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Enabling the Business of Innovation

University Perspective: Policies, Strategies and Techniques …

CreaTech Idea To Market Tour

Patrick Jones, Director

October 16-20, 2006

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Universities Have Always Transferred Technology – They Have Always Taught

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Beginnings: Goals

Technology Transfer Can Be Many Things

- A Contributor to Economic Development
- A Service Function to the University
- A Source of Discretionary Revenue (sometimes)
- A Means to Add Direction to Knowledge Diffusion
- A Form of University Strategic Research and Business Development

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Whatever Technology Transfer Is

- It Should Add To The Benefit To Society Of Having Universities
- It Should Help Universities Sustain And Expand On University Activities
  - Distinction Between Being More Businesslike And Being A Business
  - An Understanding That Technology Transfer Will Not Replace Public Funding For Education

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Care In Decision Making

Difference Between Investment & Economic Development

- SharMoore Children's Production
  - Not-for-Profit Delivering Education Program Developed by The Founders
  - Great Impact for University, Appropriate Level of OTT Support
  - Emphasizes the Broad Range of University Activities
- Vehicle for Dissemination Needs To Be Sector Appropriate

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Whatever the Goal, TT Practice Should Be

- Proactive Rather Than Reactive
  - IP BY DESIGN And Transaction-oriented
- Enabling Rather Than Disabling
  - What Can Be Done, Not What Cannot Be Done
- IP Management, Not Solely Copyright Or Patent
  - IP As Tool, Choosing Right Tool For Right Task
- Focused on IP-based Relationships
  - Strategic IP Use Preferred Over Tactical

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Everything Begins With Information

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Information and the University

Purpose of a University Is To:

- Create
- Organize
- Validate
- Disseminate

  Knowledge in the Form of Information

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Information and the University

Purpose of a University Is To:

- Create
- Organize
- Validate

} **Research Mission**

- Disseminate

Knowledge in the Form of Information

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Information and the University

Purpose of a University Is To:

- Create
- Organize
- Validate
- Disseminate

} **Teaching Mission**

Knowledge in the Form of Information

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The Information Cycle of Universities

- Internalize Available Information as Knowledge
- Construct Research To Extend Knowledge
- Perform Research Generating New Knowledge
- Validate / Organize Knowledge Into Information
- Disseminate Information:
  - Traditional Education; and now
  - Formal Technology Transfer as well

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Technology Transfer is A Form of Teaching

T^2 Is A Dissemination Activity And A Natural Part Of The University's Activities

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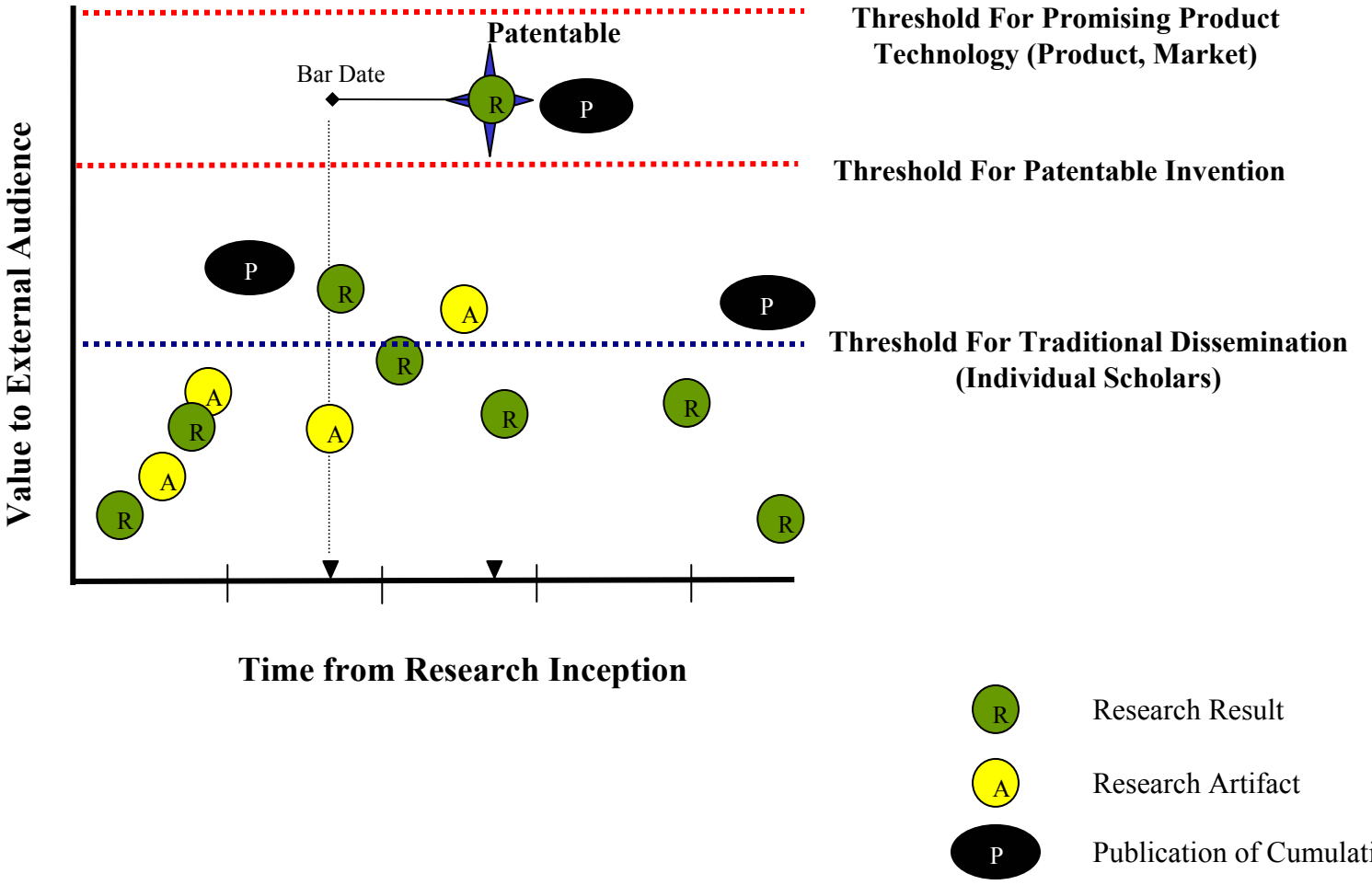
IP, Licensing And Structuring Relations

- Consider Fees Under Licenses As Tuition. However Contracts Don't Just Set Prices
- An IP License Is A Contract:
  - One Role Is To Establish A Common Set Of Behaviors Between Two Groups
  - Gives Certainty To The Relationship With Respect To
    - Obligations
    - Permissions (Including Right of Association)
    - Assumptions
- IP And Contracts Are Tools For Constructing The Knowledge Dissemination Relationship Between Universities And Commercial Organizations

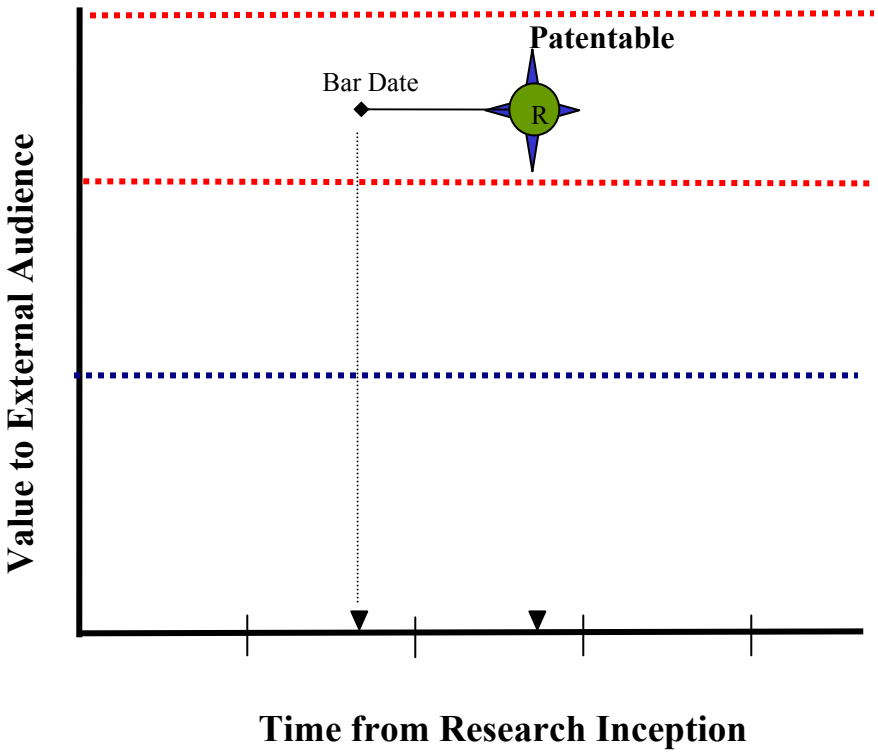
Example - Software

- If Computer Scientist, I May Wish To Give Software Away
- License May Be Simple Permission Statement With
  - Requirement For Attribution To My Research Group
  - All Changes From Original Are Noted And Authors Indicated

Results of Research



If We Focus On Patents Rather Than Information



Threshold For Markets: Promising Product Technology (Product, Market)

