




The Economics of Innovation

ideation
Innovate Effectively
Collaborate Securely

The background of the slide is a photograph of blue water with concentric ripples emanating from a central point, creating a sense of depth and movement. The ripples are most prominent in the center and fade towards the edges.

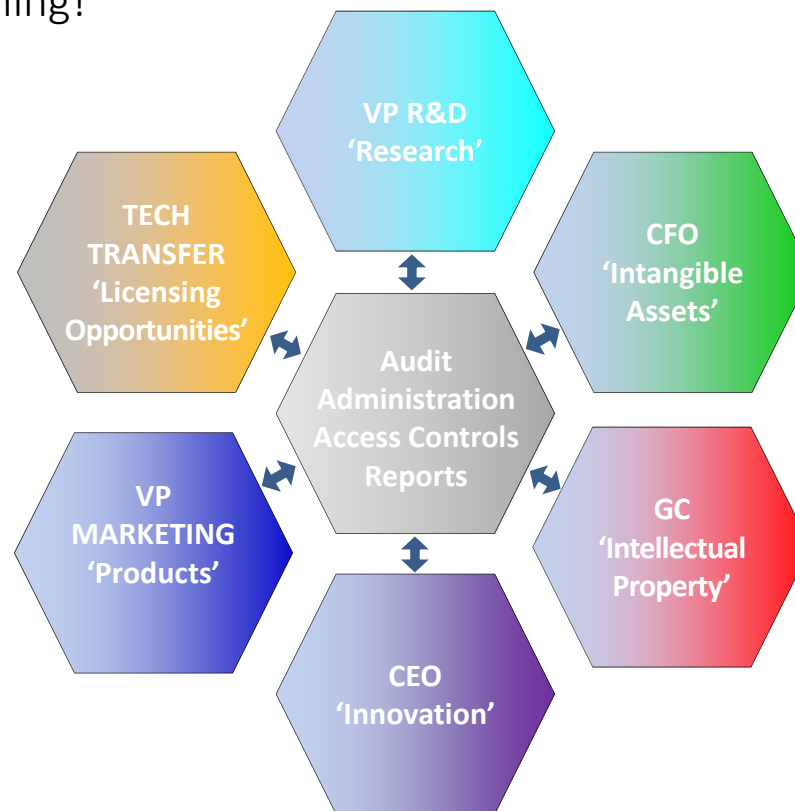
*“What we become as individuals,
organizations and nations depends on the
quality of our ideas and our ability to
realize them.”*

IDEATION: The Birth & Death of Ideas

Defining Innovation

Innovation [in-uh-vey-shuh n]: noun *The introduction of something new or different*

Each functional role in the organization has its own term for innovation – but they are all talking about the same thing!



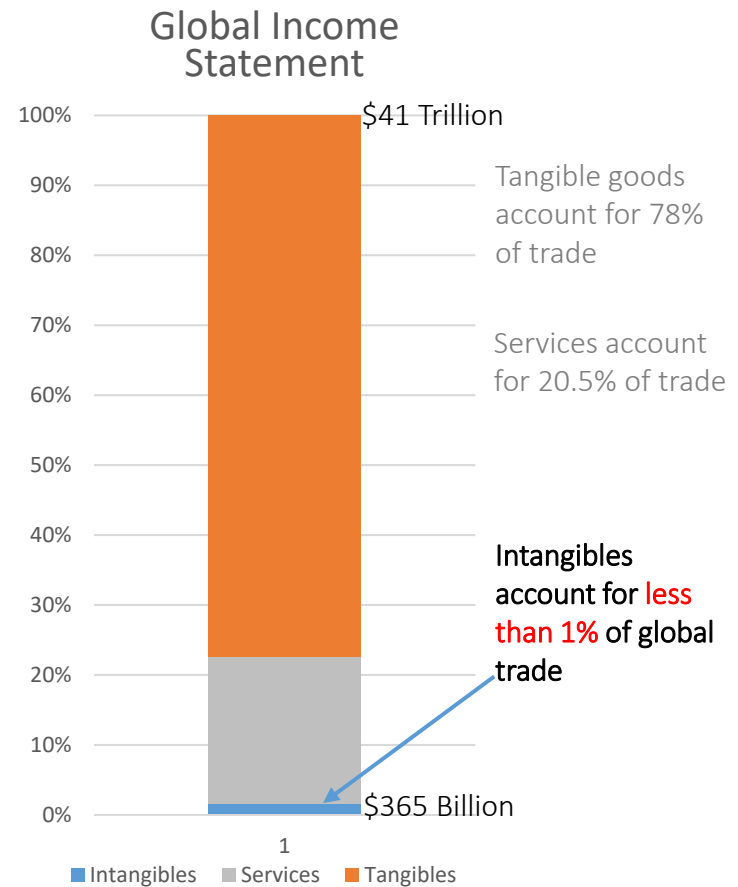
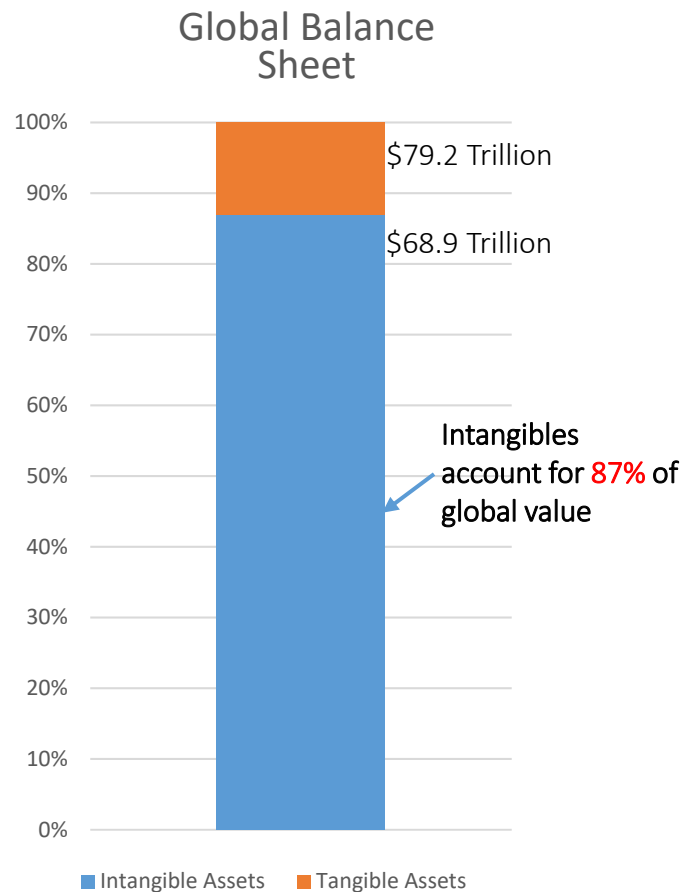
The Economics of Innovation

The economics of innovation is an emerging science. We will address the topic in a series of steps:

