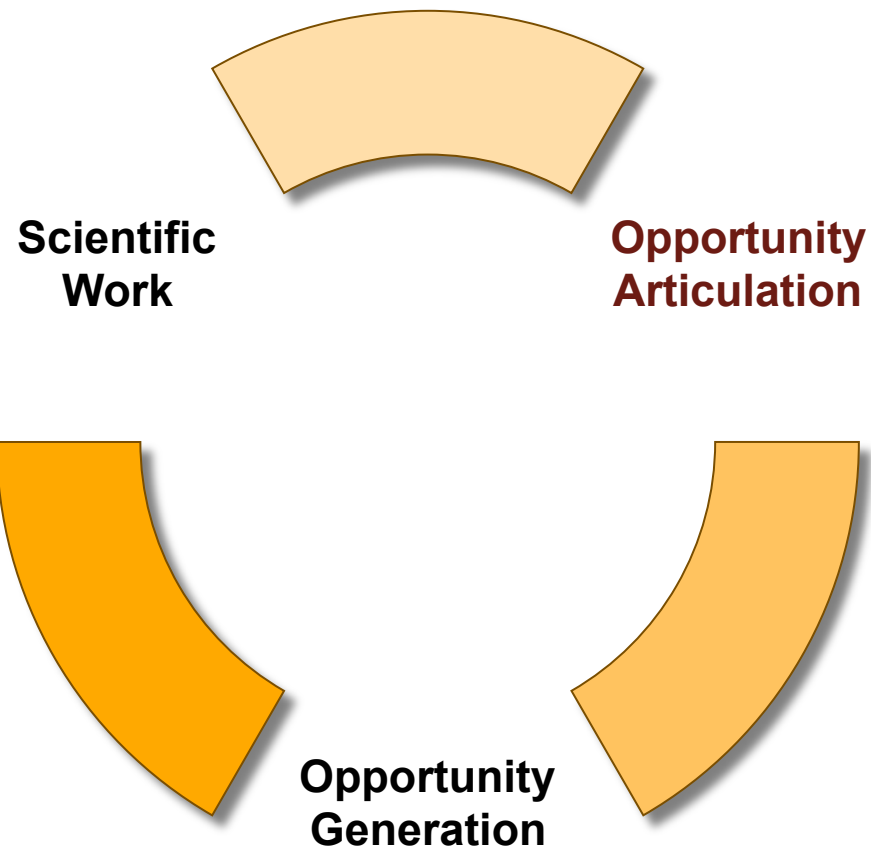
Management System Elements: Discovery

Mandate/Scope: Explore; Create business concepts in alignment with strategic intent.

Metrics/Rewards: Quantity of ideas, richness/robustness of concepts.

Leadership/Culture: Owned by CTO. Fluid, imaginative culture.

Skills/Talent Dvlpmt: Creative, inductive reasoners w/ penchant for strategic thinking.

Org. Structure/ Interfaces: Centralized yet diverse, tightly linked to R&D.
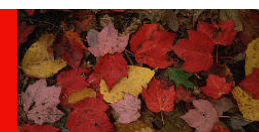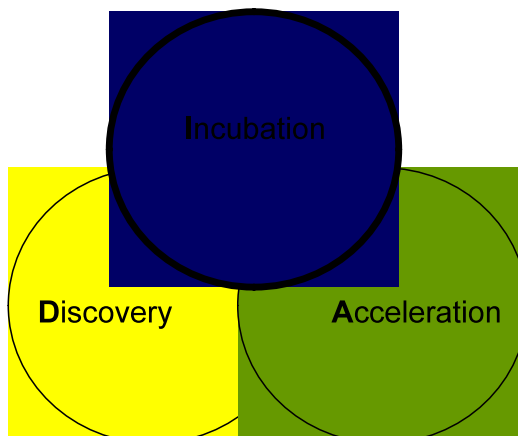
Processes/Tools: External & internal scanning, open sourcing of ideas, networking. Opportunity elaboration & socialization. Able to combine disparate bits of info.