Threshold For Patentable Invention

Threshold For Scholarly Publication

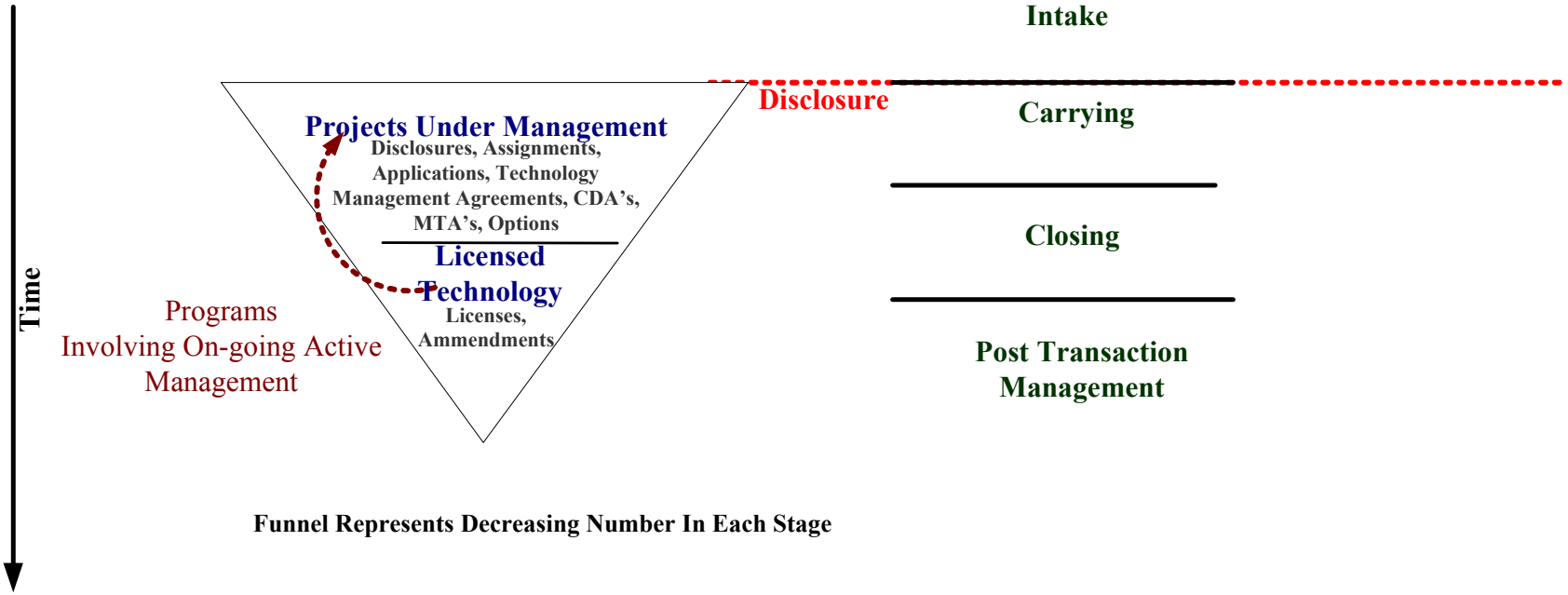
R Research Result

Transactional View Of Technology Transfer

Project Status

OTT Activity

University Faculty & Staff: Project Universe



Funnel Represents Decreasing Number In Each Stage

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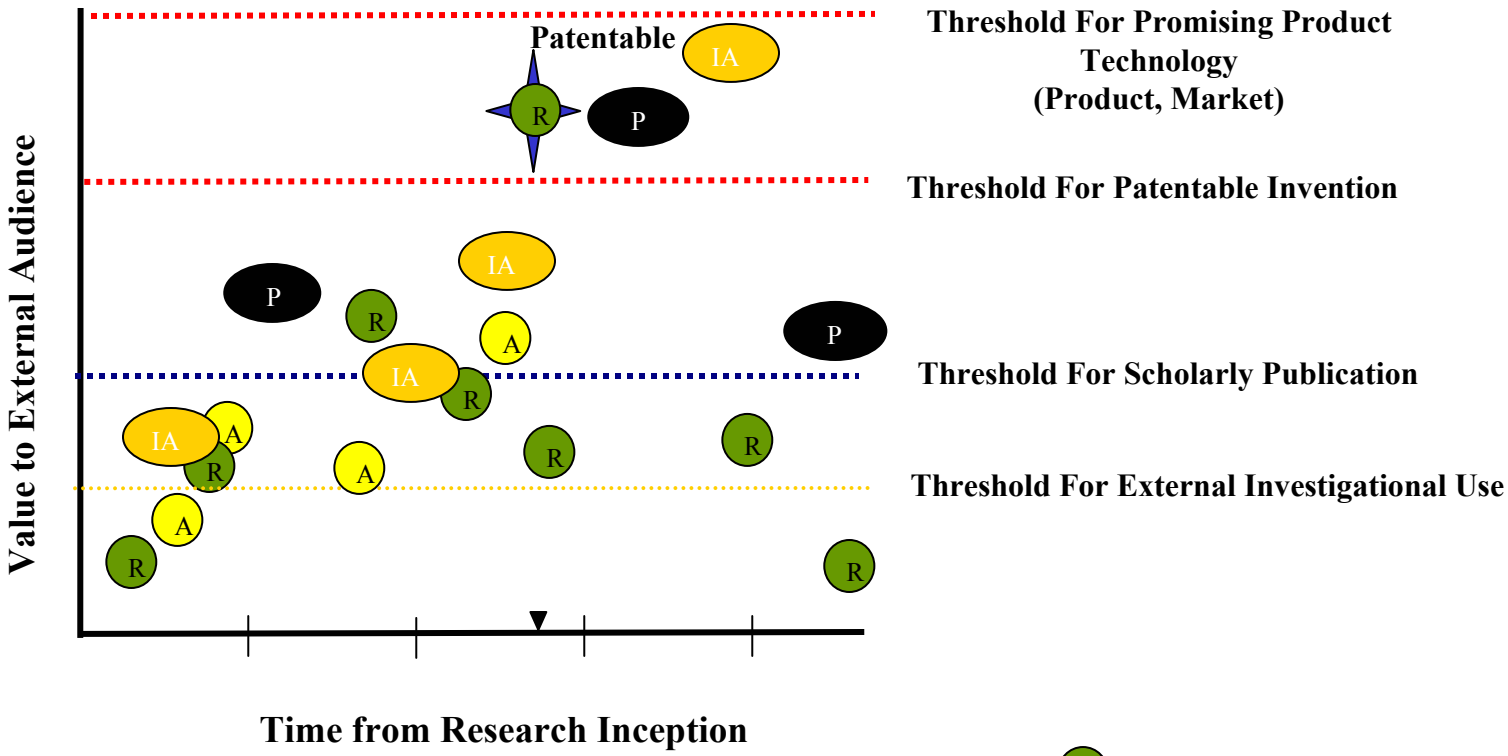
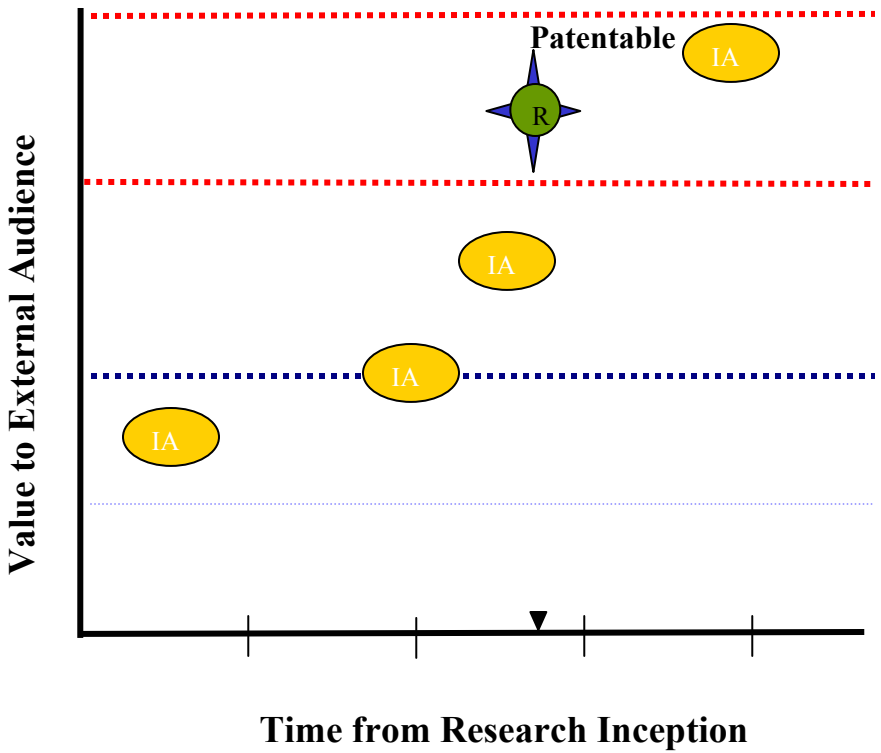
Research Results: Embodying Information

Talent	Technical data
Prototypes	Tangible Research Products
Protocols	R&D Infrastructure
Design Specifications	Code Implementations
Validation Data	Services (Assays, …)
Performance Data	Business & Research Plans
Documentation	Regulatory Filings
Audiences & Needs	IP rights (P,C,TM,TS)

Thinking In Terms of Information Assets



What Technology Transfer Could See



Threshold for Promising Product Technology (Product, Market)

Threshold for Patentable Invention

Threshold for Academic Publication

Threshold for External Use

R — Research Result

A — Research Artifact

P — Publication of Cumulative Results

IA — Cumulative Results Information Asset

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Example

Micro-reactor Technology For Ethylene Production

- Design Codes
- Reactor Design
  - Design
  - Bills Of Materials And Specifications
- Operating Protocols
- Data

Bundle As Information Asset at $45,000 With

- Four-Year Research Right To Patents And Standstill
- One Week On-site Short Course
- Some Consulting

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It Is Always Important To Remember:

Intellectual Property is NOT The "Technology"

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Working Early To Create Opportunities

- In Select Areas, Helping to Construct New Interactions
- Goal:
  - Informed Decision-making
  - New Insight
  - New Resources

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Technology Access Programs

- What?

  an "industrial affiliates" program built around an existing government-sponsored research program

- How?

  uses intellectual property rights as a vehicle for establishing relations in the way companies need to promote adoption of results