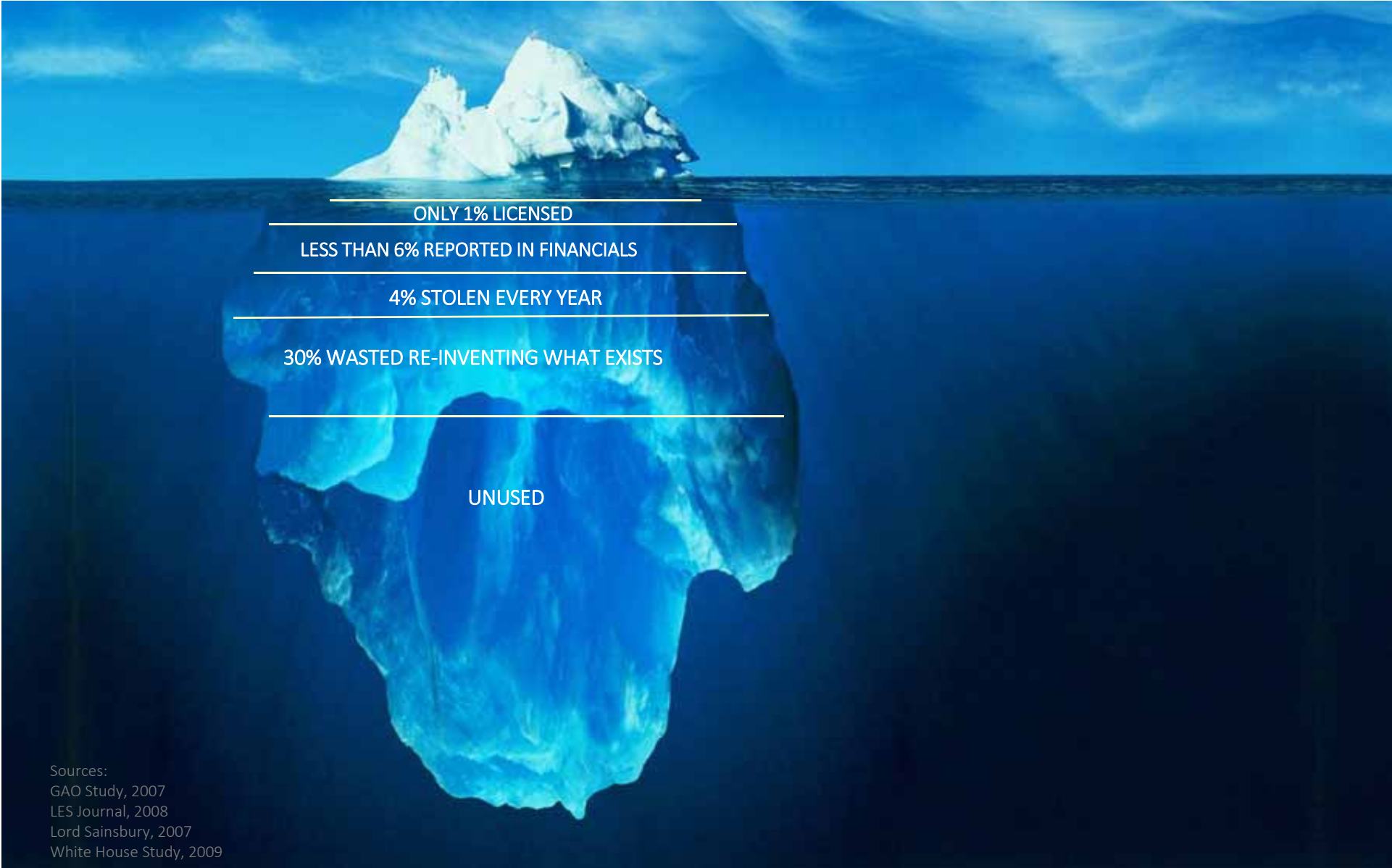
1. Consider the little data that is available on the role of innovation in our global economy. Although the data is sparse it is sufficient to show that we do a poor job of managing this asset class.
2. We will then consider how value is added to the global economy at a macro level.
3. We then discuss the microeconomic level - how to value individual ideas and the challenges in doing this.
4. Finally we show how these individual valuations can be aggregated into an econometric model of our innovation.
5. Use these insights on the economics of innovation to derive some best practices for managing innovation.
6. If time allows we will take a few minutes to consider 'Innovation in Economics'.

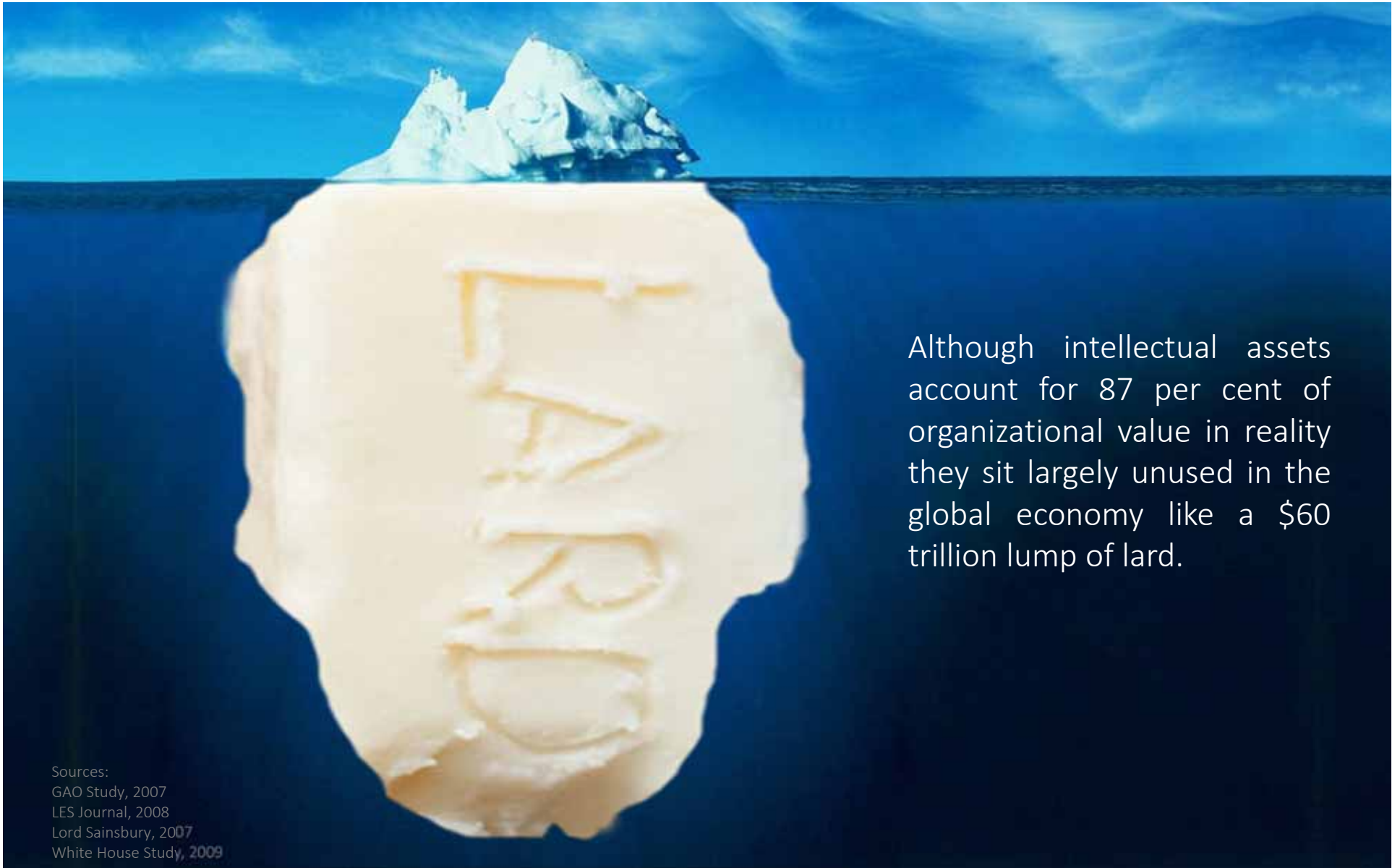
All of the above will be in the context of how can we leverage our university technology to participate in the global economy and how can we use licensing revenue to fund future R&D.

