IRI2038 Foresight Project

Ted Farrington
Fellow
Kalypso Consulting

Research and Technology Management

2038

2017 SPE INTERNATIONAL
POLYOLEFINS CONFERENCE
February 26 - March 1 | Houston, Texas

SPE SPE South Texas

Industrial Research Institute

Industrial™ Research Institute

Creating Innovation Leadership Solutions

- Over 200 Members Companies and Laboratories
- Founded 1938

Industrial™ Research Institute 2038

75 1938 2013 Creating Innovation Leadership Solutions WWW.IRIWEB.ORG

Agenda

Industrial Research Institute
Creating Innovation Leadership Solutions
WWW.IRIWEB.ORG
2038

Review Overall Project Approach

Show Scenarios and Online Game Results

Prepare for Backcasting Exercises

Christian Crews
Principal, Sr. Manager,
Kalypso

Lee Green
VP, Research &
Innovation
IRI

Ted Farrington
Sr. Director,
PepsiCo Corporate
R&D

Jennifer Blenkle
VP, Research &
Innovation
IRI

STRATEGIC FORESIGHT

*is **NOT** about*

Predicting The Future!

Death of Distance v Megacities
Smart Cities
City Perks
Federation of Megacities
Smaller Projects
Prize R&D
Human Augmentation
Hollywood Model
Skunkworks
Connected Brains
3 Roads to Innovation
Africa Leapfrogs
Infrastructure
MOOC's
Mass Customization
Regulatory Constraints
Deprinting
Speed
Embedded Resources
PPM by β
Talent Sourcing
Bifurcated Skills
Social Problem Solver
Buyer Beware!
Everything's in Beta
PROJECT MANAGEMENT
UNITED STATES PATENT AND TRADEMARK OFFICE
DEPARTMENT OF COMMERCE
EXTREME OPEN INNOVATION

The FUTURE
is a **big place**

IRI2038

Focus Question:

How might future trends, developments and events impact the art and science of research and technology management ***over the next 25 years***?

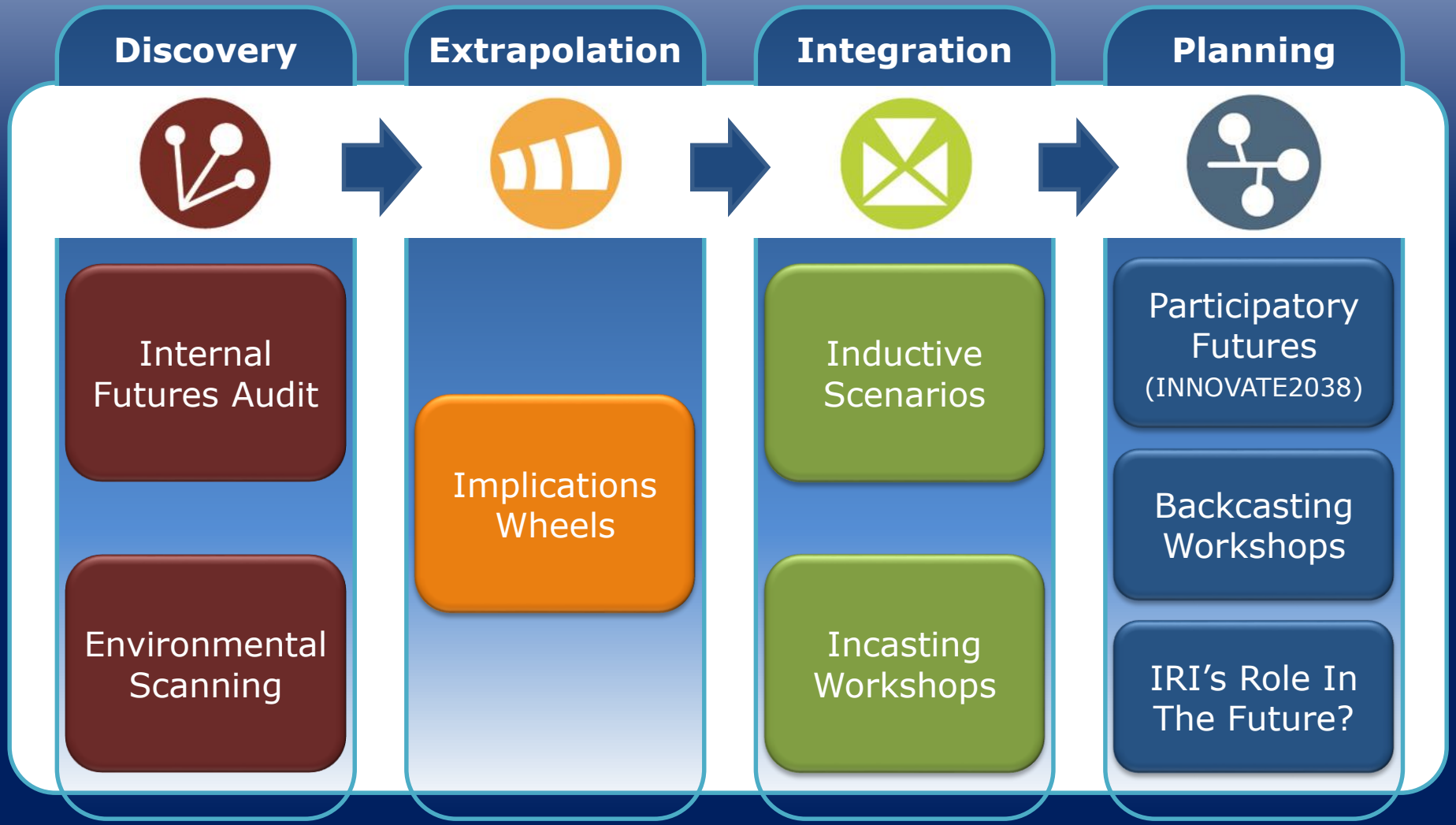
Four Phase Strategic Foresights Process

andspace consulting

SME and Overall Project Management

Discovery	Extrapolation	Integration	Planning

Detailed IRI2038 Foresights Process



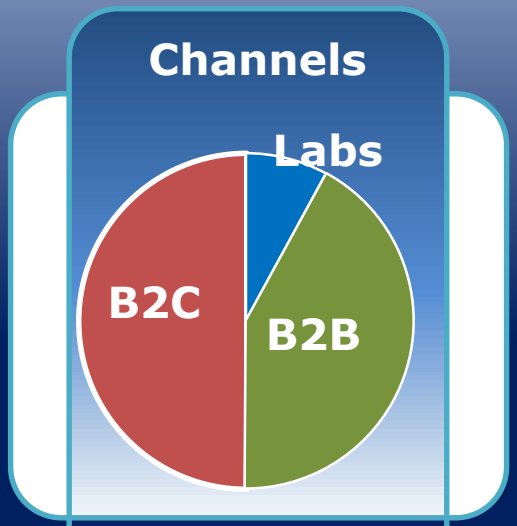
Internal Futures Audit

Futures Audit

IRI Industrial Research Institute 2038
Creating Innovation Leadership Solutions
WWW.IRIWEB.ORG

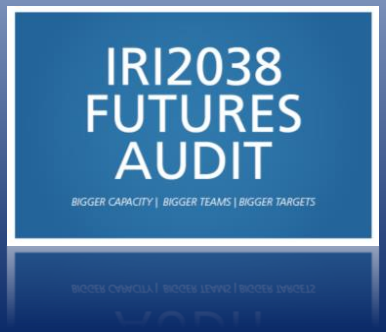
Industries Represented

- Consumer Products
- Pharma/Medical
- Industrial Materials
- Consulting
- Chemicals
- Food/Beverage
- R&D Labs
- Electronics
- Conglomerates
- IT Systems
- Pulp & Paper
- PetroChemical
- Power Systems
- Automotive
- Aerospace



Internal Futures Audit

DRIVERS of Past 25 Years



OpenInnovation

BigDataAnalytics

GlobalizationofRnD

VideoConferencing

Miniturization

Computation

Internet

FearOfScience

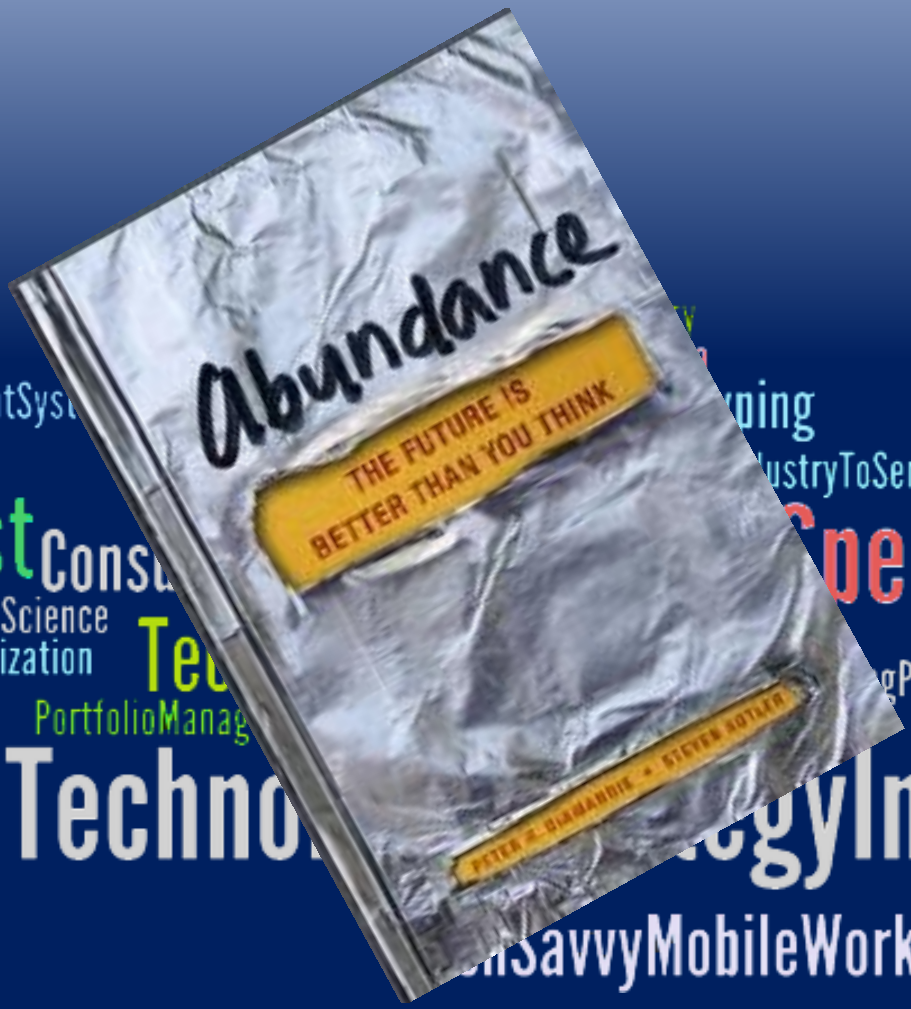
Incrementality

IncreasedRegulation

Internal
Futures Audit

What We Are Seeing Today

IRI2038
FUTURES
AUDIT
BIGGER CAPACITY | BIGGER TEAMS | BIGGER TARGETS



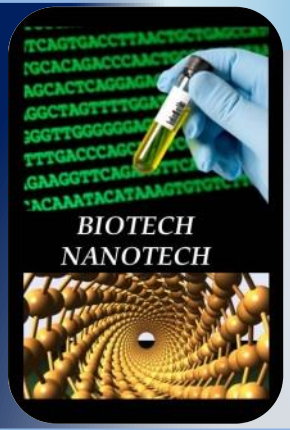
Personalization
RnDforOrganicGrowth
TheShiftEast
BigDataAnalytics
CitizenScience
Urbanization
ConnectedWorld
PortfolioManag
Speed
gPopulation
gyIntegration
SavvyMobileWorkforce