Governance/Decision Making: Connections to strategic intent. Able to see possibilities, to enlarge opportunities.

Incubation Defined

- A competency of experimentation. The ability to experiment with technology and business concepts/models simultaneously to arrive at a demonstrated model of a new business that brings breakthrough value to the market and consequently to the firm.

  - Allowances for failures, but expectations of continued pursuit of new frontiers.

  - Creation and pursuit of options.

  - Movement in multiple directions simultaneously.

  - Focus on learning and redirecting.

  - Focus on enriching and extending internal and external networks to enlarge scope of the company's knowledge base and commercial opportunity space….in big ways.

Incubation: Objective

- To nurture a portfolio of opportunities (options?) of highly uncertain outcome, but immense possibility for the market and the company.
- To develop *proposals (not plans)* for new businesses, based on experimentation with the technology, production processes, value chain and potential customers.
- To clarify new strategic growth frontiers for the company.
- 2 foci:
 - Individual Opportunity level
  - Competency level

Incubating Individual Opportunities: Defined

- That work to build the concept to be bigger and bigger and bigger, and to explore it's potential as an appropriate business for the company:
    - How do we get the concept to be as broad as we can make it before trying to narrow it down to a targeted market entry? Enlarge the scope of the business.
    - Develop a strategy for the new business in terms of application(s) to pursue, value chain participation, revenue model proposal, and underlying economic analysis.
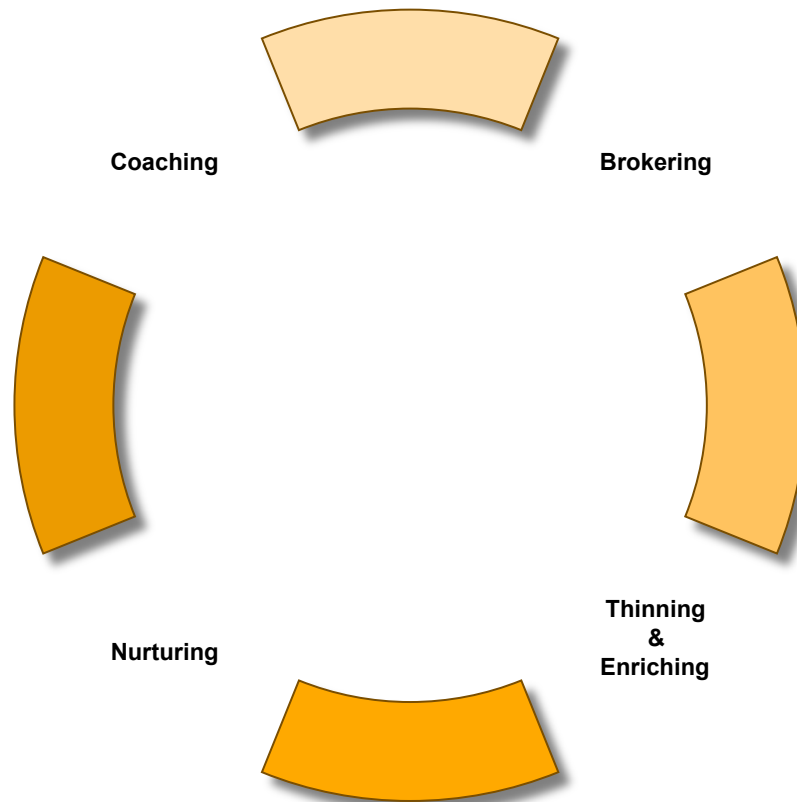   - Clarify link to the company's strategic intent