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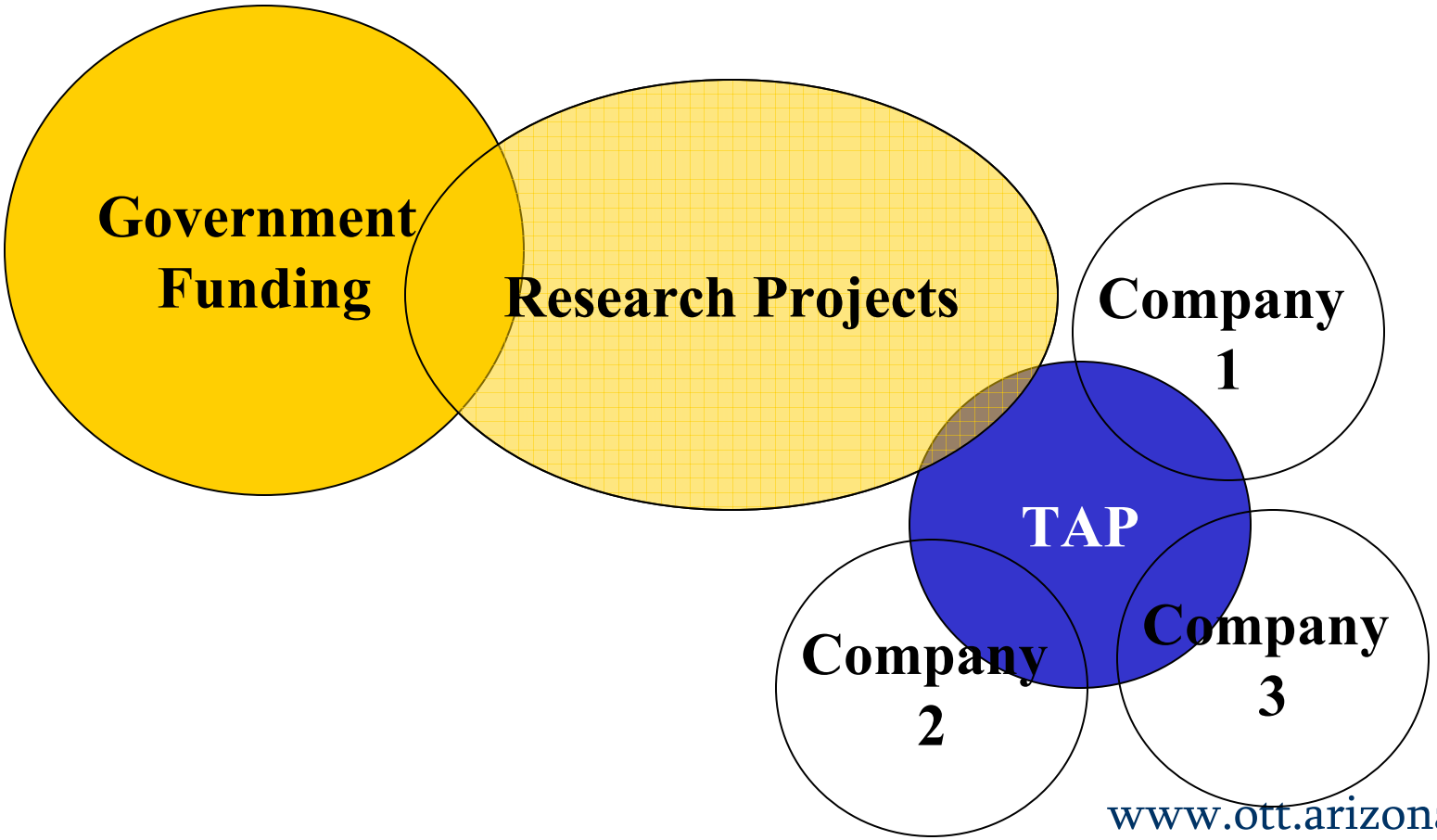
TAP Deployment Model

- Base Membership Fee Model
  - Additional Fees Dependent On Artifact Or Innovation & Rights
- Research Courtesy Site License
  - Modest Charge To For-profits
  - Free Or Incremental Expense For Non-profits
- May Expand Site To Enterprise License
- May Expand Enterprise To Distribution
- Relationships More Valuable Than The Assets

Framework


Government Funding
Research Projects
Company 1
TAP
Company 2
Company 3

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The TAP Sustains the Dissemination

- Putting Knowledge Into Usable Form Takes Time, Effort And Money
- TAP License Fees Should Go Back To Pay For The On-going Effort To Make Information Assets Available
- Relations Creates Other Opportunities Built on Sustainable Basis

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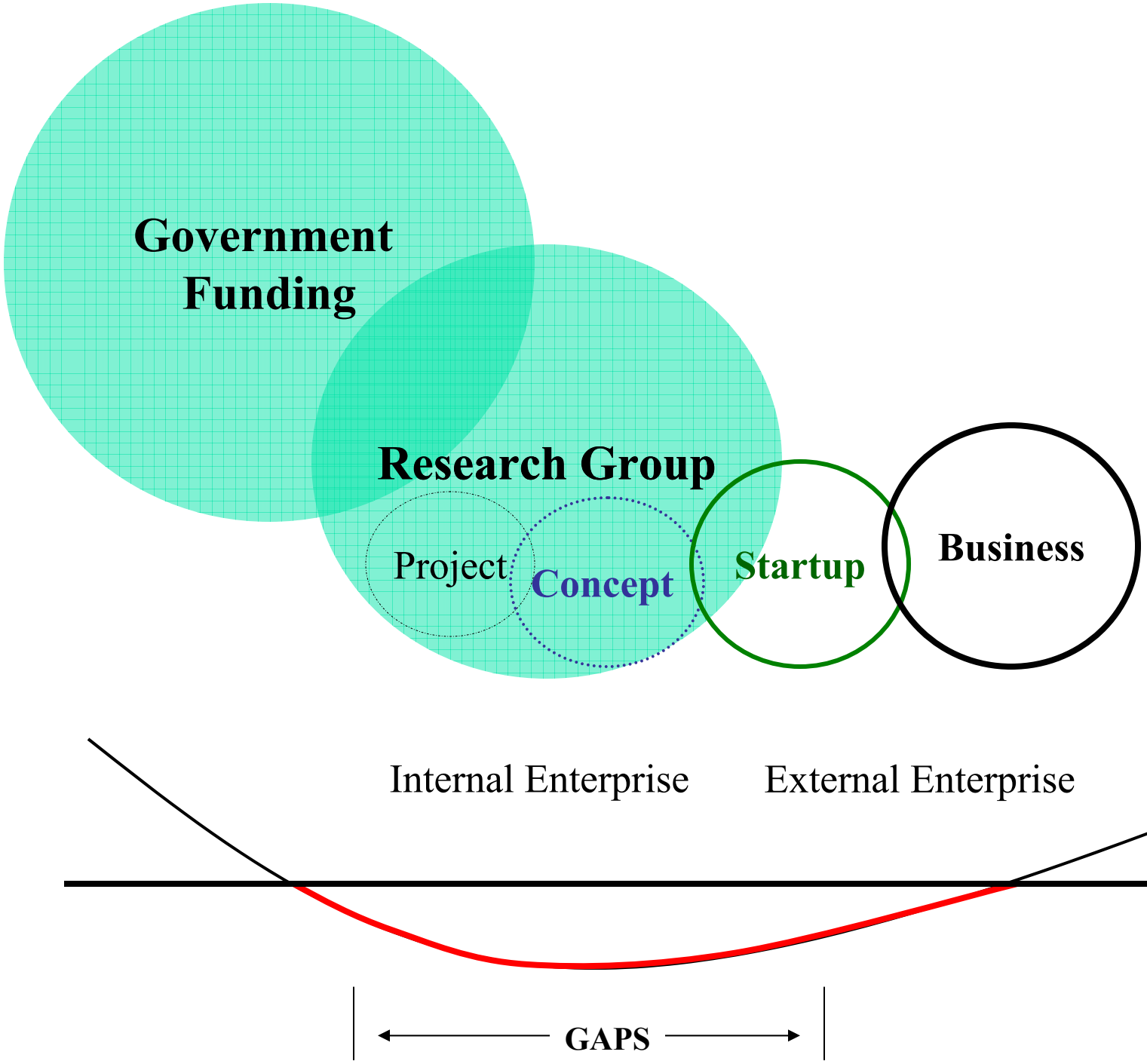
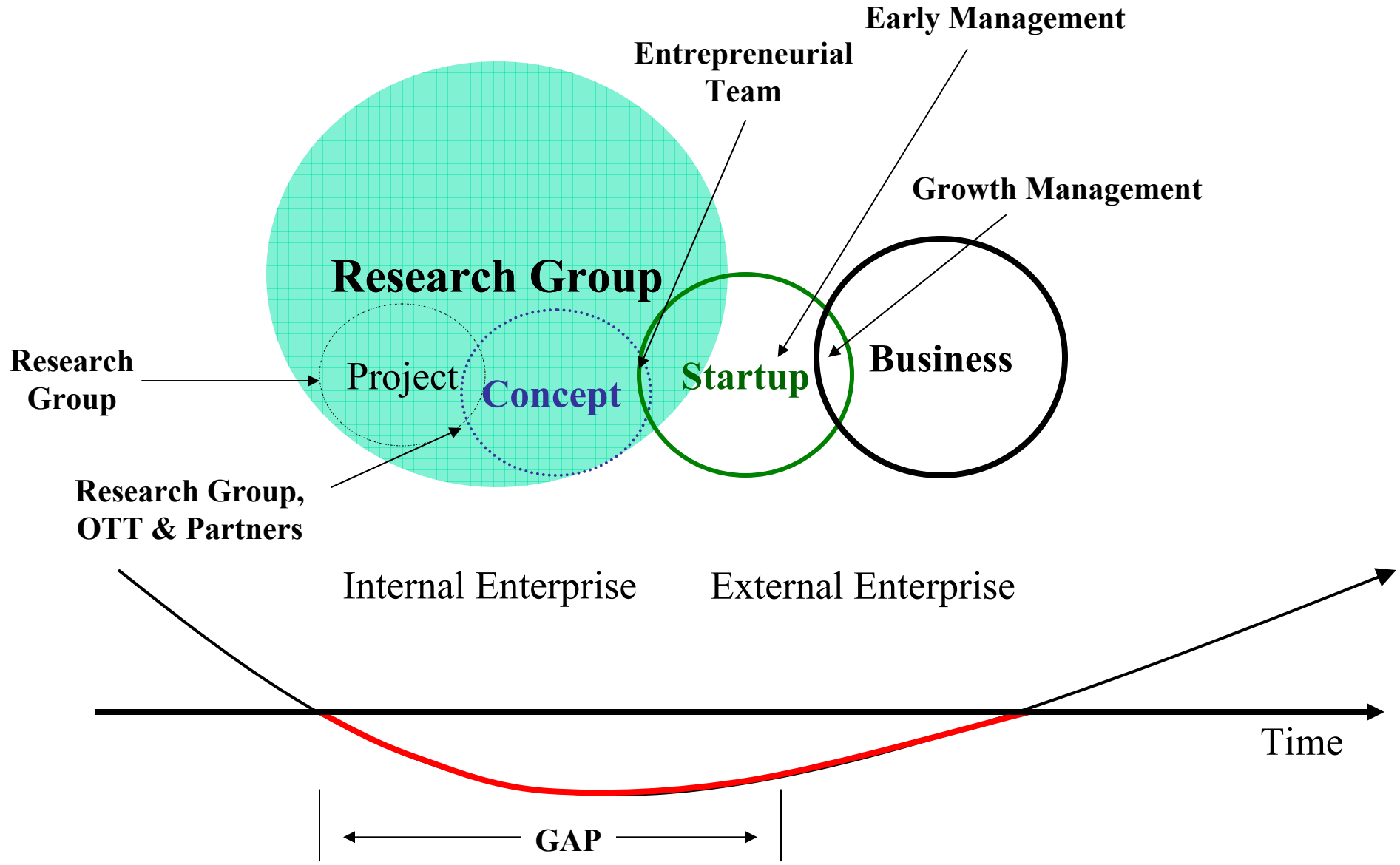
However Proactive Means Partnering