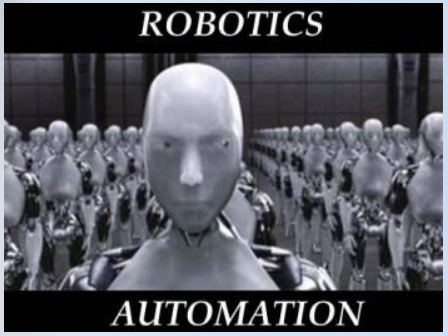
Internal
Futures Audit

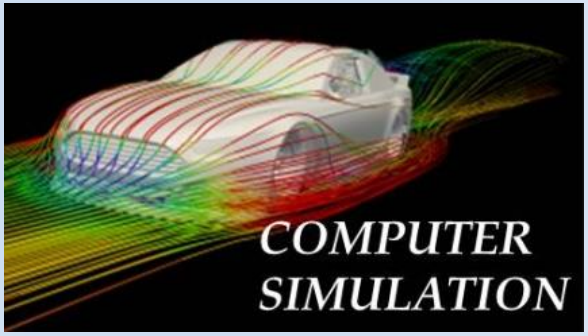
Future Drivers

Simulation
CompanyLoyalty
RiseofAfrica
RisingSOL
SpeechRecognition
IPChallenges
IntelligentSystems
CloudResearch
PureRnDCompanies
Sensors
SocialMedia
Collaboration
AcceleratedLearning
Automation
Cybernetics
3DPrinting
SeaLevelRise
IPinChina
VirtualWork
TissueEngineering
Genomics
WarforTalent
PopulationGrowth
EmbeddedCommunication
MolecularHardware
Biofuels
AgingPopulation
Nano-Biotech
Sustainability
Robotics
Energybreakthrough
TrueGlobalCurrency
ReverseInnovation
ResourceScarcity
WorkLifeBalance
Biomimicry
FutureofF2F

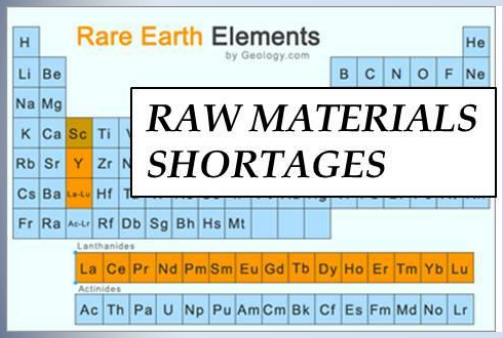
CREATE







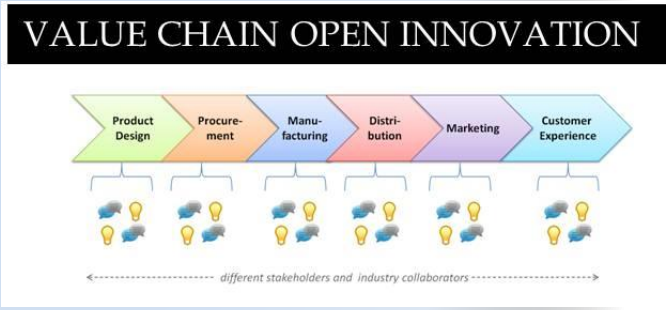
CONSUME



CONNECT

DEFINE

RELATE



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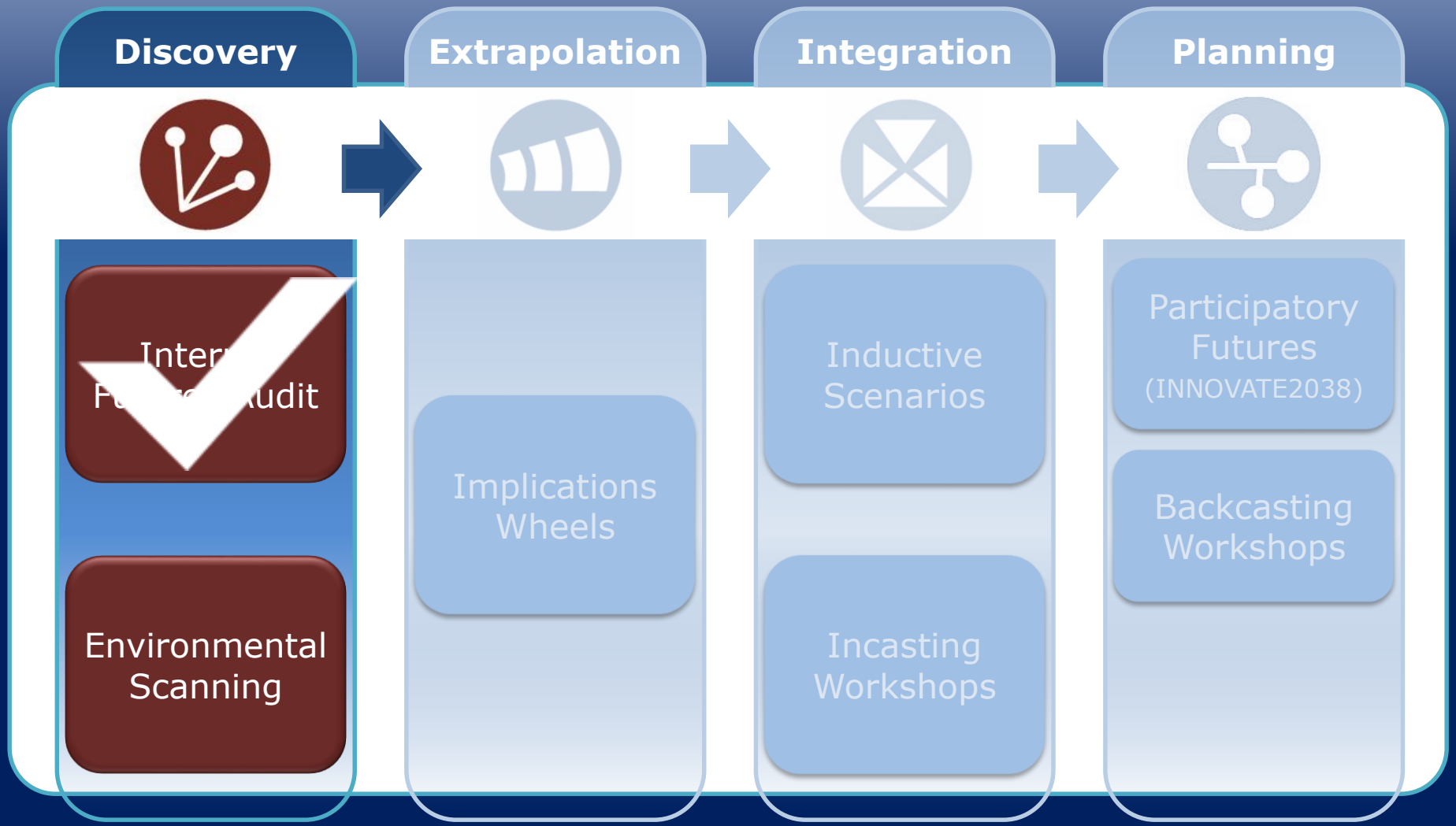
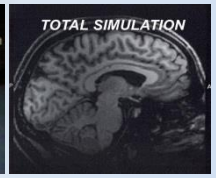


Environmental Scanning

WEAK Signals

Foresight Alliance

CREATE



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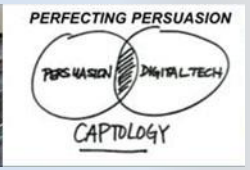

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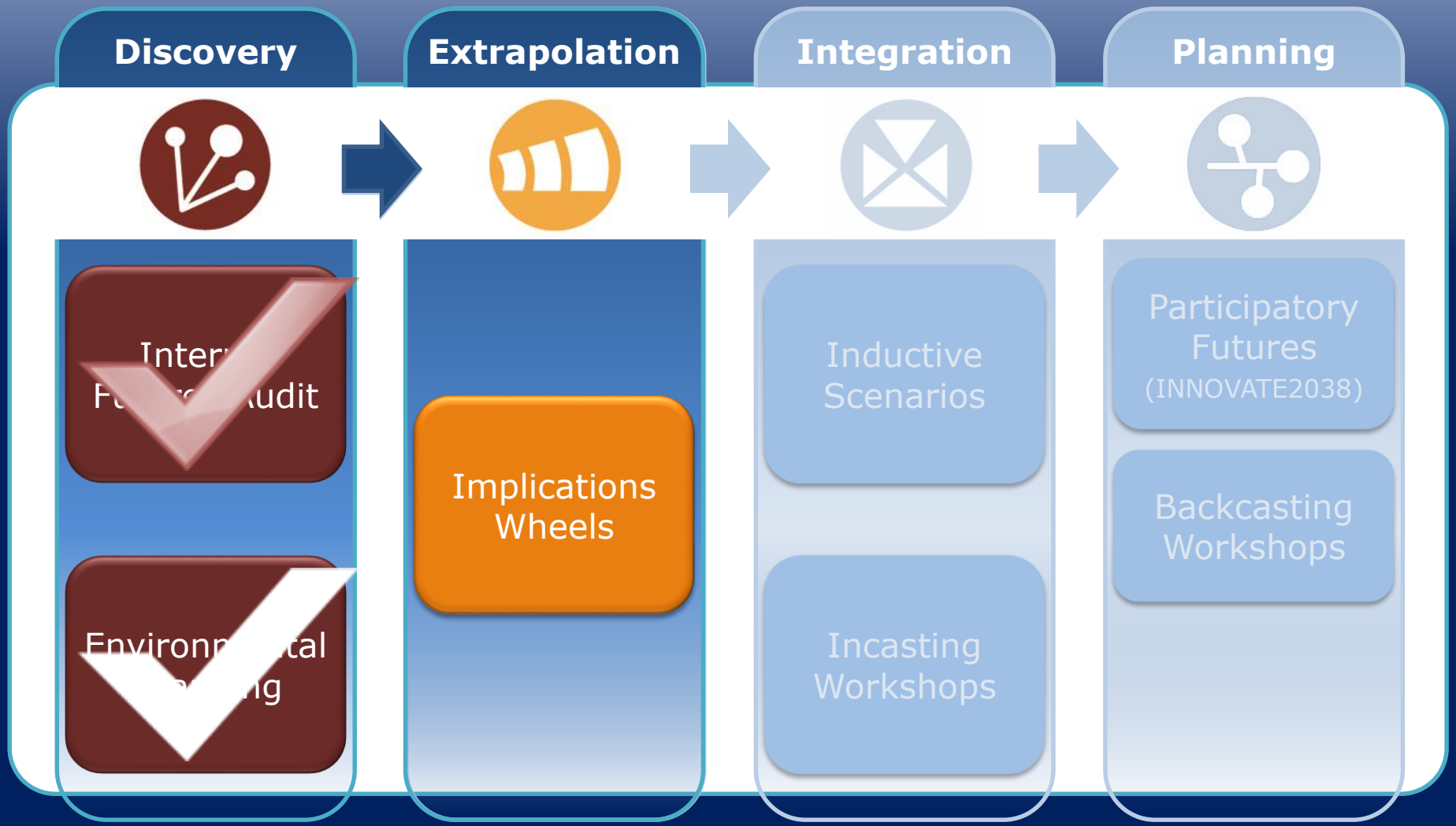
Detailed IRI2038 Foresights Process