Incubation

**In Incubation many avenues are
explored initially, but few enter Acceleration**

Time

Incubation Competency
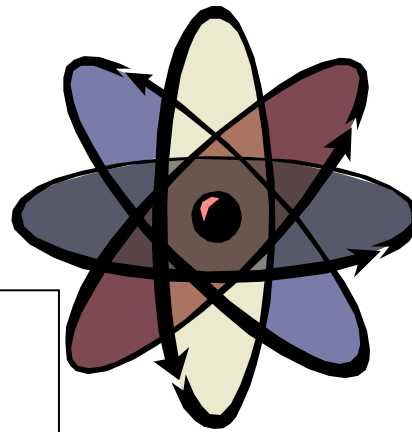
Coaching

Brokering

Nurturing

Thinning
&
Enriching
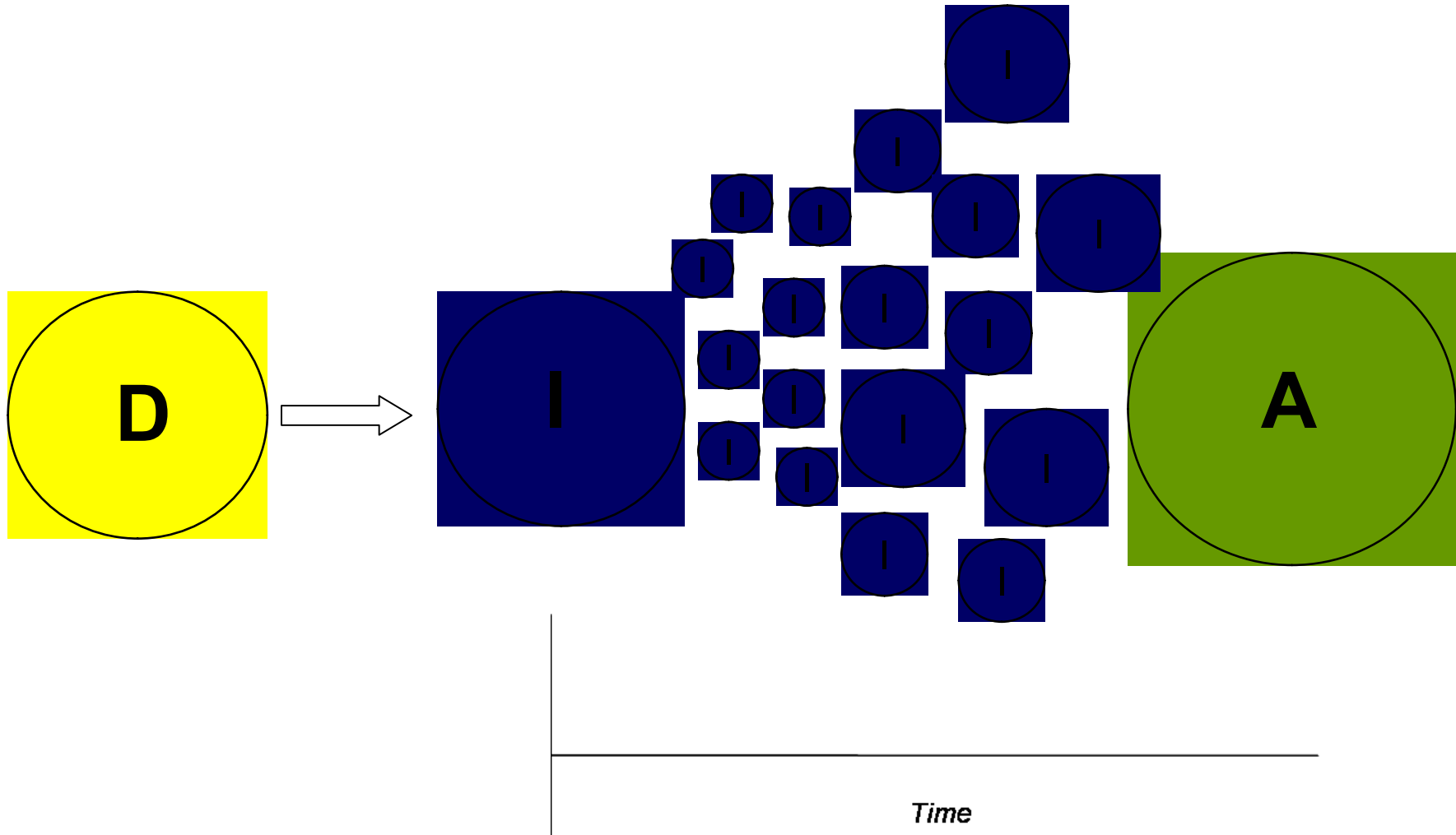
Management System Elements: Incubation

Mandate/Scope: Experiment; Vet projects through T, M, R, O issues to determine biz potential. Manage portfolio.