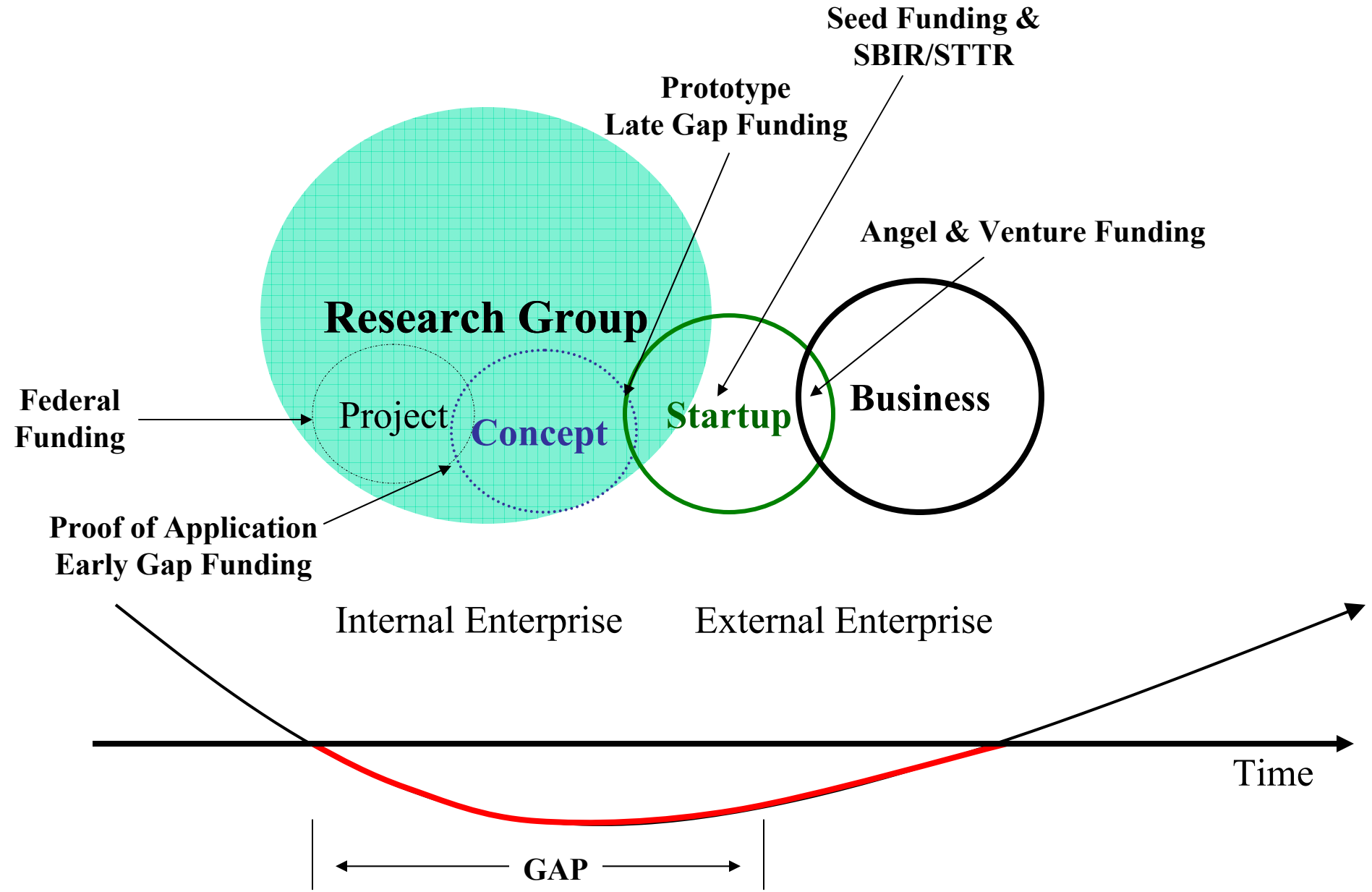
- Not All Activities Are Ready Or Need IP Management
- Partner to Provide Information
  - With Business Schools
  - With External Organizations
  - With Potential Adopters


Government Funding
Research Group
Project
Concept
Startup
Business
Internal Enterprise
External Enterprise
Time
GAPS

People


Early Management
Entrepreneurial Team
Growth Management
Research Group
Research Group
Project
Concept
Startup
Business
Research Group, OTT & Partners
Internal Enterprise
External Enterprise
Time
GAP

Funding


Seed Funding &
SBIR/STTR
Prototype
Late Gap Funding
Angel & Venture Funding
Research Group
Federal
Funding
Project
Concept
Startup
Business
Proof of Application
Early Gap Funding
Internal Enterprise
External Enterprise
Time
GAP

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Teaming For Resources / Personnel

- Academic Programs / McGuire Entrepreneurship Center
  - Early Market Feasibility
  - Business Planning
  - Engineering Senior Design Programs
- Other Universities
  - Collaborative Research and Translational Efforts – Salk Institute
  - International Collaborative Tech Transfer
- Community Economic Development Programs
- Financial Community - Desert Angels / Desert Tech
  - Financial Resources
  - Business Expertise

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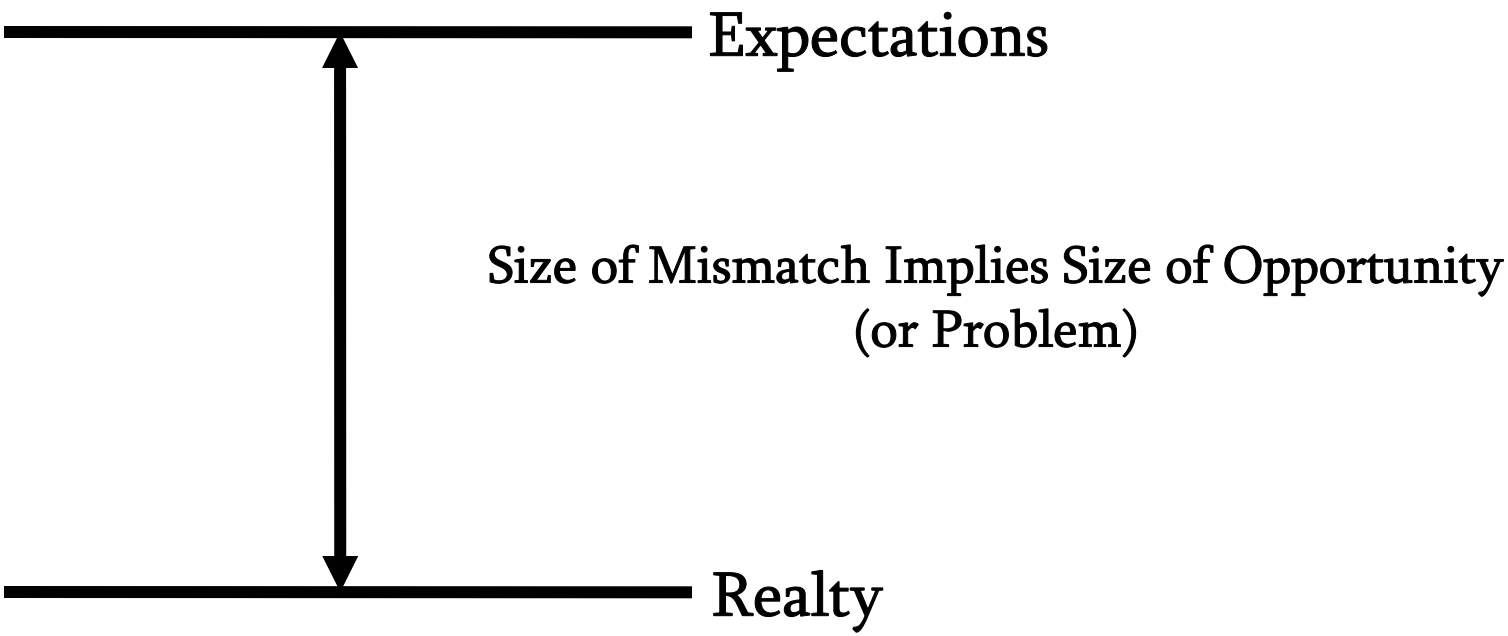
Defining Opportunities