Implications Wheels

Augmented Workforce

WEAK Signal

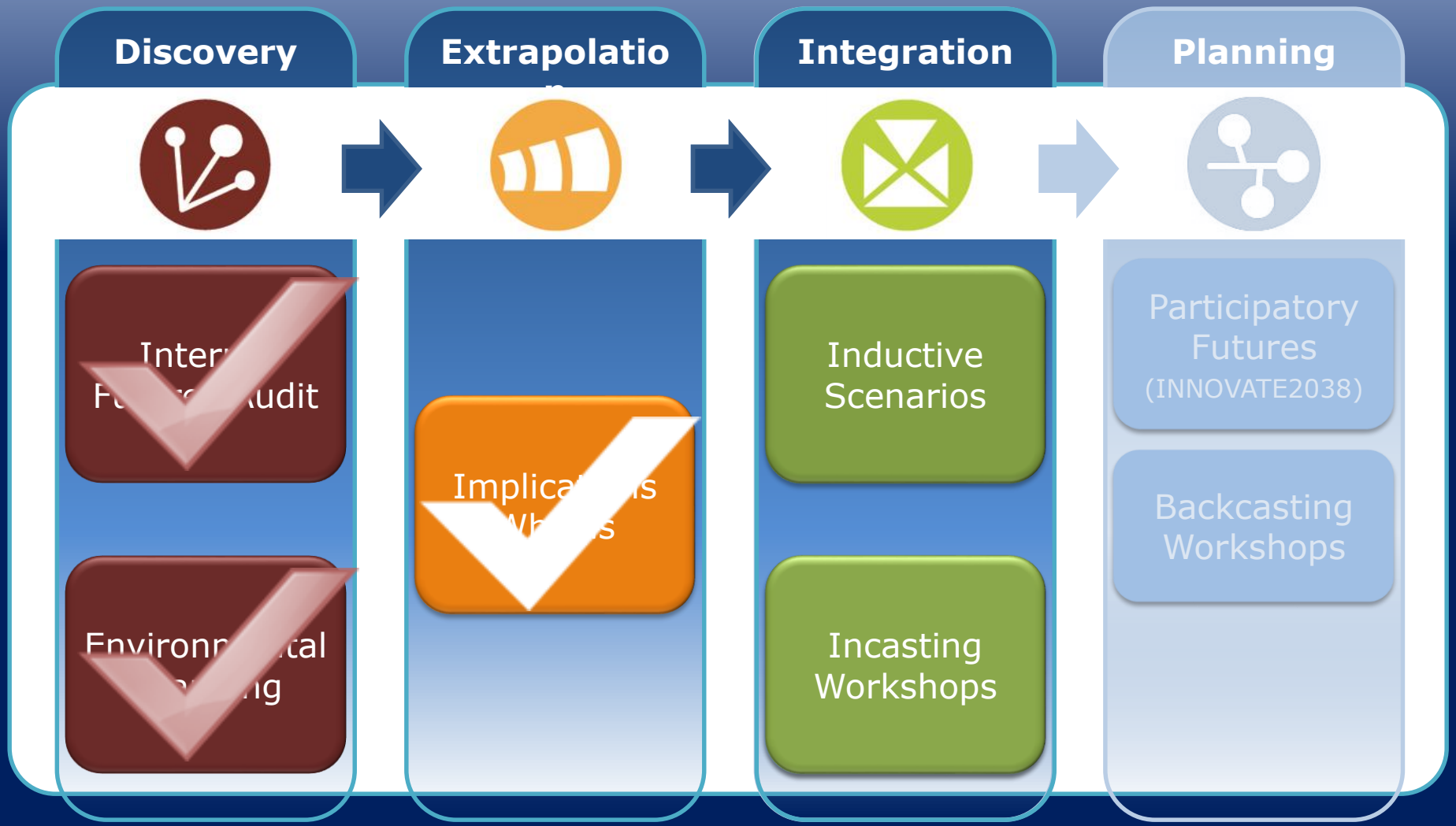
1st Impacts

- **Mental Augmentation Divide**
  - Stratified Society Accepted By Some → Social Unrest
  - Laws Protect Rights of the Unaugmented → Augments Level Playing Field?
- **Physical (Endurance)**
  - Long Term Health Impacts → Safe Augmentation vs Capability
  - Faster Innovation Productivity ↑ → Impact on Work/Life Balance
- **Distributed Workforce**
  - Boundary of Who is an Employee → New Compensation Systems (not $$'s)
  - Even More Garage Innovation → Large Companies Less Relevant

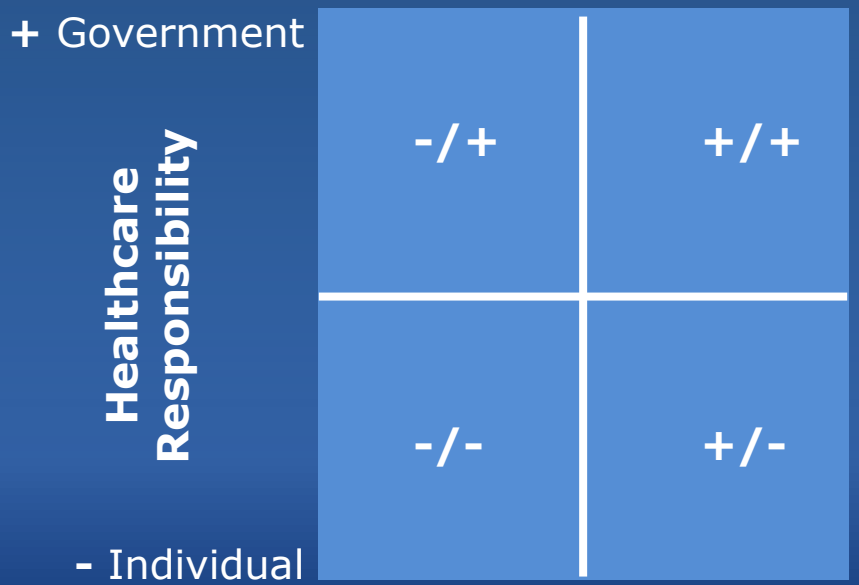
2nd Impacts

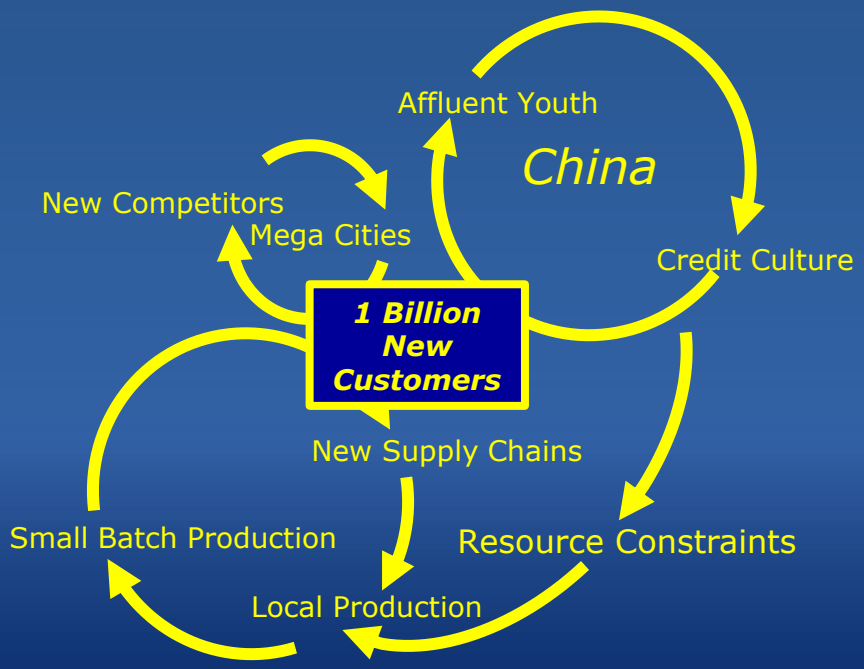
3rd Impacts

Detailed IRI2038 Foresights Process



Deductive VS. Inductive





Inductive Scenarios

(4) Influence Diagram Workshops

IRI Winter ROR Meeting
Fort Lauderdale, FL

PRIZE R&D	THE END OF MEMORY LOSS	THE NPV OF SOCIAL VALUE	BRAINS CONNECTED TO THE NETWORK	VERTICAL FARMING
NOBEL PRIZE FOR SENSORY INTEGRATOR	SCIENTIST CELEBRITIES	THE RETURN OF THE SKUNKWORKS	WORLD ON BRINK OF COLLAPSE AS PEOPLE STOP DYING	3D DE-PRINTING
MANUFACTURING ECOSYSTEM COLLAPSE	BLACK MARKET RECYCLING	SHOWROOMING DOMINANT FORM OF RETAIL	PERSONAL DATA STARS	DATA VALIDATION POLICE
DATA HEDGING	JUST IN TIME EDUCATION	ACCRA, GHANA: SILICON VALLEY ON STEROIDS	CURRENT DEVELOPED COUNTRIES "LOCKED OUT" OF HIGH GROWTH MARKETS	BOOM IN NATURAL RESOURCES
THE END OF PROJECT MANAGERS	SMART CITIES RULE	MORE CUSTOMER RESEARCH	THE DEATH OF DISTANCE	MORE PRIVATE COMPANIES
DOCUMENTATION MARKET	GRIDLOCK – NO NEW INDUSTRIAL PLANTS ANYWHERE	NO MIDDLE CLASS	EXPERIENCE CURATORS	GAMER STRIKES
INTERNAL COMMUNICATION SILOES	DOING MORE WITH LESS	INTENTIONAL COMMUNITIES	CONSENSUS MANAGEMENT	MICRO-ORGANISM POLLUTION
LOCKDOWN!	NEW COUNTRIES FORM	SYSTEMS THINKING EVERYWHERE	GLOBAL REGULATIONS ON GEO-ENGINEERING PROJECTS	GIANT PARTNERSHIPS
SURVEILLANCE COUNTERMEASURES	GUARANTEED HITS	NO PRODUCT IS EVER GOOD ENOUGH	RETURN OF IMPERIALISM	LOYALTY CARD WARS