Metrics/Rewards: Learning based milestones (project), churn rate (portfolio), magnitude of opps, learning spillover.

Leadership/Culture: CSO, CNO or VP NBD. Inquisitive, learning oriented culture. No 'failure.'

Skills/Talent Dvlpmt: Project leaders: NBC expertise, entrep'l acumen, rich networks. Staff: strategic coaching, nurturing capabilities.

**Org. Structure/ Interfaces:** Dedicated group at Corporate level, tightly linked to R&D.

Processes/Tools: Inventory of projects to make killing easier. Learning plan. Strategic Coaching.

Governance/Decision Making: Project level: advisory boards of experts. Portfolio level: Sr. BU and Corp representatives.

The Acceleration Competency
or
Gathering Steam & Building Critical Mass
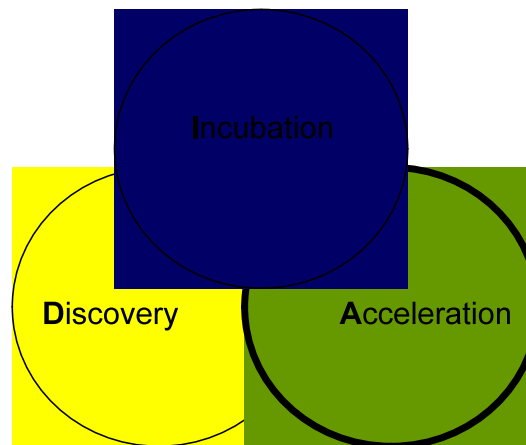
Describing Acceleration

- Driving fledgling businesses to a point where they can stand on their own relative to mature businesses in their ultimate home (existing BU, new division).
- Building critical mass of sales and operational infrastructure.
- Establish market presence.
- Develop the management team.
- Scaling
- Prepare the business to blend into the fabric of the rest of the organization.

Acceleration Objectives

- ## Predictability
  - Sales forecasts with some level of accuracy
  - Manufacturing with respectable yields.
  - Economics are at least heading toward profitable, can demonstrate a pathway to profitability
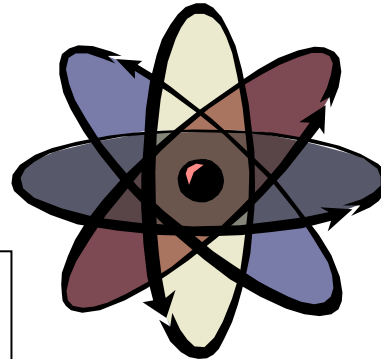- ## Scaling for Viability
  - *I need a landing zone for projects that the business unit does not feel comfortable with. If I transfer these projects too early, the business unit leadership lets them die. I need a place to grow them until they can compete with ongoing businesses in the current operating units for resources and attention.*

Management System Elements: Acceleration

Mandate/Scope: Escalate. Mature high impact businesses to predictability and acceptability to operating unit culture.

Metrics/Rewards: Growth in sales/inquiries of portfolio businesses: identification of migration path, uplift and spillover opps. NOT margins

Leadership/Culture: General manager orientation. Hard driving, urgent culture.

Skills/Talent Dvlpmt: Acumen in nurturing high growth businesses. Ability to interface with mainstream

Org. Structure/ Interfaces: Separate structure, even for aligned opps, unless BU's use acceleration metrics.

Governance/Decision Making: Sr. Ldshp team with powerful networks, respect, political clout.