Problems Are Gaps Between Expectations and Reality

Solutions Are Actions That Narrow The Gaps Between Expectations and Reality

Concept – Pictorial Version



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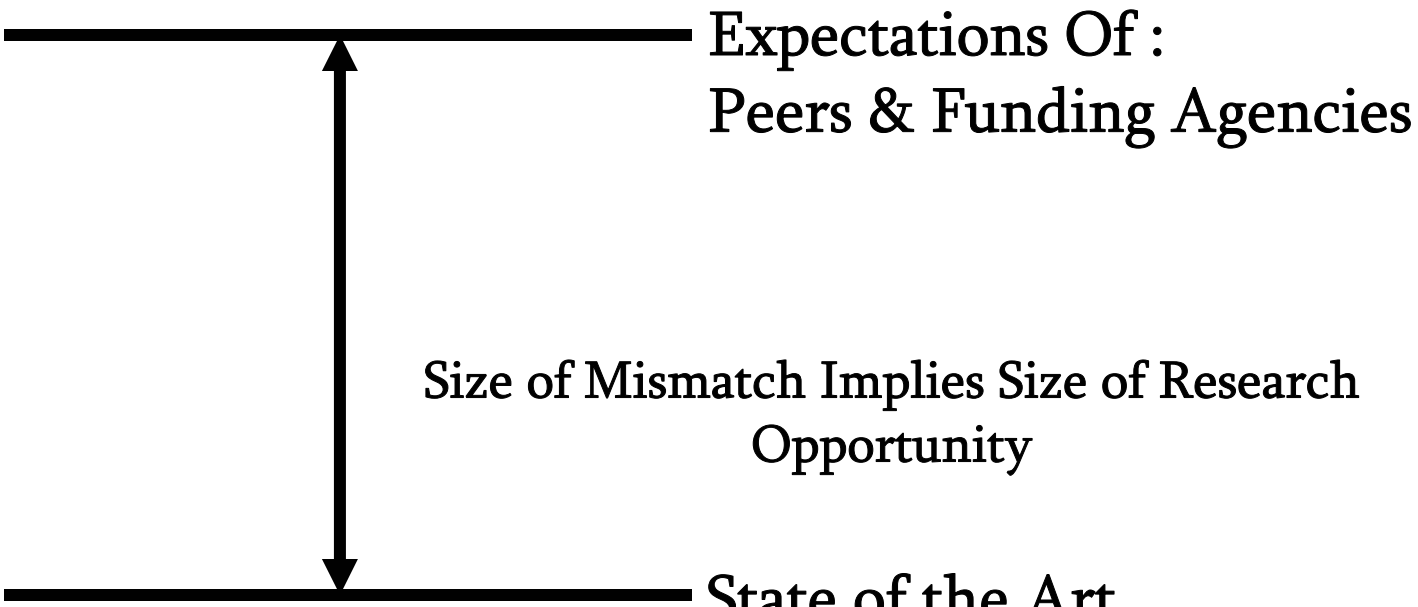
In University Research



Research Proposal Sets Out Plan To Narrow The Gap

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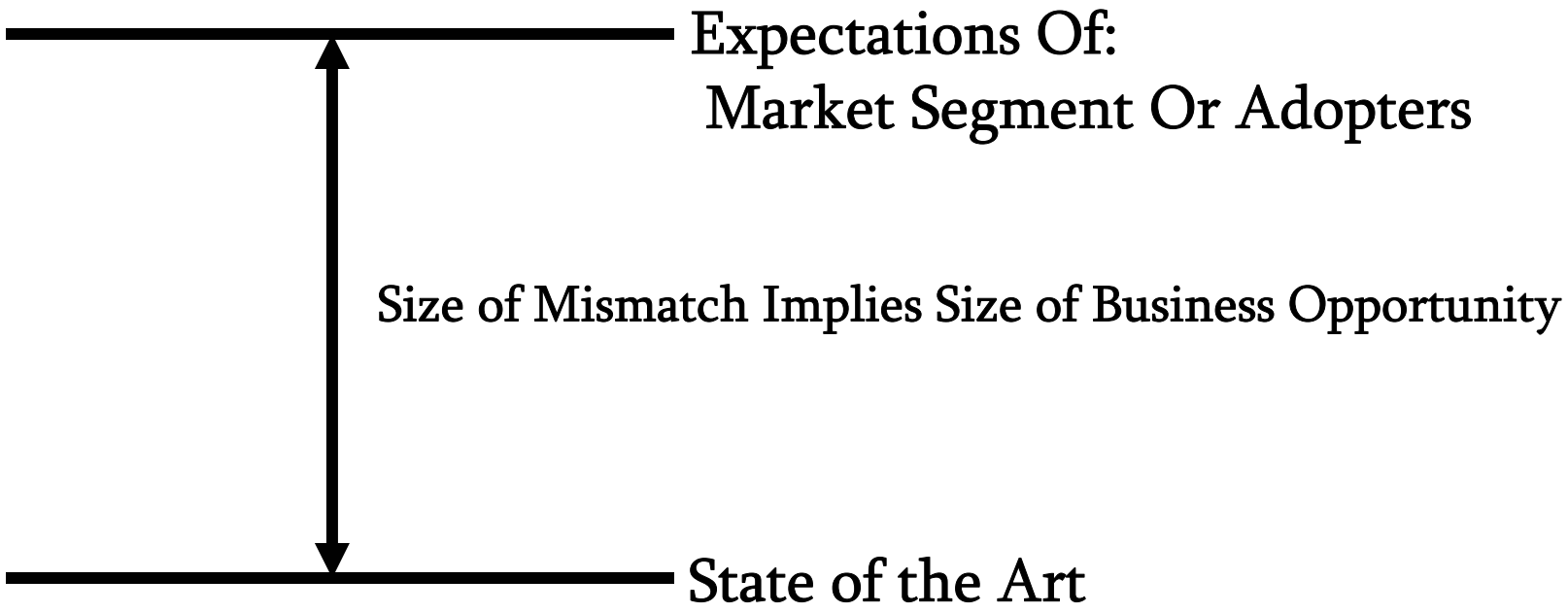
In Business



Product Proposal Sets Out Business Plan To Narrow The Gap

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Business Take-away

Our Gap Analysis Has Two Relevant Dimensions:

The "Technology" Dimension Defining Today's Reality

The "Market" Dimension Defining A Target Group's Expectations (Needs / Wants)

Overlay of Product Proposal & Research Proposal Defines Possible Path For Working Towards Commercialization

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Policy Enables

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What Good Institutional Policies

Should Do

Address Their Intended Aims And Scope

- Improve On The Defaults Granted By Law
- Require Candidness, Not Merely Truthfulness
- Provide A Framework For Resolving Conflicts
  - Setting Reasonable Defaults

Should Not Do

- Confuse Lines Of Authority
- Create False Choices e.g. Commercial vs. Noncommercial
- Increase Ambiguity e.g. By Using Terms In Conflicting Manners - Inventor

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The Challenge for the Innovator

Convert an Innovation Into a Solution That Is Demanded By A Target Audience Which Defines a Market Large Enough To Justify The Resource Investment

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Desert Angels – UA Partnership

Goals:

- Increase the Flow of Well-conceived, Lower-risk Start-ups From University R&D
- Create a Structured, Reproducible Interaction Between University Tech Transfer and Angel Investors
- Provide a Framework for Experienced Angels to Mentor Entrepreneurially-minded Students, Staff and Faculty
- Expand the Opportunities for Entrepreneurship & Involvement Across the University & Community

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Technology Transfer Role

Structure Access To, And Use Of, University Information By Groups Focused On Its Economic Applications

Enable Information Flow Through Structured Interaction Built Around Use of IP Rights

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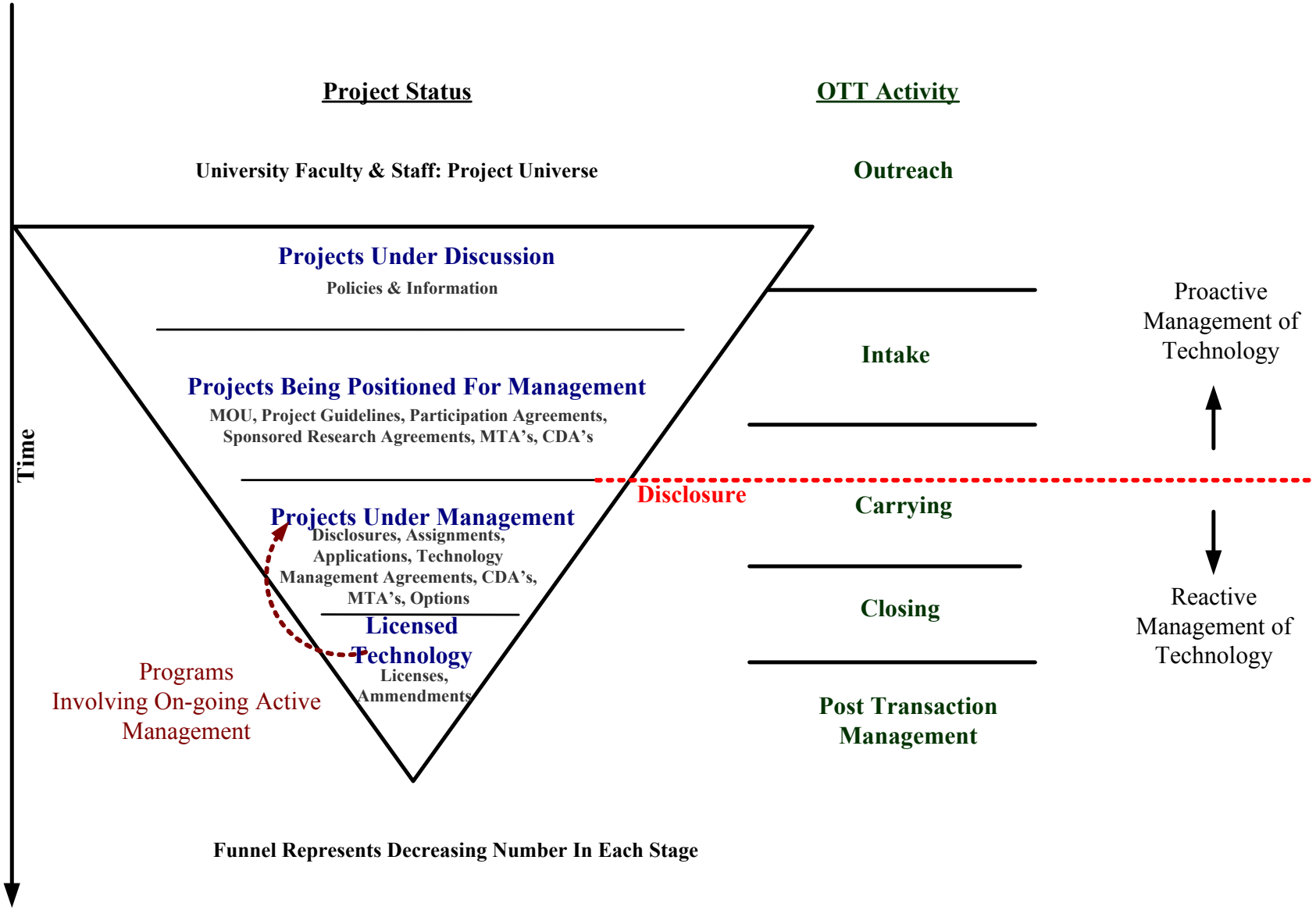
Angel Program Advantages