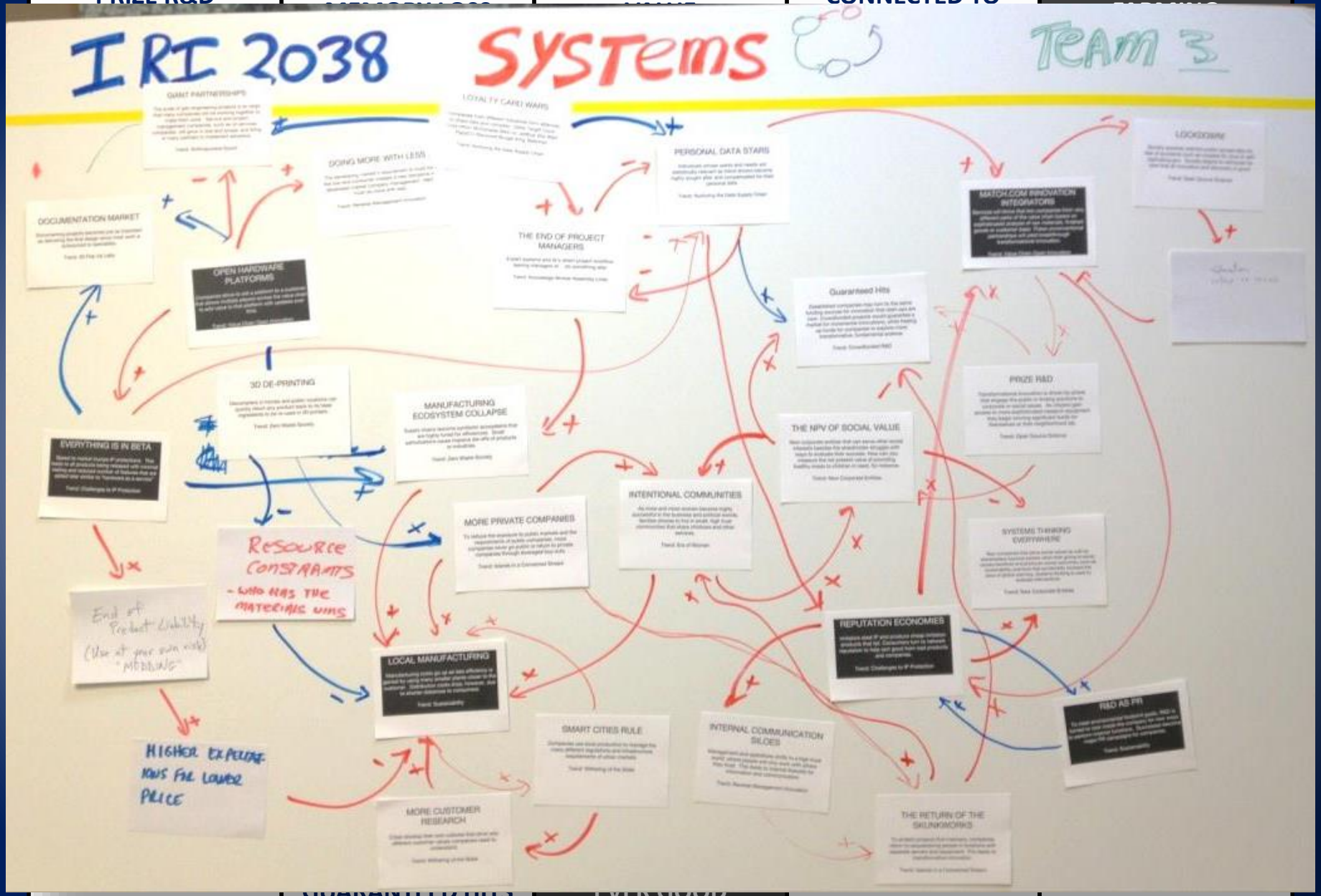
PRIZE R&D

THE END OF

THE NPV OF SOCIAL

BRAINS CONNECTED TO

VERTICAL



COUNTERMEASURES

GUARANTEED HITS

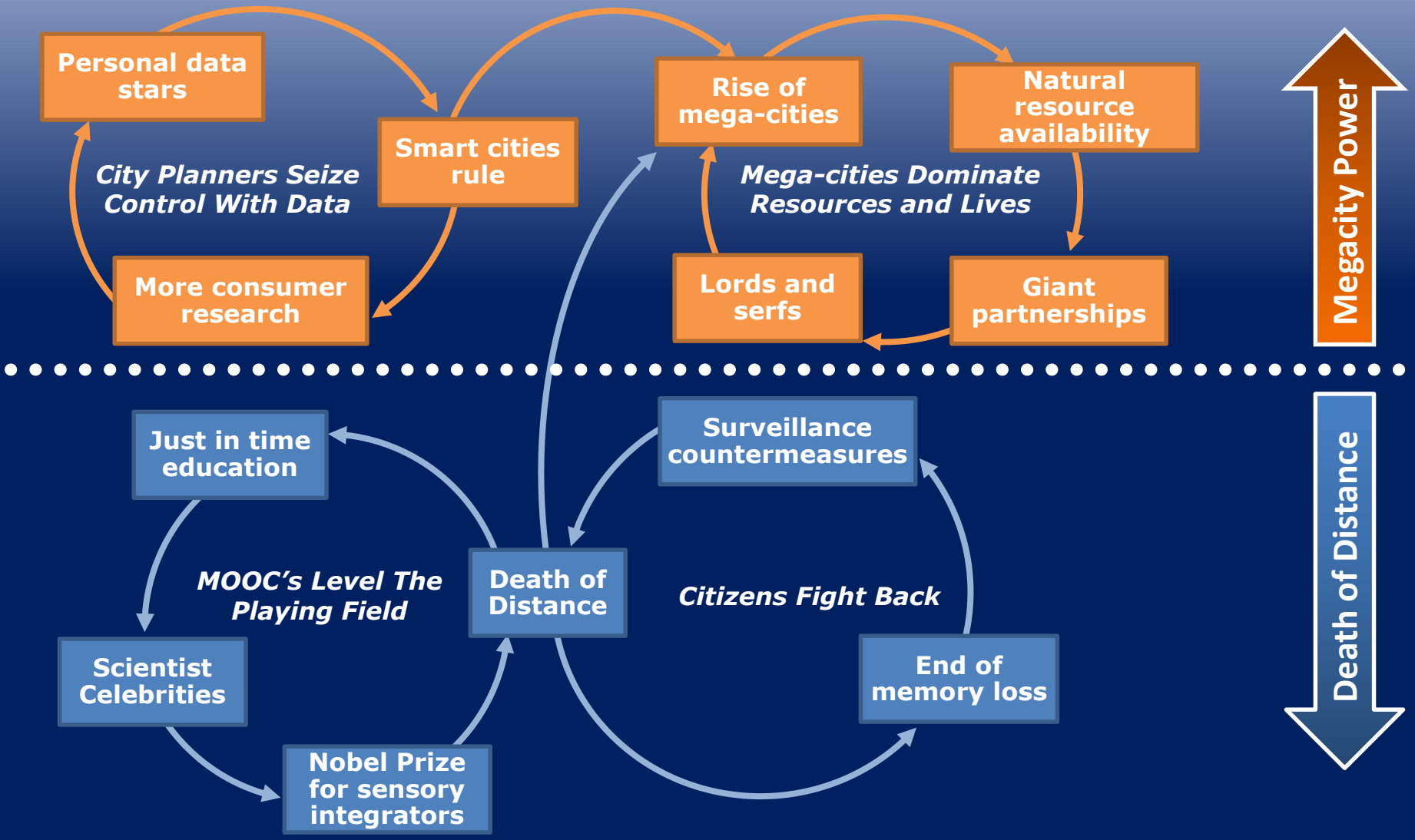
EVER GOOD ENOUGH

IMPERIALISM

WARS

Inductive Scenarios

Death of Distance vs. Megacities

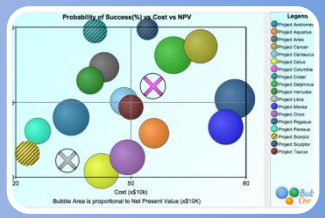


Incasting Workshops

Implications for R&D?

May Jubilee Meeting

PROJECT
Management



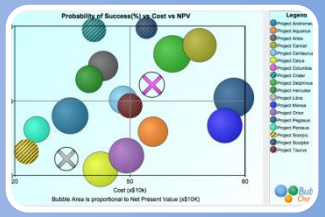
PORTFOLIO
Management

R&D's
Value Proposition

TALENT
Management

Implications for R&D

Many Smaller Projects
Rapid Startup and Execution Key



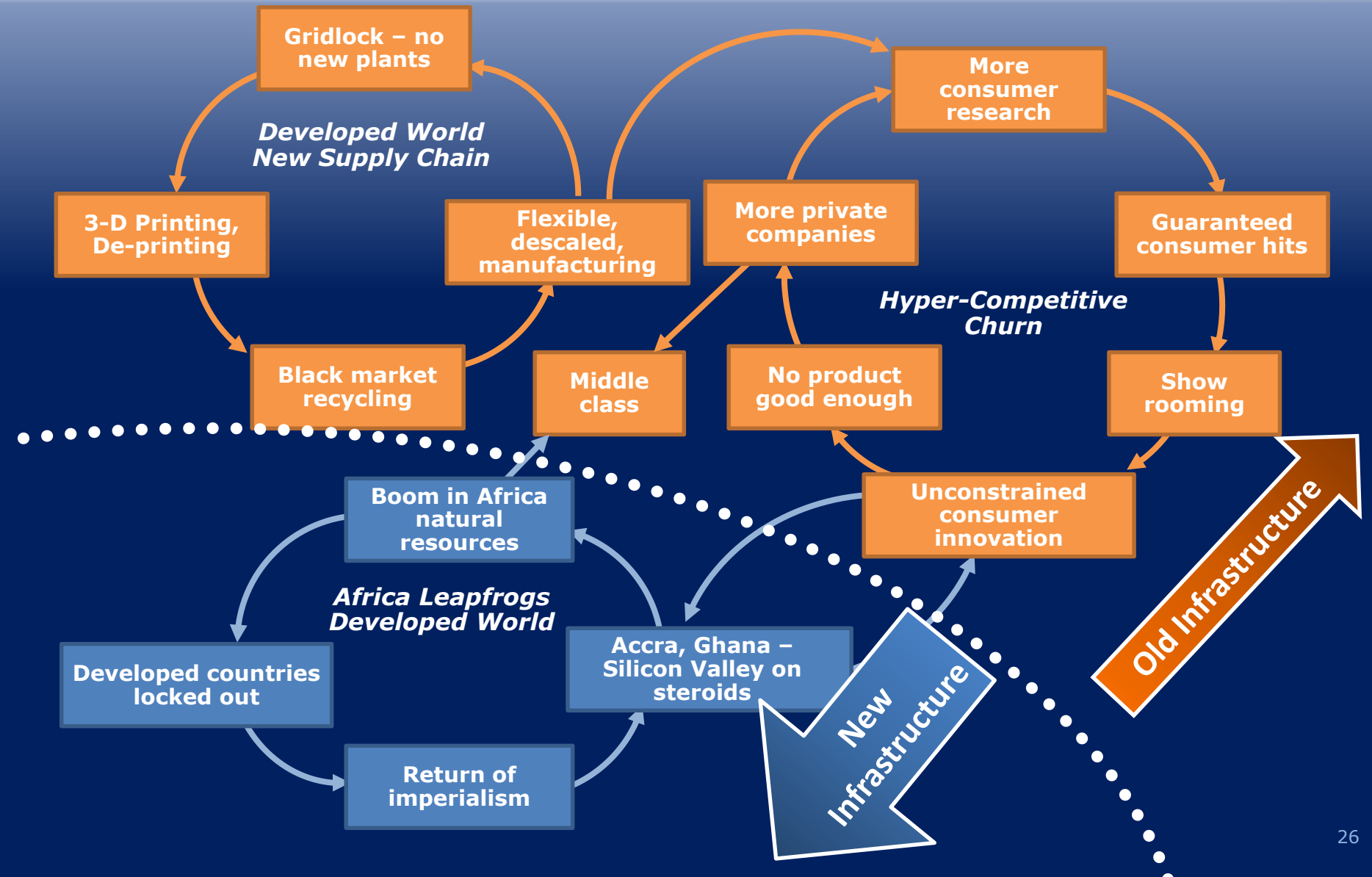
Driven By Megacity Needs and
Funding IP Supports Megacity Needs