Intangible assets account for 87% of global value yet less than 1% of global trade



However intangible trade is growing with a 12.7% CAGR & tangible trade with a 2.8% CAGR



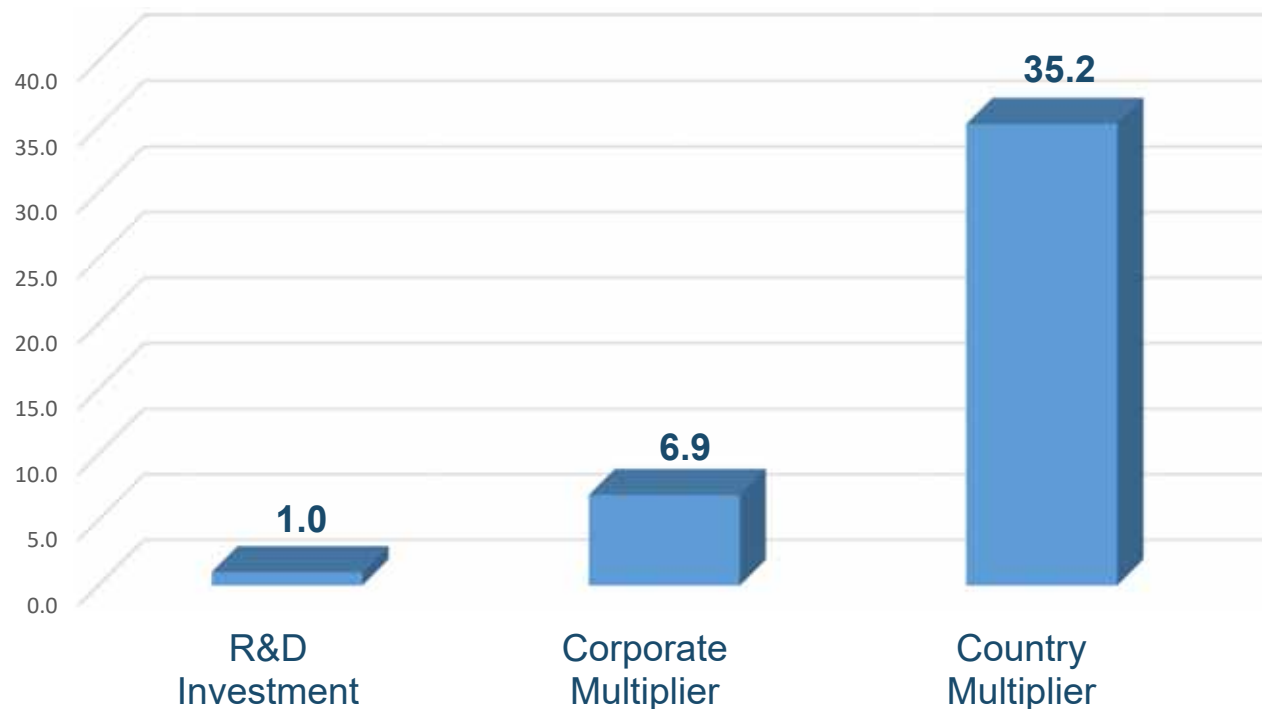


Although intellectual assets account for 87 per cent of organizational value in reality they sit largely unused in the global economy like a \$60 trillion lump of lard.

Sources:
GAO Study, 2007
LES Journal, 2008
Lord Sainsbury, 2007
White House Study, 2009

IP Investment's Multipliers

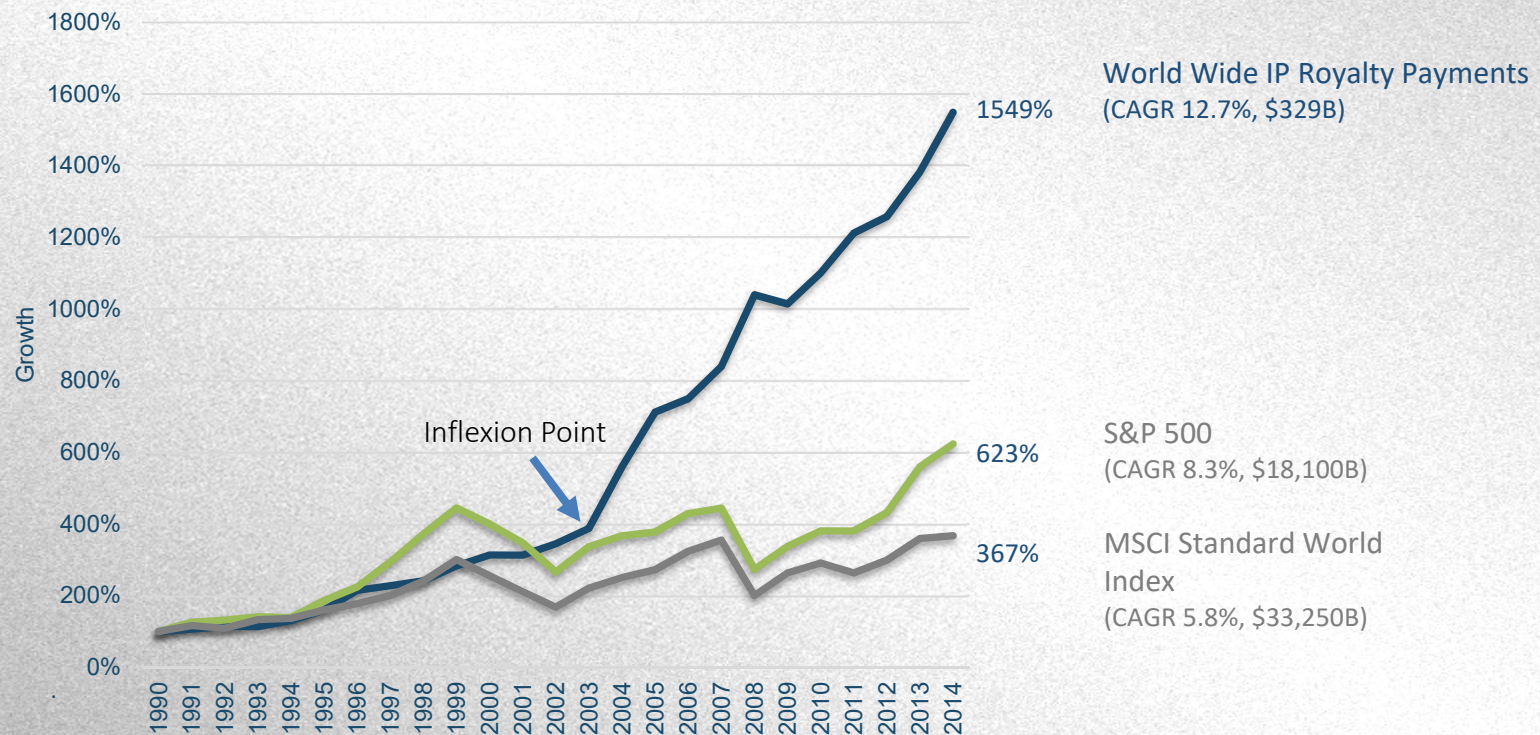
Investment in R&D results, on average, in a 6.9x increase in corporate profitability and a 35x increase in GDP.