- Gives Structure to
  - Angel Involvement in the University Project Activities
  - Licensing of IP Rights
  - Leveraging off University Infrastructure and Resources
- Shortens Time to Follow-on Funding At Exercise of Option
  - Provides Rest of Angel Community Known Investment Opportunity
  - Provides Rest of Angel Community With Knowledge and Experience In the Specific Technology

Transactional View Of Technology Transfer



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	Innovator's Dilemma **New Market**	Adopter's Dilemma **Existing Market**
New Technology	~20% of Innovations Push to Market	~40% of Innovations Pull From Market
Existing Technology	~30% of Innovations Push to Market	~ 10% or Less of Innovations Pull From Market

Percentages in quadrants based upon experience

Creating Companies

- Basic Team Required
  - Innovator (faculty, graduate student, postdoc)
  - Operations (faculty then COO/CEO)
  - Strategic Business Development (faculty & OTT, VP Biz Dev)
- Resources
  - Financial (research, prototyping, seed, A- round)
  - Personnel (market, business planning, mfg./distribution)
  - Specialized (legal, accounting, real estate, production)
- Planning

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Technology Transfer - What is it?

- Realizing Public Benefit?
- Economic Development?
- Commercialization of Research?
- Generating Income From Patents?
- A Dilution of The University's Mission?
- An Inappropriate Tax on the Public?

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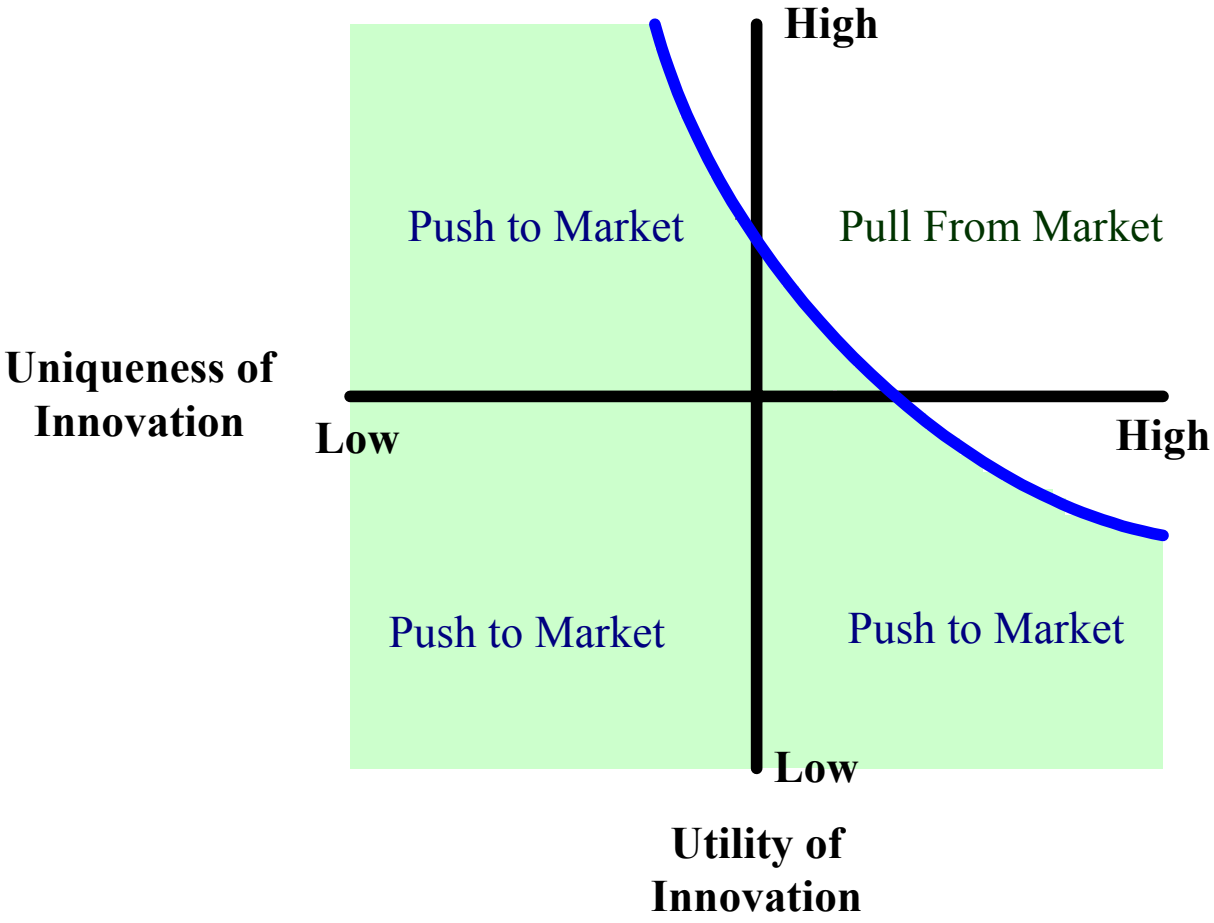
Origin of the Adopter's Dilemma



Secondary Analysis of Innovation

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	New Market	Existing Market
New Technology	**Unstructured Market & Disorganized Competition** **Push to Market**	**Organized Market & Competition but Tech. Discontinuity Creates Barriers** **Pull from Market**
Existing Technology	**Unorganized Market & Organized Competition** **Push to Market**	**Organized Market & Competition** **Pull from Market**

Influence of Matrix Position on Market Structure

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	New Market	Existing Market
New Technology	**Risk Seeking** **Push to Market**	**Risk Minimization** **Pull from Market**
Existing Technology	**Risk Neutral** **Push to Market**	**Risk Adverse** **Pull from Market**

How Technology and Market Affect Risk Perception of Organizational Management

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UA Office Of Technology Transfer

- Personnel (10 FTE + Various Students)
  - Director
  - 4 Licensing FTE
  - Support & Back Office Staff
- Basic Activities
  - Perfect and Manage UA IP
  - Embed IP in Contracts Creating Relationships
    - Licenses
    - Startups
    - Research

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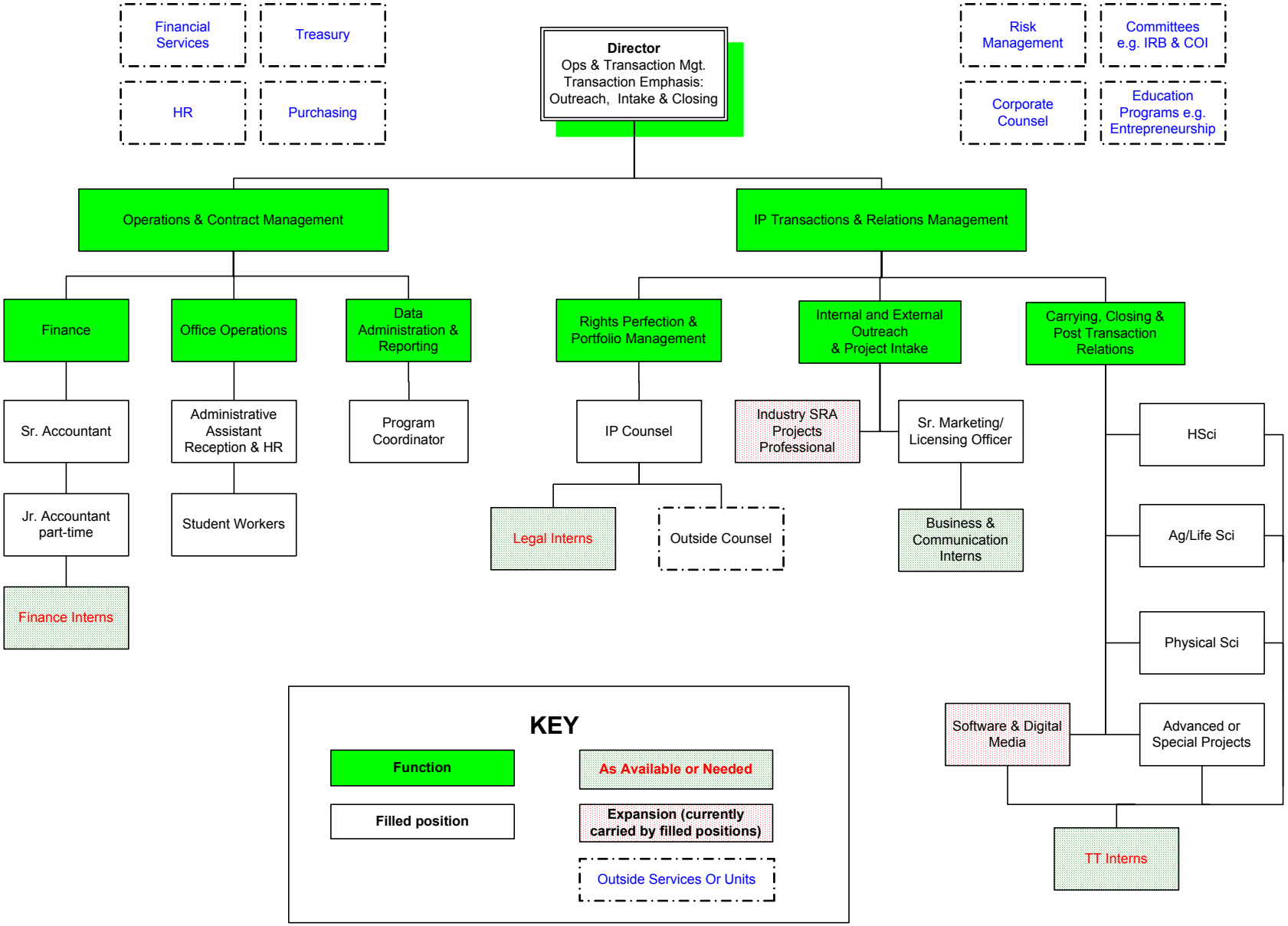
Transaction Activity