Megacity Path to Open Innovation
Value Judged by Megacities

Reputation Market
Compensation Includes Megacity Perks

Inductive Scenarios

Africa Leapfrogs Developed Countries

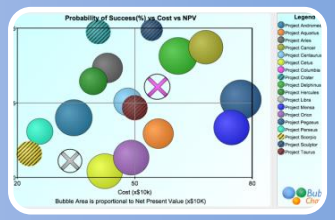


Inductive Scenarios

Implications for R&D

Africa Leapfrogs Developed Countries

Fail Fast & Fail Cheap
Software For Basic Project Management



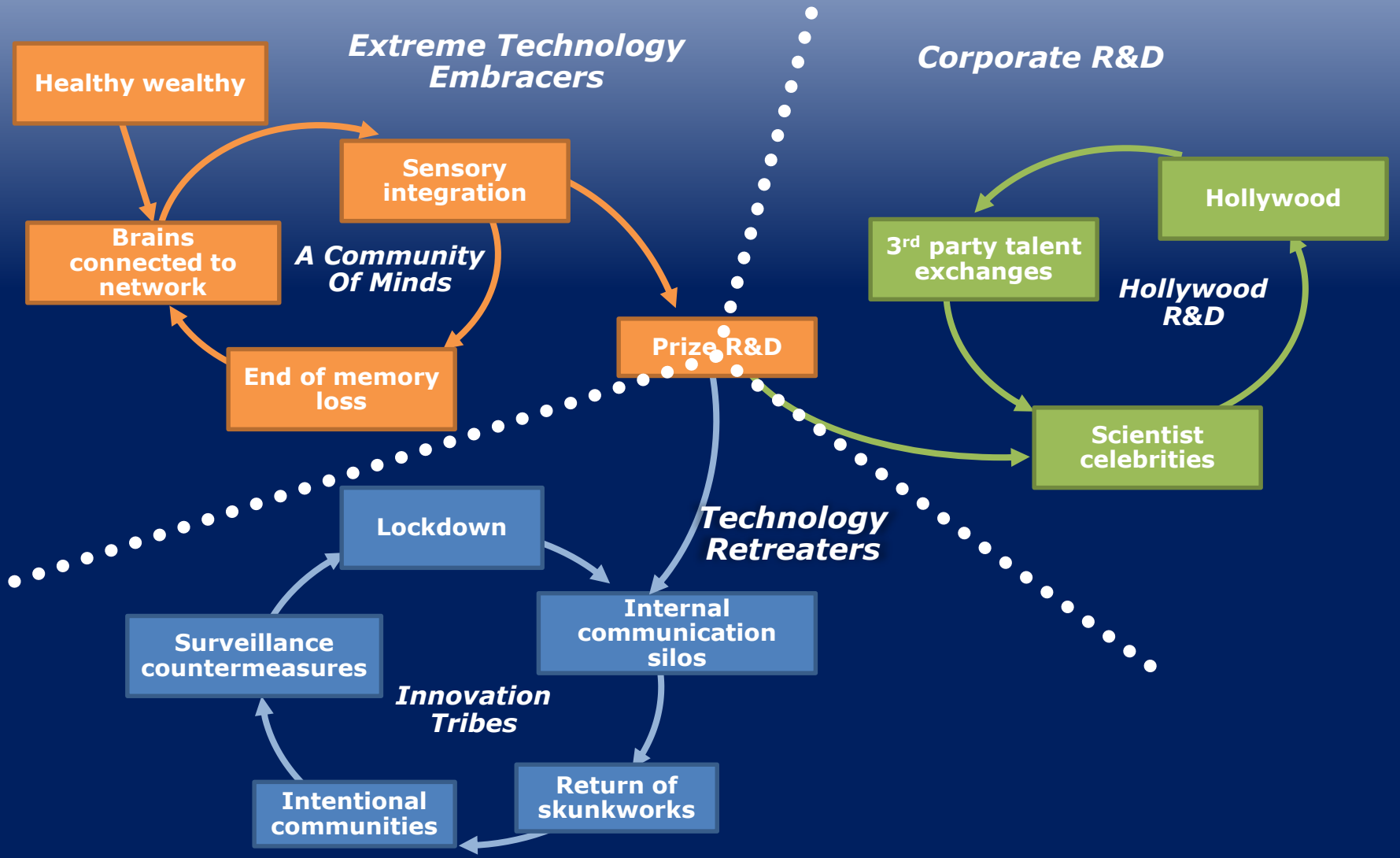
Simulation Dominates Decision Making
IP For Processes, Not Things

Speed!
Not Long Term IP

Rented Workforce
Talent Sourcing Is Key

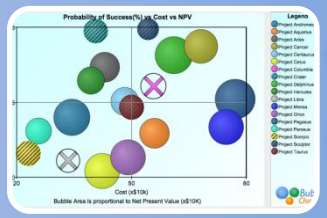
Inductive Scenarios

Three Roads To Innovation



Implications for R&D

Simulations Improve PM
Managers Focus On Collaboration



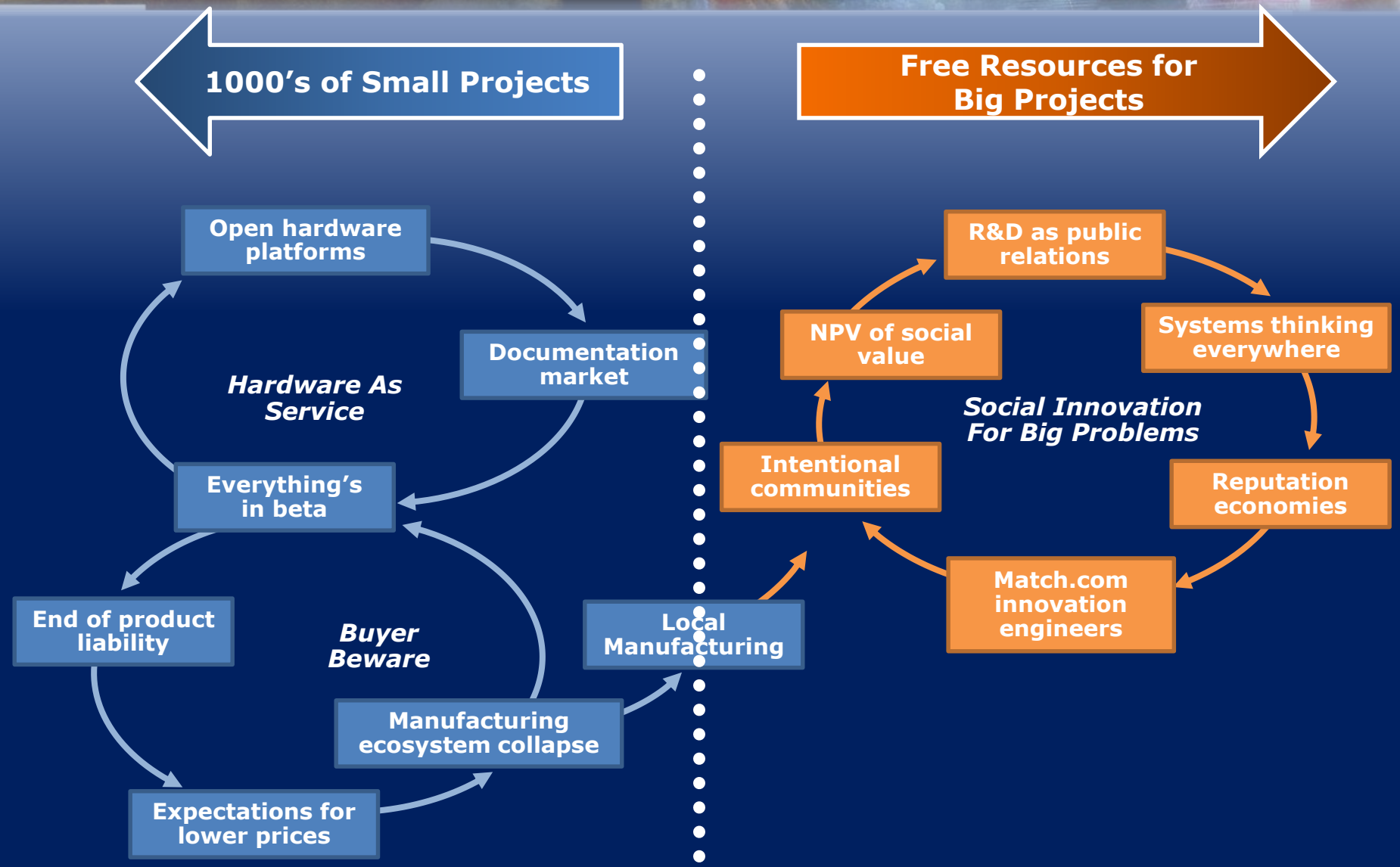
Very Open To Very Closed Projects
Clearly Defined Needs & Requirements