Processes/Tools: Manage for high growth. Focus, respond to market inquiries, invest in demonstrating path to profitability.
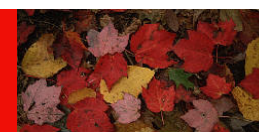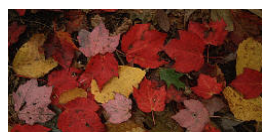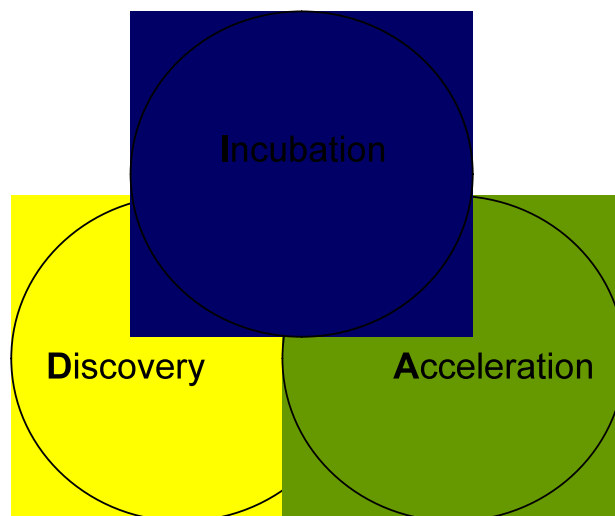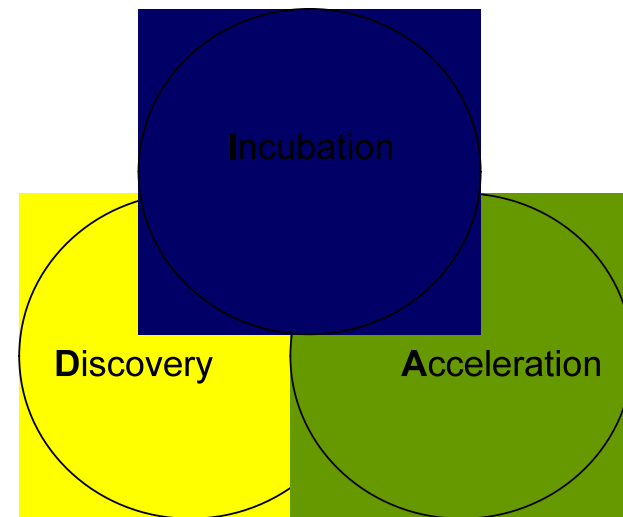
The DIA System

- The set of activities that manage the links and interfaces within DIA, and oversee its health in terms of the RI mandate, it's perceived role in the firm, and its portfolio of businesses.

System Imbalances

Can't get heard

Discovery
Incubation
Acceleration
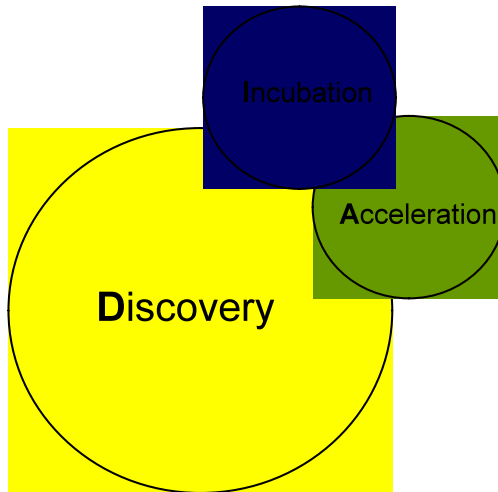
Big Ideas, Incrementally Executed