Agreement Type	*FY2005*	*FY2004*	*FY2000*
Exclusive Patent Licenses	10	6	1
Non-Exclusive Patent Licenses	0	2	0
Exclusive Copyright Licenses	1	1	3
Non-Exclusive Copyright Licenses	7	8	6
Other Licenses (IND & Other Information)	0	1	0
Fee-Bearing Bailment Agreements	6	4	7
Total Licenses	***24***	***22***	***17***
Options (including options from SRA's)	8	9	3
Option extension agreements	0	7	0
Total Options and Extensions	***8***	***16***	***3***
Inter Institutional Agreements	5	3	0
Master Agreements	8	4	0
Technology Donations (inbound)	2	0	0
Research and Assignment Agreements (110% SRA)	0	1	1
Total Other Major Agreements	***15***	***8***	***1***
Total Major Agreements (excluding extensions)	***47***	***39***	***21***
Letters of Understanding	9	6	0
Biological Material Transfer Agreements (outbound)	40	47	1
CDA s	43	46	9
Total Minor Agreements	***92***	***99***	***10***


Financial Services
Treasury
HR
Purchasing
Director
Ops & Transaction Mgt.
Transaction Emphasis:
Outreach, Intake & Closing
Risk Management
Committees e.g. IRB & COI
Corporate Counsel
Education Programs e.g. Entrepreneurship
Operations & Contract Management
IP Transactions & Relations Management
Finance
Office Operations
Data Administration & Reporting
Rights Perfection & Portfolio Management
Internal and External Outreach & Project Intake
Carrying, Closing & Post Transaction Relations
Sr. Accountant
Jr. Accountant part-time
Finance Interns
Administrative Assistant Reception & HR
Student Workers
Program Coordinator
IP Counsel
Legal Interns
Outside Counsel
Industry SRA Projects Professional
Sr. Marketing/ Licensing Officer
Business & Communication Interns
HSci
Ag/Life Sci
Physical Sci
Software & Digital Media
Advanced or Special Projects
TT Interns
KEY
Function
As Available or Needed
Filled position
Expansion (currently carried by filled positions)
Outside Services Or Units

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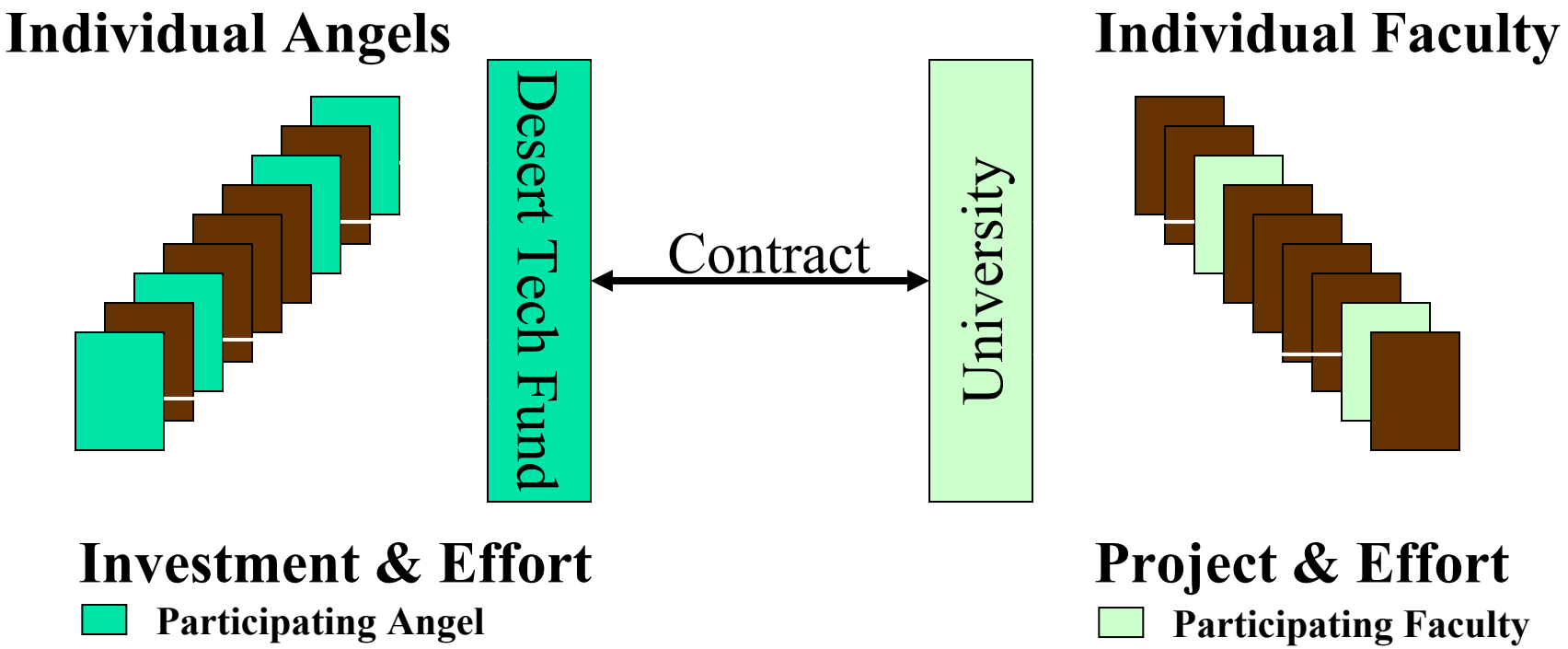
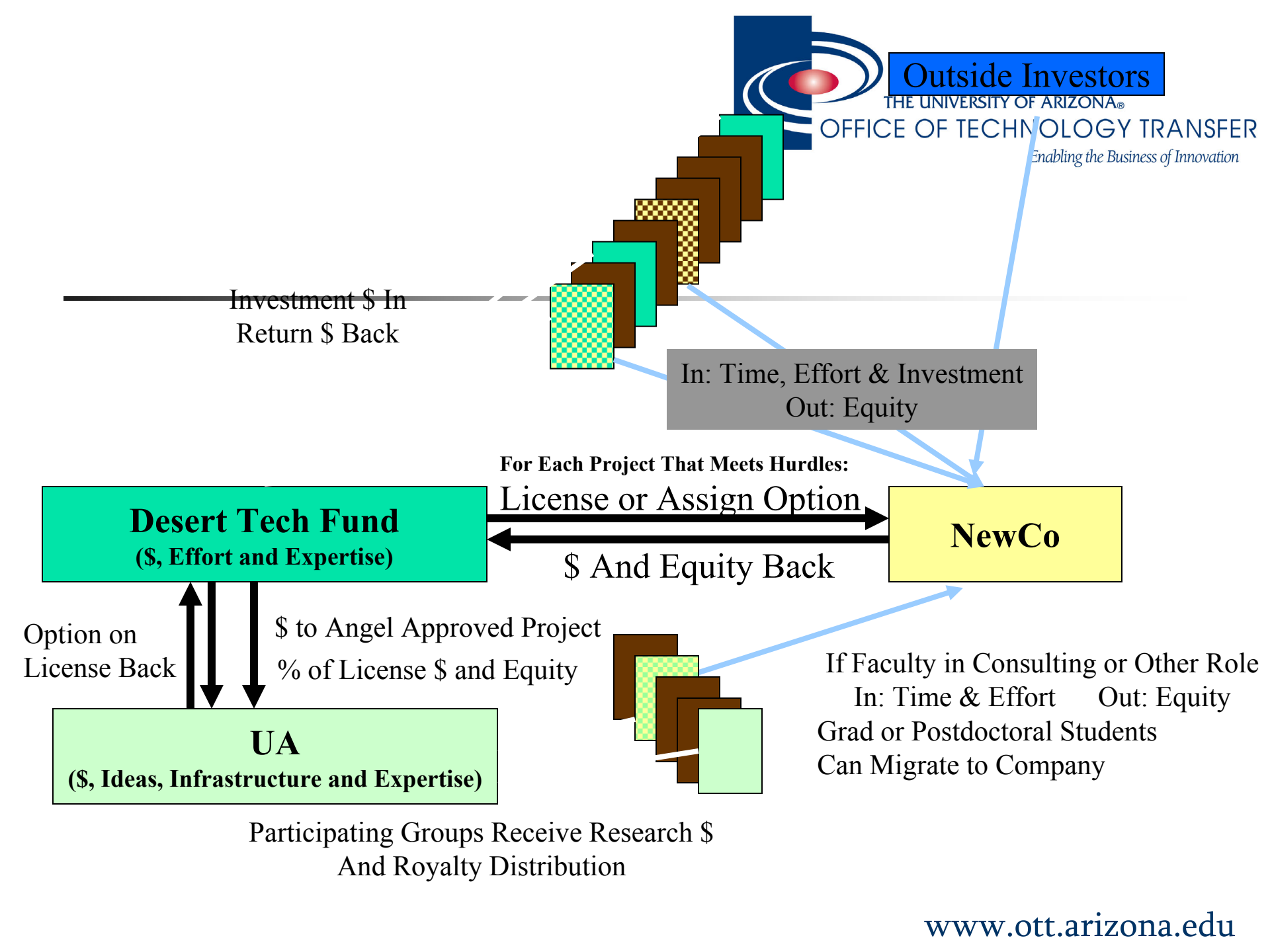
Visualization