Connecting Needs and Research Model
Fast Tracked Product Launches

Cultivating Freelance Network Is Key
Simulation Assists Team Assembly

Inductive Scenarios

Everything's In Beta

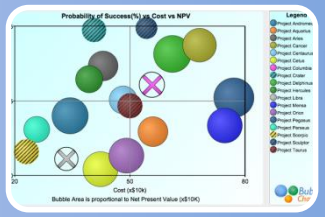


Inductive Scenarios

Implications for R&D

Everything's In Beta

AI for Project Management
Embedded Resources



PPM by Beta Testing
Networks, Relationships, Communities

Data Management, Speed & Cost
Reputation as Social Problem Solver

Bifurcated Skills Base
Limited Mobility

Death of Distance v Megacities
Smart Cities
City Perks
Federation of Megacities
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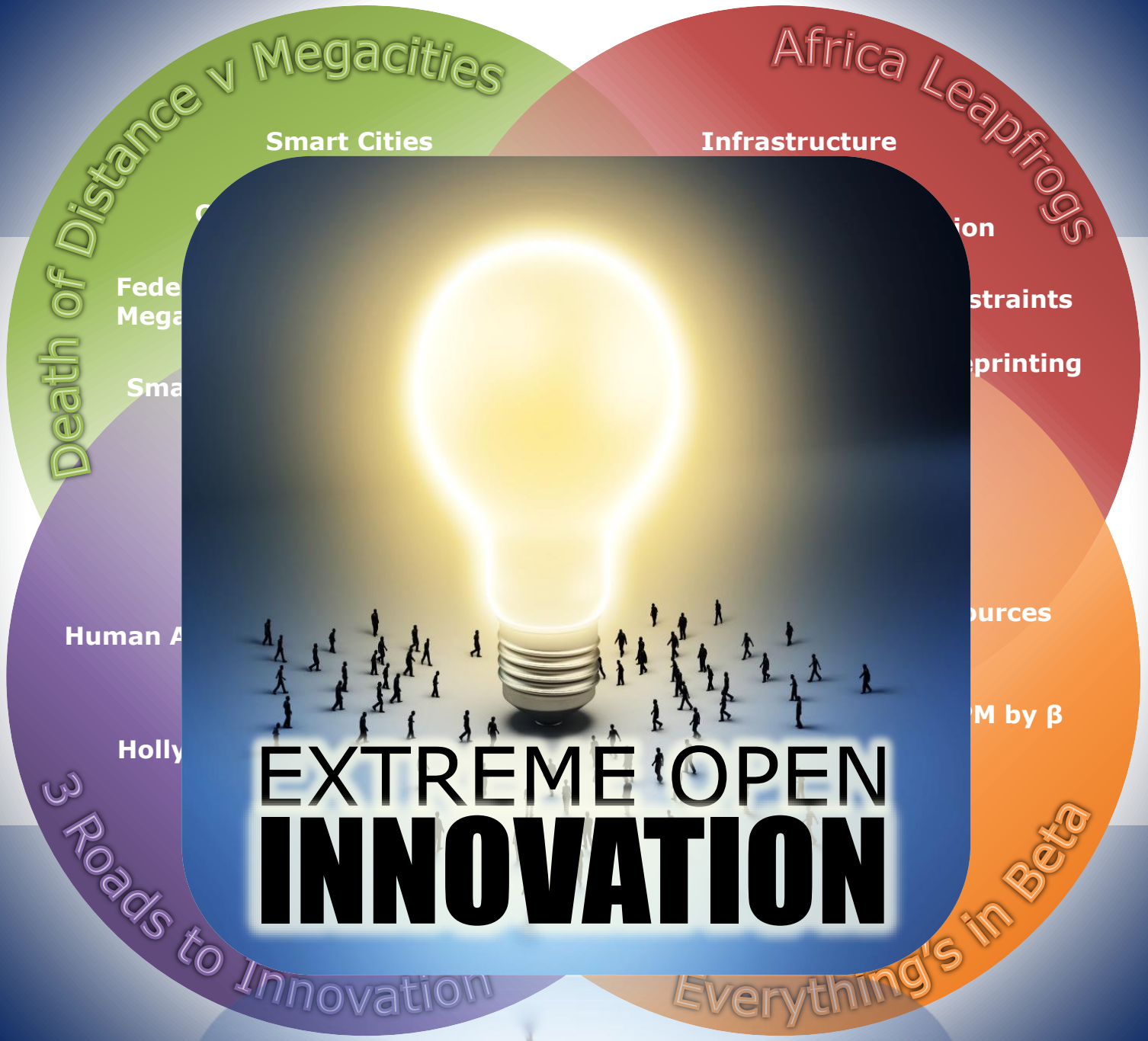
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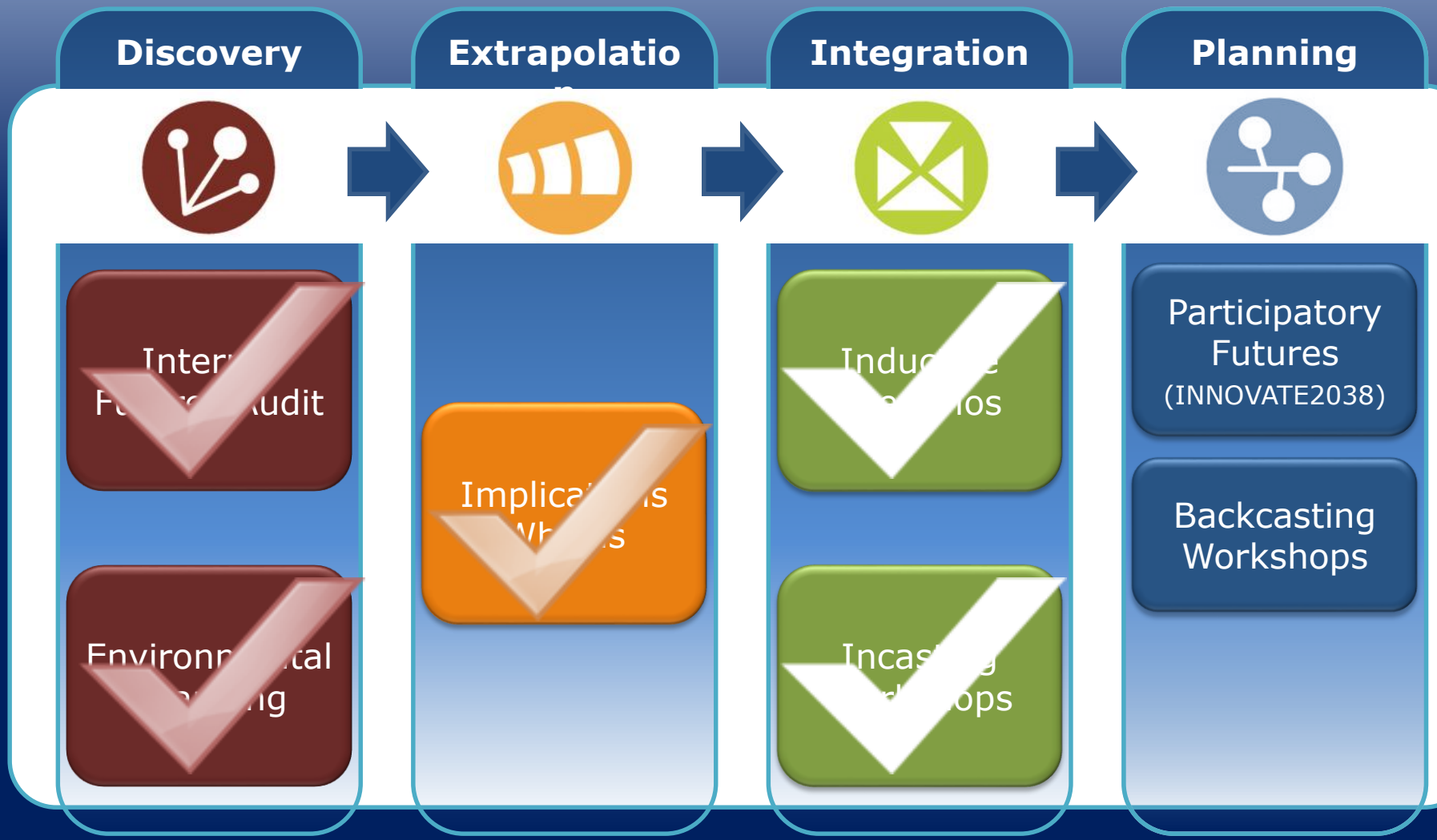


innovate2038

FORESIGHT ENGINE

Today's paths to research and innovation won't work in 2038 ...

INSTITUTE FOR THE FUTURE

INNOVATE 2038

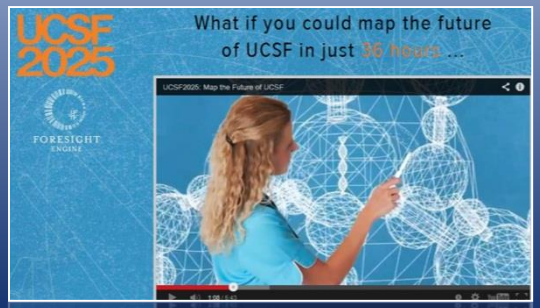
Play the game. Make the future.

GAME ARCHIVE

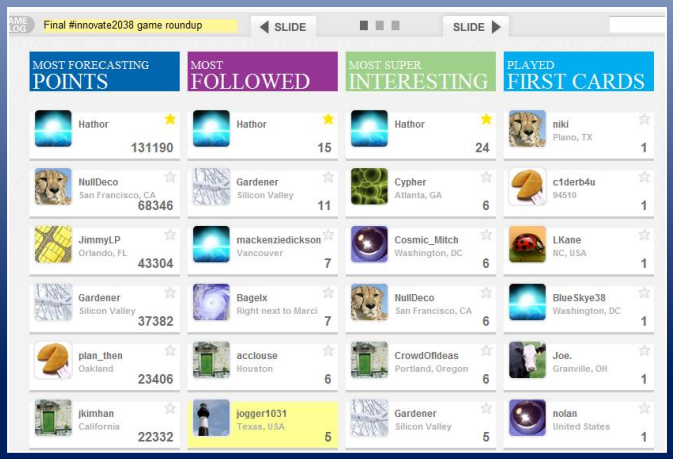
September 25 - 26, 2013

Backcasting Workshops

IFTF Foresight Engine



Introductory Video



What urgent challenges will UCSF face?

How can UCSF lead the way in 2025?

Two Provocative ?'s

- Answer 1
- Answer 2
- Answer 3

→

- Build 1
- Build 2
- Build 3
- Build 4

→

- Build 1
- Build 2
- Build 3
- Build 4

innovate2038

FORESIGHT ENGINE

Today's paths to research and innovation won't work in 2038 ...

INSTITUTE FOR THE FUTURE

You have **36 hours** to change the future.

Play the game. Make the future.

GAME ARCHIVE

September 25 - 26, 2013

FORESIGHT ENGINE

HOME ABOUT BLOG FAQ & HELP HOW TO PLAY Welcome jogger1031 SIGN OUT 7580 POINTS

Today's paths to research and innovation won't work in 2038 ... how will you remake the future? #Innovate2038

DETAILS PLAY CARD

innovate2038

GAME BLOG Final #innovate2038 game roundup

GO TO DASHBOARD

Search

Innovate2038

Make the future of research and innovation!

PLAY POSITIVE IMAGINATION

How can new research and innovation practices lead the way in 2038?

The trial is not open.

PLAY CRITICAL IMAGINATION

What obstacles & roadblocks will hold research & innovation back?

The trial is not open.

POSITIVE IMAGINATION CARDS

Unlimited free energy allows terraforming; global paradises follow

CrowdOfIdeas

The AI's realize that everything is built geometry-like on axioms...and they begin changing them

CRITICAL IMAGINATION CARDS

Lack of forgiveness - we must practice forgiveness within innovation as we look back on failed ideas with new uses and novel possibilities.

Hathor

Increasing "thought-silos" from media fragmentation

FORESIGHT ENGINE

SIGN OUT

POINTS

Today's paths to research and innovation won't work in 2038 ... how will you remake the future? #Innovate2038

DETAILS PLAY CARD

innovate2038

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GO TO DASHBOARD

Search

POSITIVE IMAGINATION IN RESPONSE TO:

How can new research and innovation practices lead the way in 2038?

Will innovative become the new normal? Will we need a new definition for "innovative" by 2038?

played 14 days ago by SaschaGoto

Momentum

PLAY MOMENTUM

If this is true... what happens NEXT?

The trial is not open.

MOMENTUM CARDS

Antagonism

PLAY ANTAGONISM

Disagree? What could happen INSTEAD?

The trial is not open.

ANTAGONISM CARDS

Adaptation

PLAY ADAPTATION

Yes, and...how might this EVOLVE?

The trial is not open.