Incubation
Acceleration
Discovery
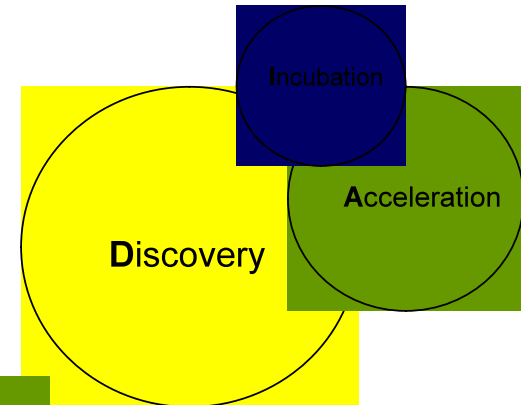
Failure to leverage learning

Discovery
Incubation
Acceleration

No Courage to continue

Incubation
Discovery
Acceleration
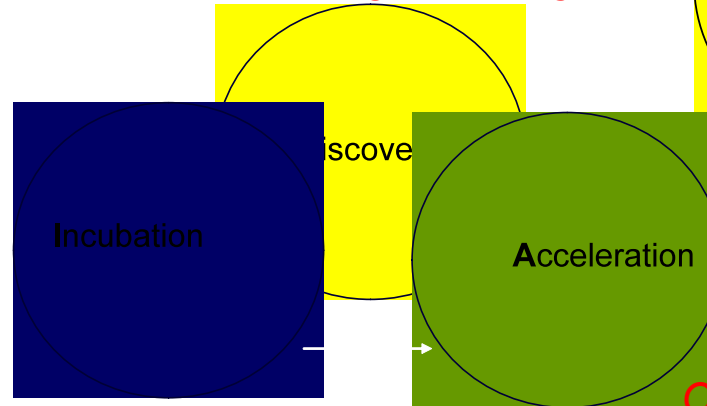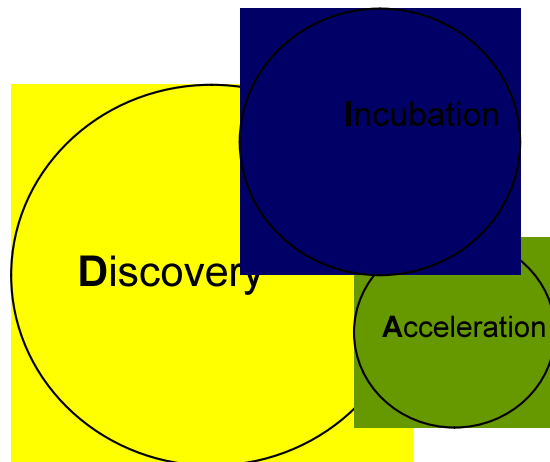
Open Innovation at the Extreme

Incubation
Discovery
Acceleration
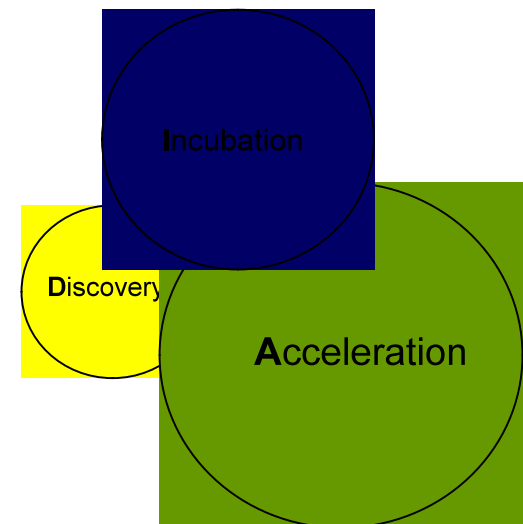
DIA System Activities

- Screening and evaluating businesses
- Coaching
- Assembling and re-assembling Project Teams
- Providing & enabling project infrastructure
- Barrier removal
- Broker external and internal liaisons
- Strategic alignment activities
- Providing help for project resource acquisition
- Education about role of Radical Innovation in the company viz a viz rest of innovation system and ongoing operations.
- Pacing of projects
- Oversee transitions from D$\rightarrow$I$\rightarrow$A$\rightarrow$ landing zone
- Attend to portfolio health and diversity