Outside Investors
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Investment $ In
Return $ Back
In: Time, Effort & Investment
Out: Equity
For Each Project That Meets Hurdles:
License or Assign Option
$ And Equity Back
Desert Tech Fund
($, Effort and Expertise)
NewCo
Option on
License Back
$ to Angel Approved Project
% of License $ and Equity
UA
($, Ideas, Infrastructure and Expertise)
If Faculty in Consulting or Other Role
In: Time & Effort Out: Equity
Grad or Postdoctoral Students
Can Migrate to Company
Participating Groups Receive Research $
And Royalty Distribution
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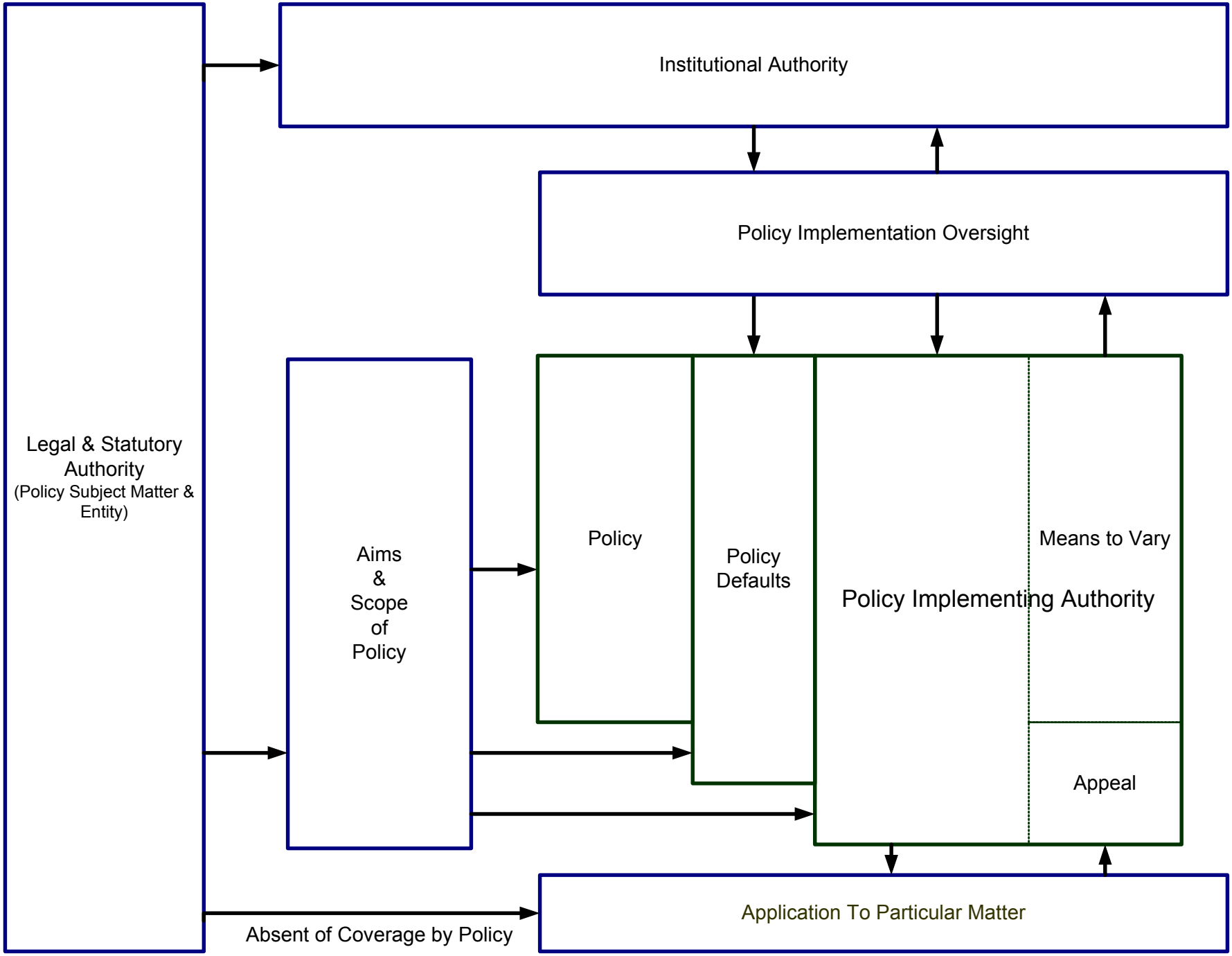
What Bad Policies Do - continued

- Rephrase Existing Law Or Other Policies
- Set Defaults Less Favorable Than Existing Law Would In The Absence Of The Policy
- Embed Procedures Unless Unavoidable
  - Classic: Procedures for Disclosure Handling And Ownership Determination – This Is An Oversight Matter


Institutional Authority
Policy Implementation Oversight
Legal & Statutory Authority
(Policy Subject Matter & Entity)
Aims & Scope of Policy
Policy
Policy Defaults
Policy Implementing Authority
Means to Vary
Appeal
Application To Particular Matter
Absent of Coverage by Policy

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Example:

Most U.S. Policies Allow For The Recovery Of Direct Expenses To Enable The Tech Transfer Activity

- Cost Of A Distribution Is A Direct Expense Tied To The TT Activity
- Create Budget With The Group That Recovers The Cost of Distribution
  - Comes Off The Top
  - Is Not Discretionary Money – Excess Returns For Royalty Distribution
  - May Not Be Fully Funded – Depends Upon License Revenue Stream

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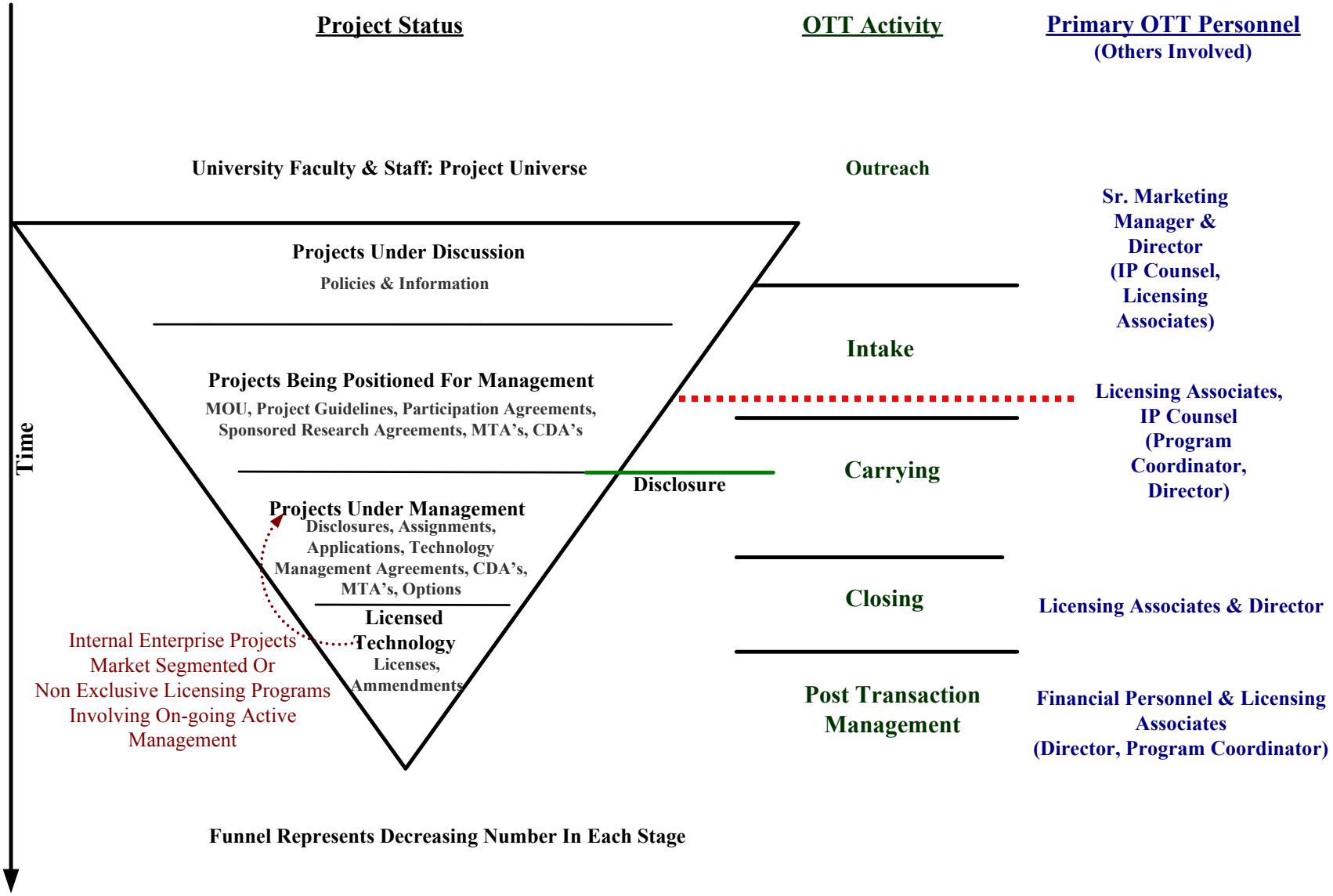
Overview

- Setting the Context
- Implementation
- Office Structure
- Policy


Project Status
OTT Activity
Primary OTT Personnel
(Others Involved)
University Faculty & Staff: Project Universe
Outreach
Sr. Marketing Manager & Director (IP Counsel, Licensing Associates)
Projects Under Discussion
Policies & Information
Intake
Projects Being Positioned For Management
MOU, Project Guidelines, Participation Agreements, Sponsored Research Agreements, MTA's, CDA's
Licensing Associates, IP Counsel (Program Coordinator, Director)
Carrying
Disclosure
Projects Under Management
Disclosures, Assignments, Applications, Technology Management Agreements, CDA's, MTA's, Options
Closing
Licensing Associates & Director
Licensed Technology
Licenses, Ammendments
Internal Enterprise Projects Market Segmented Or Non Exclusive Licensing Programs Involving On-going Active Management
Post Transaction Management
Financial Personnel & Licensing Associates (Director, Program Coordinator)
Time
Funnel Represents Decreasing Number In Each Stage

THE UNIVERSITY OF ARIZONA®
OFFICE OF TECHNOLOGY TRANSFER
Enabling the Business of Innovation

What Good National Policies Do

- Provide Clarity of Action and Actors
- Set Goals Not Means
- Emphasize Local Decision-making
- Encourage Sustainability
  - Through Reinvestment in Core Activities
  - By Supporting Collaboration
- Avoid Circumstances Encouraging
  - Lack of Candor
  - Forced Participation