The emerging intangible economy

Just beginning but growing fast

In the last decade there has been a substantial increase in the trade of intangibles and while it still accounts for less than 1% of total trade the next slide illustrates how far this growth can go . . .



Source: World Bank, Google Finance, MSCI, 2015

Why do so few
ideas become
realized?



"It is important that we address the management of innovation, and I hope that this book will make an initial contribution to this critical area."

— Carl Icahn
Financier, innovator, and philanthropist

"This book starts this discussion of how we can better help innovation become realized and discusses the profound impact this could have on our economy and our society."

— Sir David Cooksey
Chairman of the Committee of Non-Executive Directors of the Bank of England

"The more we can make a fertile ground for new ideas and innovations the better. The ideas in this book go a long way in showing you how to do this!"

— Lee Iacocca
Former Chairman of Chrysler

"Being engaged for almost a decade in making managers and investors aware of the challenges and potential of intangible investments and the consequent innovation, I welcome a book that brings this message to a broader audience."

— Baruch Lev
Founder and Director, The Intangibles Research Project, New York University

"Too many artists (and businessmen) fail to value their intellectual rights and all lack an efficient means of benefiting from them."

— Ron Aitbach
Concert pianist, investment banker, and former member of the Beach Boys

"A challenge is that to commercialize innovation you have to move quickly and be in a continual process of self-obsolences. You have to keep reinventing your own products."

— Craig Fields
Former Chairman, Defense Science Board and
Director, Defense Advanced Research Council (during invention of Internet)

"Each production is an idea that grows and gathers other ideas until the final event. The management of this creative process is the challenge."

— Don Mischer
Event creator and winner of thirteen Emmys

"If we can commercialize just a portion of the defense and intelligence research as suggested, then it is a huge benefit for the taxpayer and society."

— Honorable Ty W. McCoy
Former Acting Secretary of the Air Force and Chairman, Space Transportation Association

We felt these problems were so important that we wrote a book on the topic. It was well reviewed by industry leaders such as Carl Icahn, Lee Iacocca and Sir David Cooksey (above).

GRAHAM
BACHMANN

IDEATION
THE BIRTH AND DEATH OF IDEAS

IDEATION

THE BIRTH AND DEATH OF IDEAS



DOUGLAS GRAHAM AND THOMAS T. BACHMANN



These are a few of the challenges we identified in managing and commercializing intellectual property:



Visibility: Organizations often do not know what IP they have



Theft: Ideas are often stolen or misappropriated



Mismanagement: Best practices are rarely applied



Secrecy: It is difficult to market that which is secret



Risk: Assertion and protection of rights is problematic



Expense: Licensing IP is costly and time consuming



Finance: Funding innovation involves daunting challenges



How new value is added

By mining



\$0.6 T

By growing



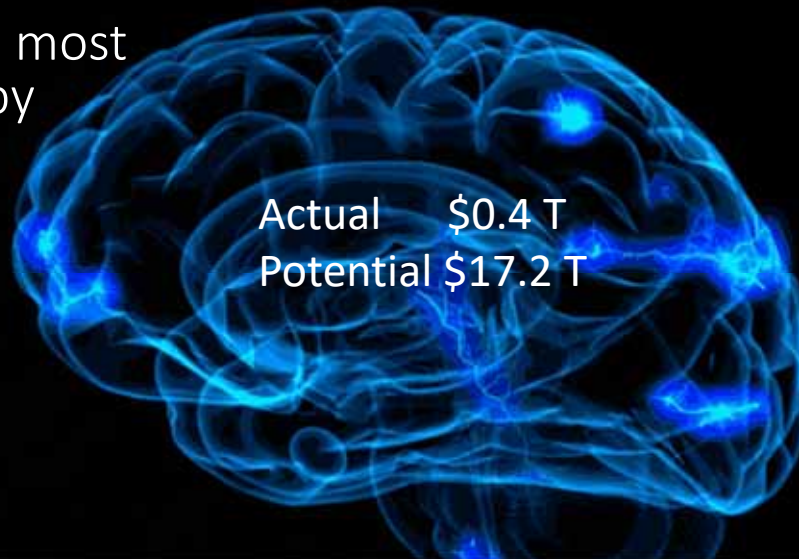
\$2.6 T

By manufacturing



\$12.3 T

But by far the most important is by thinking



Actual \$0.4 T
Potential \$17.2 T

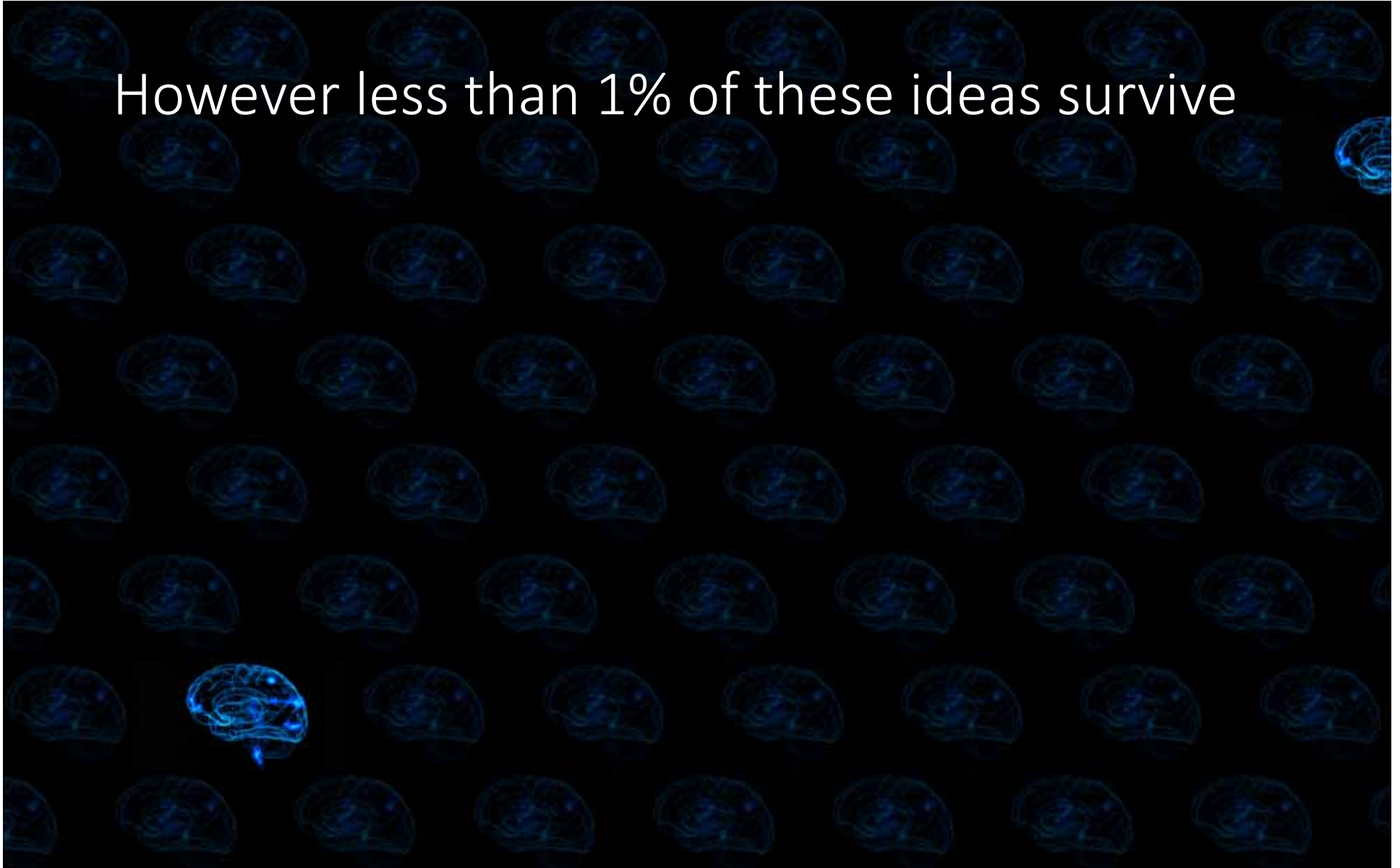
The image features a repeating pattern of glowing blue brain icons, each with a wireframe-like structure and several bright blue spots, set against a solid black background. The brains are arranged in a regular grid. In the center of the grid, the text "... and not by just one mind but from millions of minds in your region" is displayed in a white, sans-serif font. Below this main text, there are three small white dots arranged horizontally.

... and not by just one mind but
from millions of minds in your region
...

The image features a dense, repeating pattern of human brains. Each brain is rendered in a vibrant blue color with a glowing, ethereal quality, set against a solid black background. The brains are arranged in a regular grid, creating a strong sense of repetition and scale. The text is centered over the middle of the image.

... and not by billions of minds
throughout the world.

However less than 1% of these ideas survive



An aerial photograph of a tropical archipelago, likely the Philippines, showing numerous small, green, forested islands scattered across a body of water with varying shades of blue and turquoise. The water is clear, revealing sandy beaches and coral reefs. The sky is a deep blue, and the overall scene is vibrant and scenic.

The core problem of the 'Innovation Paradox'

While we all espouse collaboration and joint venturing in reality we are isolated islands keeping our innovation secret to keep it away from a few competitors. At the same time we are keeping it away from hundreds of non-competitive potential collaborators who do not even know of our existence.

However new technology (FHE and blockchain) helps solve this problem of how to market and license your innovation while still maintaining confidentiality and anonymity.



Marketing

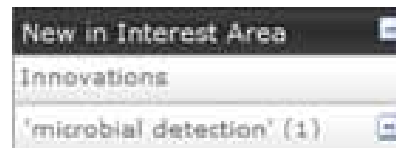
It is difficult to market that which is secret

Your university IP can be kept confidential and yet participate in the IP marketplace.

1. Each user indicates interests with keywords



2. Hits show up in "New in Interest' Area'



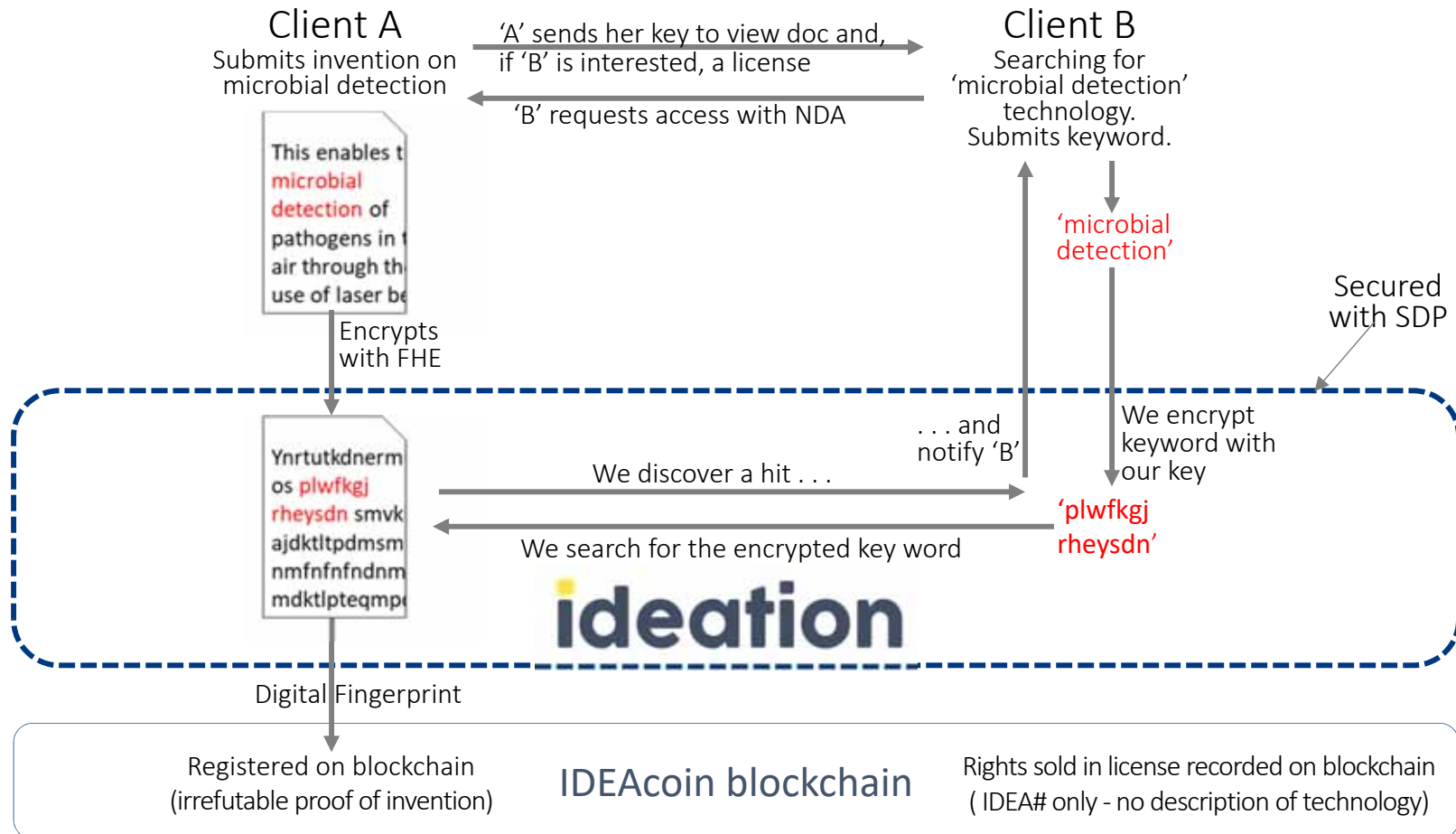
The member only knows that someone has just entered something they are interested in but do not know who or what.