ADAPTATION CARDS

Investigation

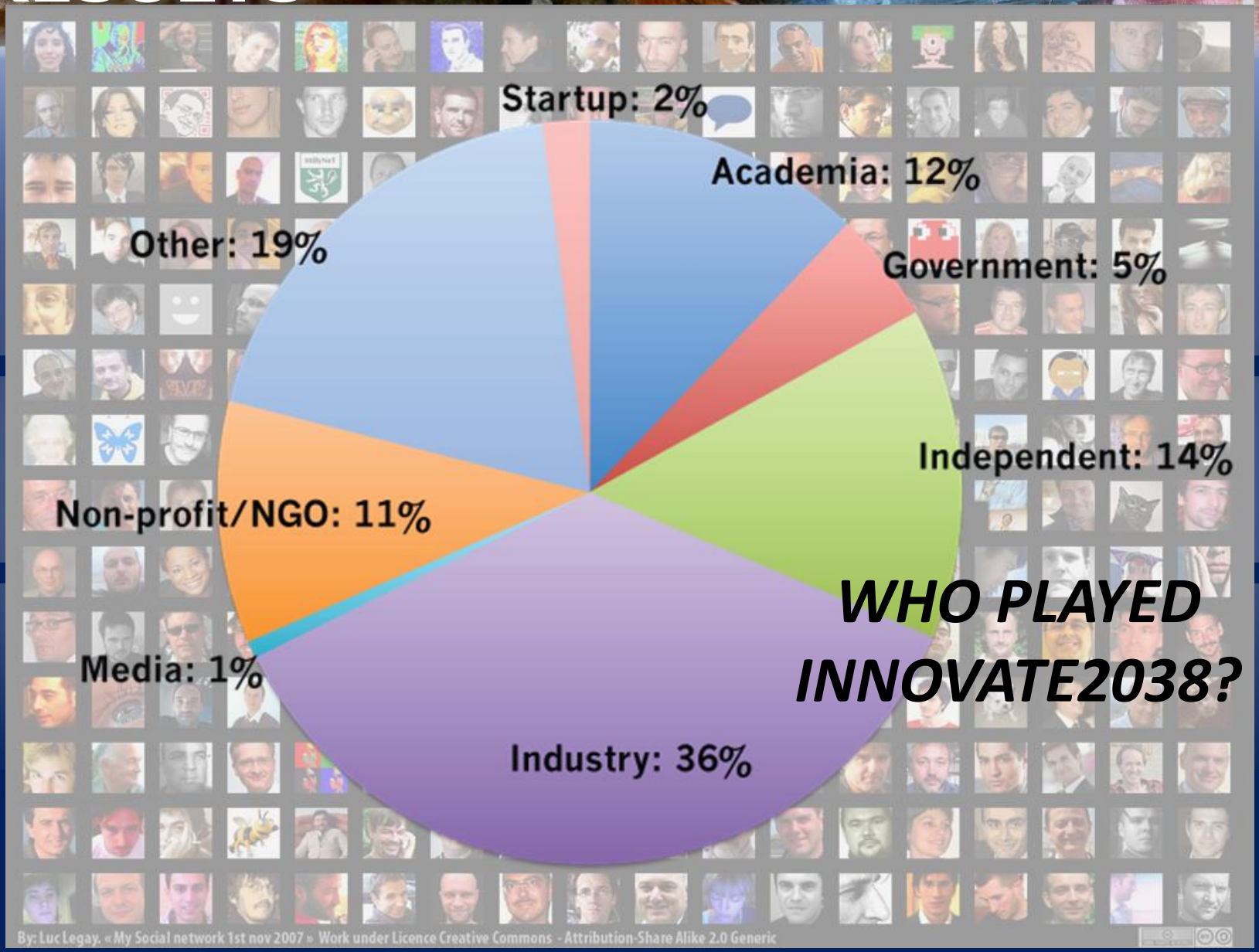
PLAY INVESTIGATION

Curious? Ask or answer a FOLLOW-UP QUESTION...

The trial is not open.

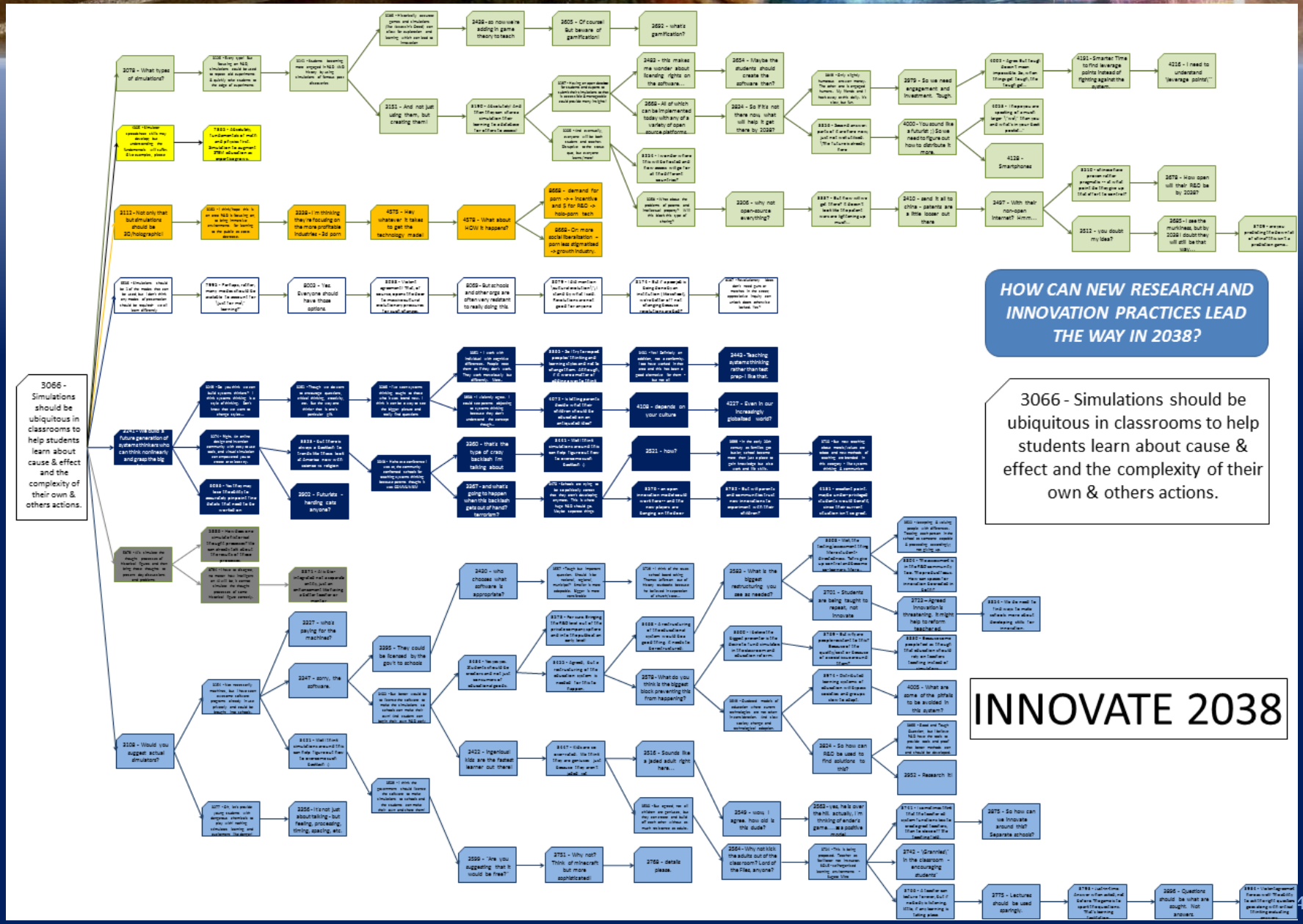
INVESTIGATION CARDS

RESULTS



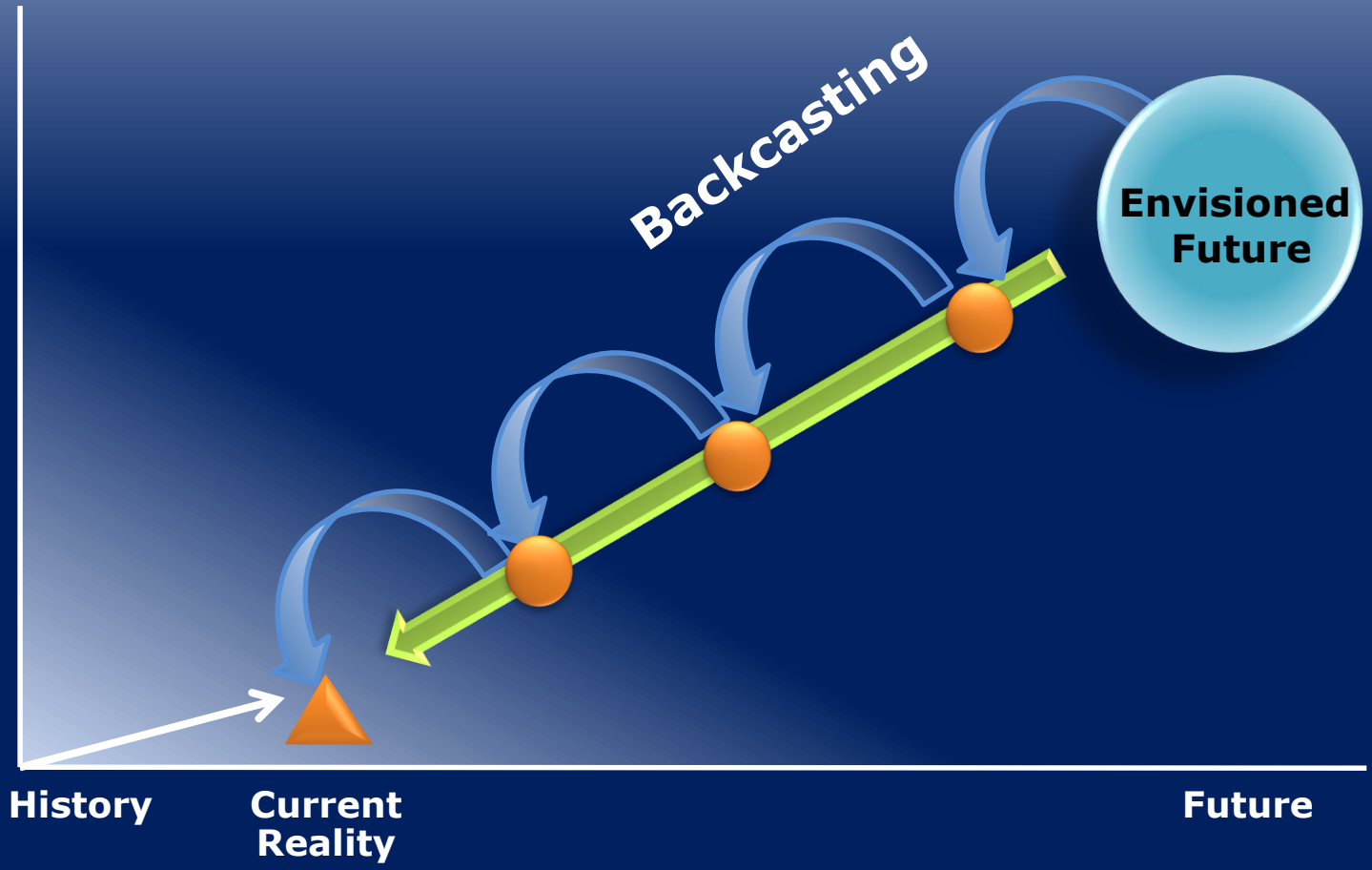
WHO PLAYED INNOVATE2038?