Project vs. Portfolio Orientation

PROJECT ORIENTATION	PORTFOLIO ORIENTATION
Tactical (operational)	Strategic
Short term focus	Balanced focus
Granular view	Broader context
No kill	Reality check
Within platform/business	Across businesses/platforms
Local	Global
Just do it	Assess value, risk, & resources
Progress check	Review & analysis
Monitor	Pacing

RI Portfolio Considerations

- ## Diversification
    - Degree desired?
    - Dimensions?
        - Technology domains/competencies
        - Business/market domains
        - Time Horizon
        - Organizational fit (aligned, white space, gray space, spin outs)
- ## Churn rate (viz a viz objectives)
    - Within D? I? A?
    - If too high in any one of these…what's wrong?
        - Poor ideas? Transitioning too early? Execution problems? Inappropriate team composition? Inadequate resources? Lack of fit with intended strategy?
    - If too low….what's wrong?
        - Not 'radical' enough? Unwilling to kill?

RI Portfolio Considerations

- ## Portfolio size objectives?
  - How many projects/platforms?
- ## Portfolio pacing objectives across DIA?
  - Easy to get caught up with I and A and forget to replenish the pipeline.
- ## Cross-portfolio management:
  - Checking for synergistic effects of one platform's learning on another.
  - Checking for convergence or redundancies
  - Spillover to other innovation efforts.
  - Think about them as mutual funds…
    - Which have more prospects, which should be fed, which should be starved a bit for now.
    - Enormous scope of responsibility.

RI System Metrics

- **Health/Activity of the Portfolio**
  - # of new ideas
  - # of new projects started.
  - # of projects transitioned between stages.
  - Synergies across projects
  - Diversity in terms of technology/market domains.
  - Pacing of projects compared to objective.
- **Interface Management**
  - Smoothness of handoffs from D→I→A→landing zone
  - Communication flows from I and A back to D as new opportunities emerge.
- **Market Impact**
  - Gaining external recognition as an expert in a particular technology domain.
  - Richness/promise of projects. "This one could really change the game."
- **Impact on company**
  - # of projects transitioned out into businesses.
  - $ impact of those projects.
  - Impact of learning within projects on other business arenas.
  - Spillover of RI management system elements to other high uncertainty arenas.
  - Development of entrepreneurial talent within company as project leaders are recycled and out posted into BU's.
  - Confidence that we can innovate. (vs. "we've atrophied.")
  - Increased robustness of new ideas coming in.

Model of Radical Innovation Capability

External Influences

economic expansion

strained stock market

new competition

lawsuit

industry consolidation

Internal Influences

Sr. leadership declares need for more innovation

financial stress of company

CEO change refocus on innovation

poor earnings

I

D   A

$CAPACITY_1$

I

D   A

$CAPACITY_2$

Internal Influences

culture, history of innovation

External Influences

pace of technological change

global economic expansion

TIME

Innovation as a Business Function

- Amazing progress among most of our companies in the 4 year observation period.
    - More embedded throughout the organization.
    - Accepted in terms of role within innovation system.
    - Continued experimentation with processes, structures, but few are backing off, even when times aren't great (Stable funding in 10 of 12 firms).
    - Increased confidence.
    - Increasing focus on portfolios of RI opportunities.

- New roles emerging
    - Leaders: EBO Czar; Commercial Development Officer; Gamechangers Director; VP, Strategic Innovation; President, RI and Corporate New Ventures; VP Corp Bus Development; CNO
    - Inbound/exploratory marketing
    - New business creation specialists coach projects
    - New emerging businesses assigned general managers prior to regular revenue flow

- Not a program, but a constant.
- But….very new yet. Most feel as if they're on the track, but wish they had better direction.

Summary of RI Requirements

- Identifiable Organization Structure
- Culture and Leadership That Values RI
- Rich Interfaces Connecting Internal and External
- Appropriate Metrics
- RI Requirements
- Powerful Networks
- Governance at Project, Portfolio and System Level
- RI Specific Process & Tools
- RI Specific Skills & Talent