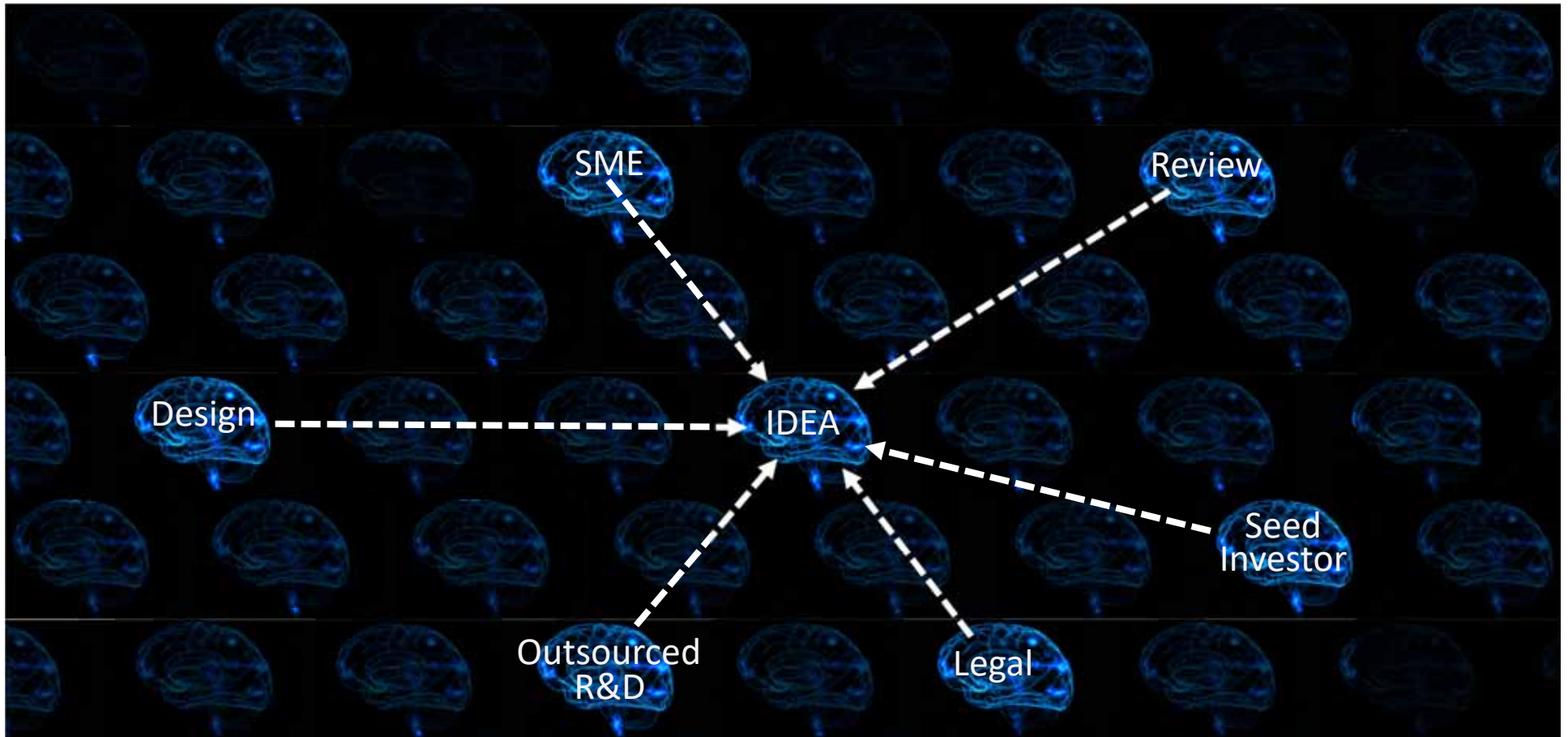
3. Contact IP owner confidentially



Trade Secrets: Secret but can still be traded

How can you keep your innovation secret yet still market it to the world? With *Fully Homomorphic Encryption* a document can be searched for keywords while remaining encrypted.