An Example "Idea Tree"



Backcasting Workshops

Backcasting: Introduction



Backcasting Workshops

Backcasting Workshop Process

SCENARIO: One Scenario Per Team

2038 Implications / Vision	What happened in 2032	What happened in 2025	What happened in 2019	What happened in 2014?
No IP Protection: FDA Accepts Simulated Clinical Results	Proposal To FDA to Accept Simulated Clinical Trials	5 Year Project Comparing Simulated vs Current Human Clinicals	1st Individual Safety/Efficacy/ Dose Full Simulations	1st Drug – Genome Interaction Simulations
World Class Open Innovation Partner		More Balanced IP Terms	Special Consideration For SBE's	Different Payment Terms

Three Roads to Innovation

What happened in:

2038	2033	2028	2023	2018	2013
UNIVERSITY DEGREES DON'T MATTER	Agreed Alternative to measure expertise	Studios emerge for talent sourcing	Credential Reputation to Results Reputation	Recruiting System Change	Tuition Model not Sustainable
Democrat-ization of Education	Formal reputation systems ubiquitous and TRUSTED		Agent-based brokers manage scientists reputation	Personal-ized Learning	Investment in Ideas, not Education
			Concern: Sabotage		Patents fail
					Systems to measure value irrelevant

Three Roads to Innovation

What happened in:

2038

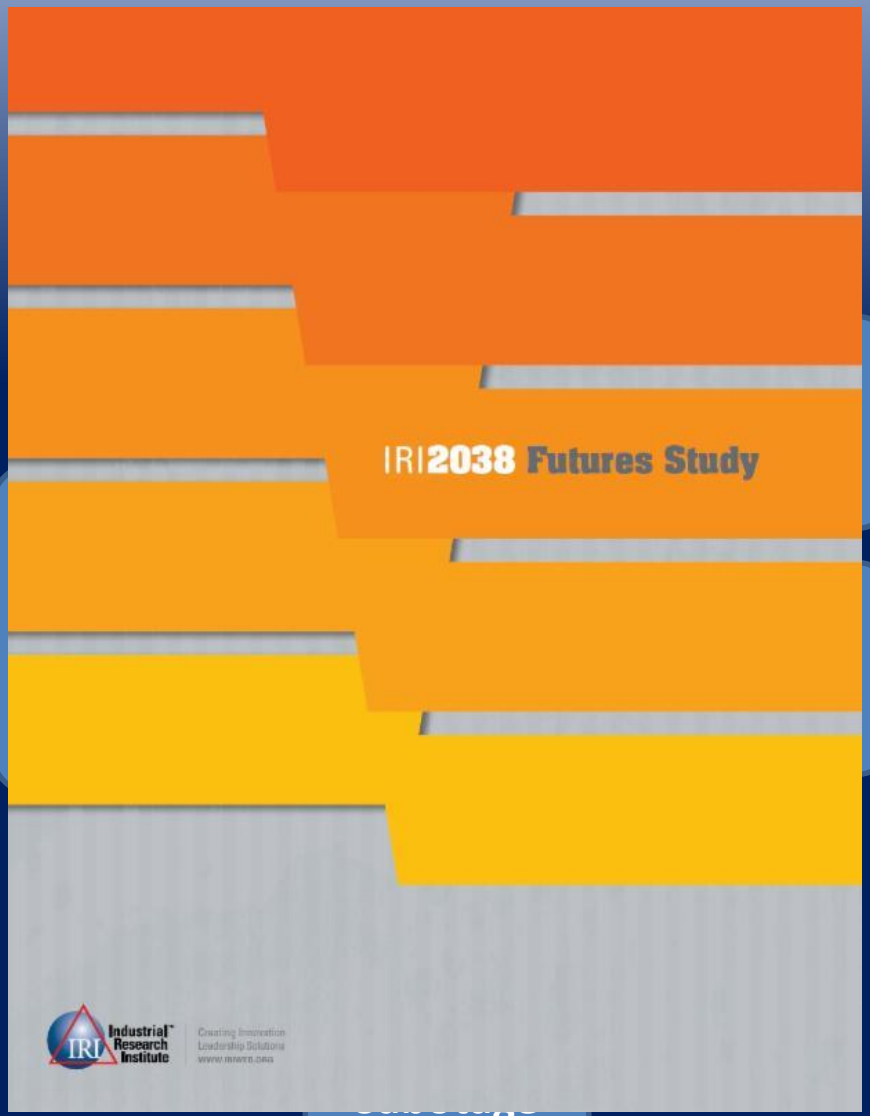
UNIVERSITY DEGREES DON'T MATTER

Democrat-ization of Education

2033

Agreed Alternative to measure expertise

Formal reputation systems ubiquitous and TRUSTED



2013

Tuition Model not Sustainable

Investment in Ideas, not Education

Patents fail

Systems to measure value irrelevant

Three Roads to Innovation

What happened in:

2038 2033 2028 2023 2018 2013

RELIABLE MARKET FOR FREELANCE TALENT

Merge reputation with ability to contribute

ANGIE'S LIST FOR TALENT

Integrate project manage-ment with reputation

Why would I give competitors this information?

Community sets standards for reputation

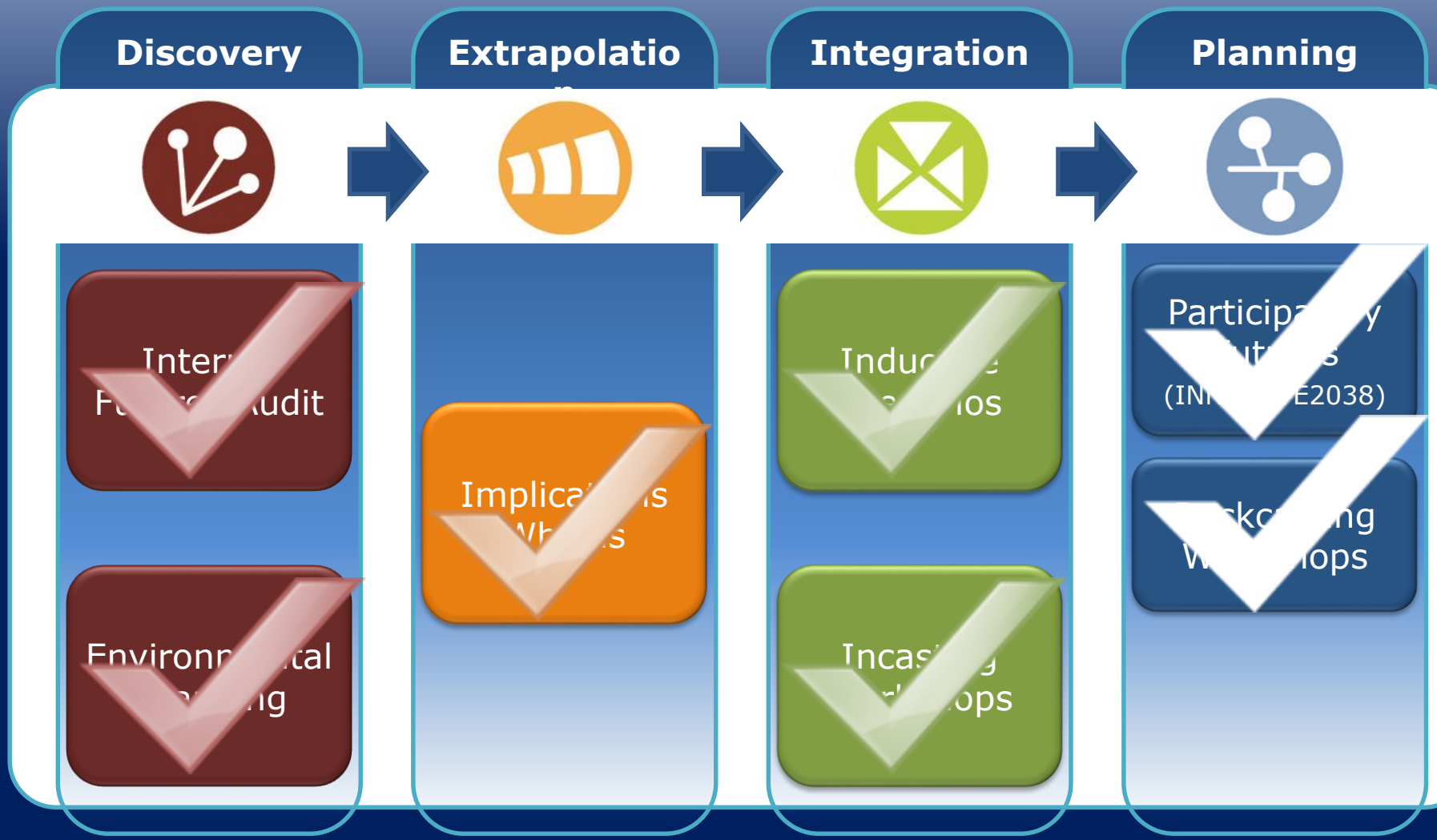
Merging of databases, & networks regarding skills, contrib-utions, know how and potential

Three Roads to Innovation

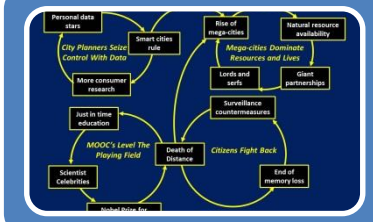
What happened in:

2038	2033	2028	2023	2018	2013
AUTOMATED PM & PPM	AI is accurate and predictable. Still needs human oversight	Inter-personal issues and Modeling Human Behavior	Appropriate simulation software for decision making?	Internal and external business input to define portfolio	Better info exchange and real time access to data

Detailed IRI2038 Foresights Process



IRI2038 Lives On!

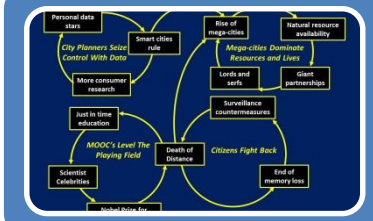


2014: One year investigation of Hollywood model

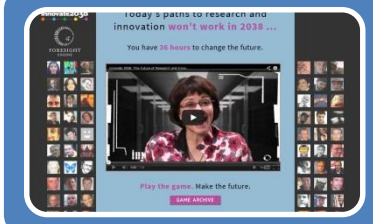
1015-1016: 18 month study of the "Digitalization of R&D"

2017: Future technical career tracks

Overall Conclusions



Inductive Scenarios are a powerful tool for exploring the future



MOOG's are evolving and will continue to grow in R&D

Engaging the organization in any foresights project is important

Resulting inductive scenarios are a valuable piece of property

Foresight Alliance

andspace consulting
FORESIGHT
INNOVATION
STRATEGY
APPLYING FORESIGHT AND DESIGN THINKING TO HELP ORGANIZATIONS INNOVATE AND GROW

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DESIGNS ON TALENT

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Customer Innovations

CROWN
Brand-Building Packaging™

PEPSICO

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dziękuję
ขอขอบคุณคุ
Gracias
谢谢
شكرا
唔該
Merci
Tack
THANK YOU
Obrigado
Дякую
спасибо
Danke
תודה
Grazie
ありがとう
তোমাকে ধন্যবাদ
σας ευχαριστώ