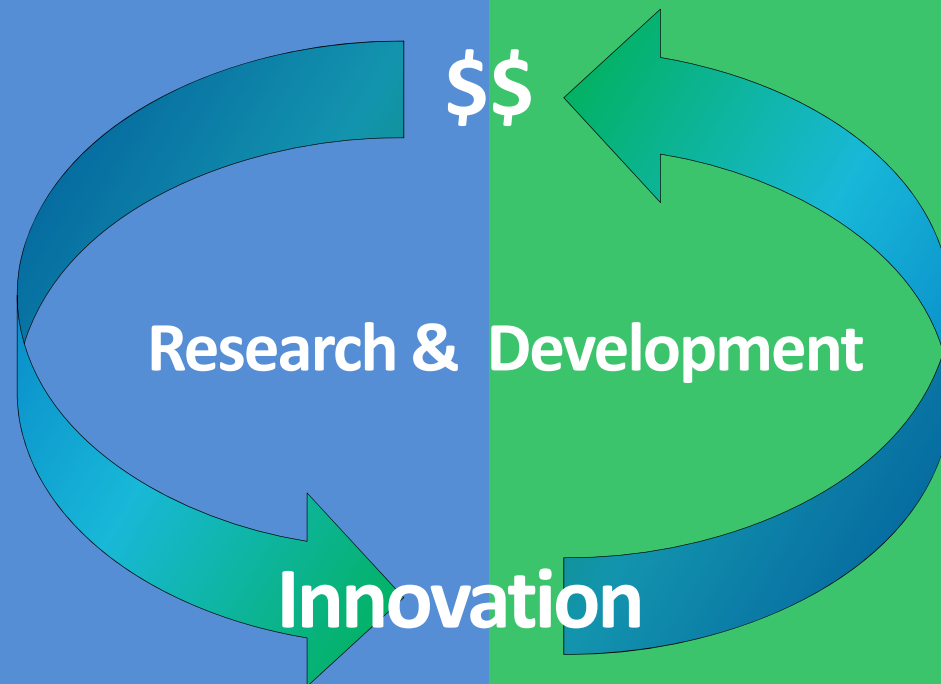
Each idea creates its own innovation ecosystem with a group that can help its development and have an interest in its success all of whom have signed a mutual NDA to protect the original idea and each person's contribution. The inventor is no longer alone.

The image features a repeating pattern of blue, glowing brain icons on a black background. Overlaid on this pattern is a network of white dashed arrows. These arrows originate from various brain icons and point to other brain icons, creating a web-like structure that represents an informal network. The text is centered in the upper half of the image.

You can protect your ideas but still potentially be found. In this way informal networks can be created to develop and fund your idea.

University & industry collaboration

Universities



Industry

There should be a virtuous circle between universities and industry that turn funds into innovation and innovation into funds.



Early Stage Funding

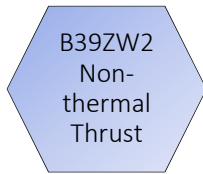
Early stage funding is the proverbial “Valley of Death” as the due diligence often costs more than the amount being raised.

Now you can seek very early funding (often from alumni or other affinity groups) for a prototype or patent.

A fund will automatically complete a raise once 60% is raised.

KEY:

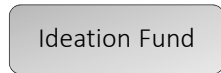
Innovations



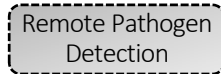
Individuals



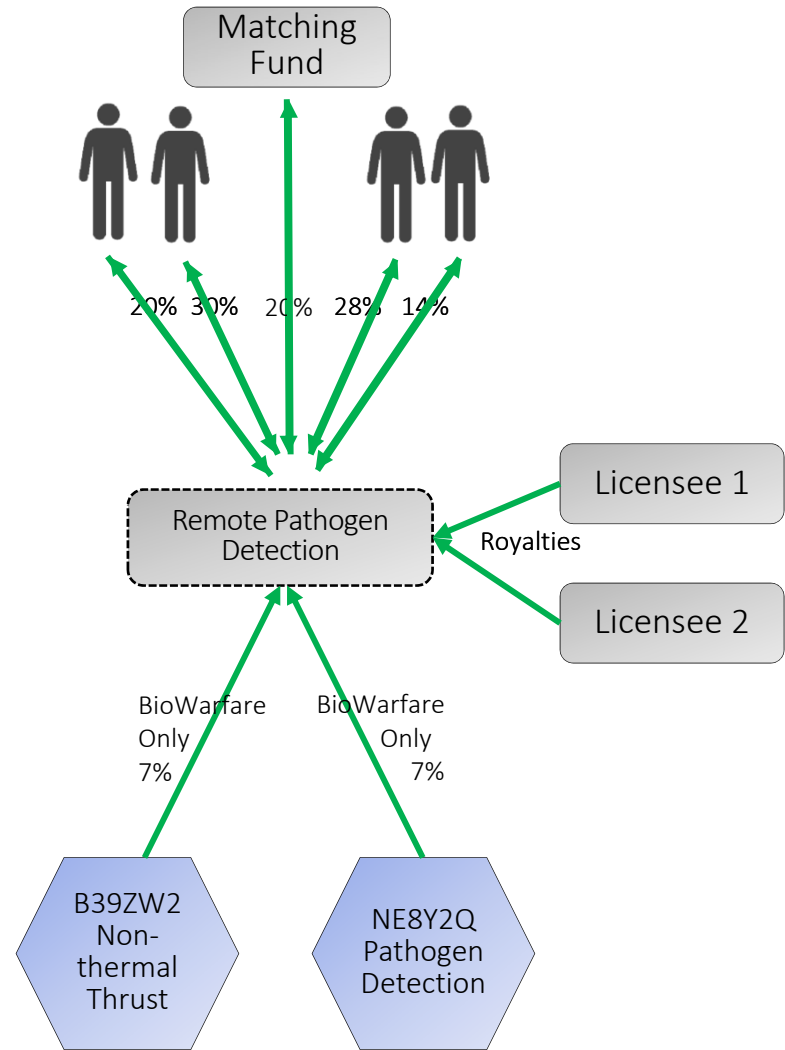
Organizations



Virtual Companies



Licenses



Let's start with the value of individual IP. Why is this useful:

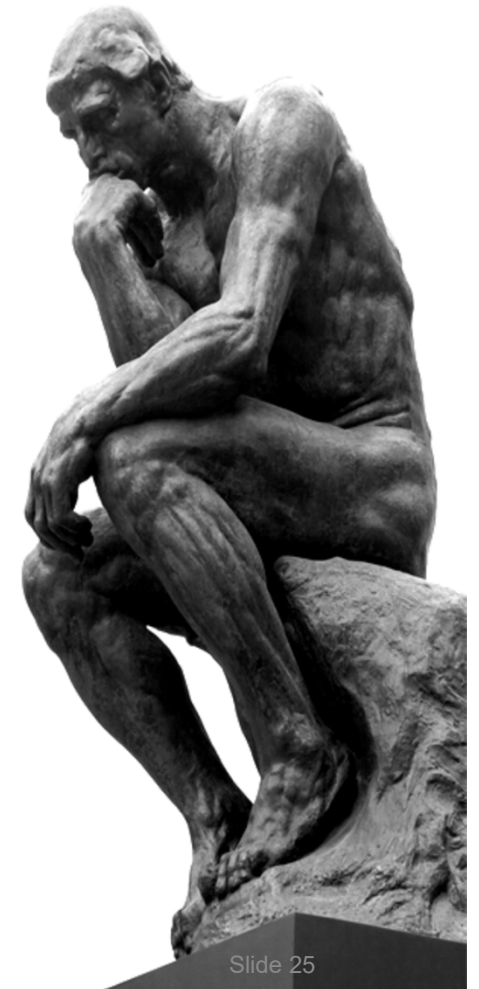
- When we understand the economics of individual IP we can aggregate to value a portfolio or even build a macroeconomic model of your innovation
 - **Compliance** You are required under current accounting regulations (FASB 141/142, IAS 36/38, SEC S-X, IFRS3) to identify, value and report all intangible assets
 - **Improve Your Balance Sheet Record** IP as assets and reduce your cost of capital
 - **Strategic Insights** into the value of and how that will vary over time to future products or research
 - **Generate New Revenues** In non-competitive companies to
 - **Plan Tax Efficiencies** Knowing tax efficiencies and, if you wish,
- each component of your IP portfolio enable informed decisions related
- many your IP can be licensed to generate additional revenue
- the value of your IP you can plan use IP holding companies



Challenges

There are many challenges to valuing intellectual assets. Many of these derive from the broader problems related to the management of IP.

1. Identifying the intangible assets
2. The prevailing secrecy related to intangibles
3. Dynamic nature of innovation value
4. Symbiotic value
5. Dearth of real world data
6. White space
7. Difficulty in regressing individual innovations
8. Human factors
9. Absence of aggregation of value data within the enterprise
10. Absence of global aggregation of valuation activity



Methodologies

While it is challenging to value patents and IP portfolios early in their life cycle there is however, even at this early stage, much that we know that leads to the three major methodologies:

Revenue Method – we can estimate the size of the potential market and the portfolio's share of that market as well as typical royalty rates for the technology

Cost Method – we know the cost of developing the technology and typical expectations of ROI for that investment

Market Method – we know what similar patents have sold for in recent transactions

Each method has advantages and disadvantages. However when all three are used together with a weighted average the errors in one tend to counteract the errors in the others:

Method	Advantages	Disadvantages
Revenue	Addresses full potential of market	Difficult to address 'technology share'
Cost	Based on actual expenditures	Does not fully allow for expected returns – tends to set 'floor' value
Market	Based on real world transactions	Tends to treat all patents alike – does not allow for Pareto effect

1. Identifying the intangible assets

Challenge: Organizations have difficulty identifying even a small fraction of their intangible assets.

Solution: Provide an eLabNotebook & eSuggestionBox to capture them.

2. The prevailing secrecy of intangibles

Challenge: Organizations keep them secret – even from others within their own organization

Solution: Sophisticated granular access controls and FHE

3. Dynamic nature of innovation value

Challenge: The value of intangibles is dynamic and fluid depending on the stage in the life cycle and on external environmental factors.

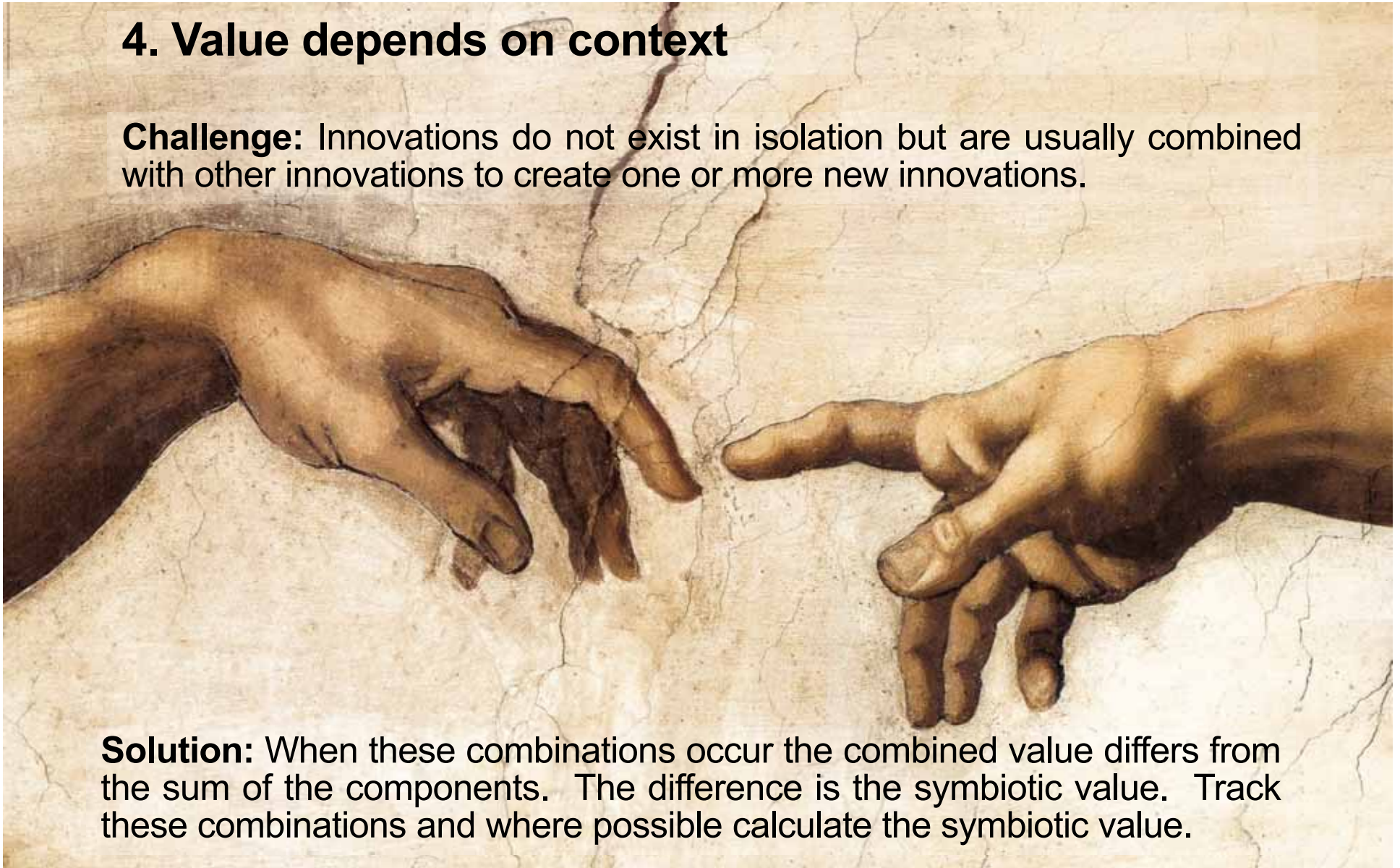
Solution: Identify parameters in each valuation methodology that vary according to various external factors and adjust valuations in real time.




4. Value depends on context

Challenge: Innovations do not exist in isolation but are usually combined with other innovations to create one or more new innovations.

Solution: When these combinations occur the combined value differs from the sum of the components. The difference is the symbiotic value. Track these combinations and where possible calculate the symbiotic value.



5. Dearth of real world data

A photograph of a vast, flat, sandy landscape under a clear blue sky. A single, small green tree stands in the middle ground, casting a shadow on the sand. The horizon is flat and extends across the entire width of the image.

Challenge: There is a dearth of real world data sets that can be used to test the effectiveness of valuation metrics.

Solution: Gather data from sources such as search engines and industrial property offices around the world.

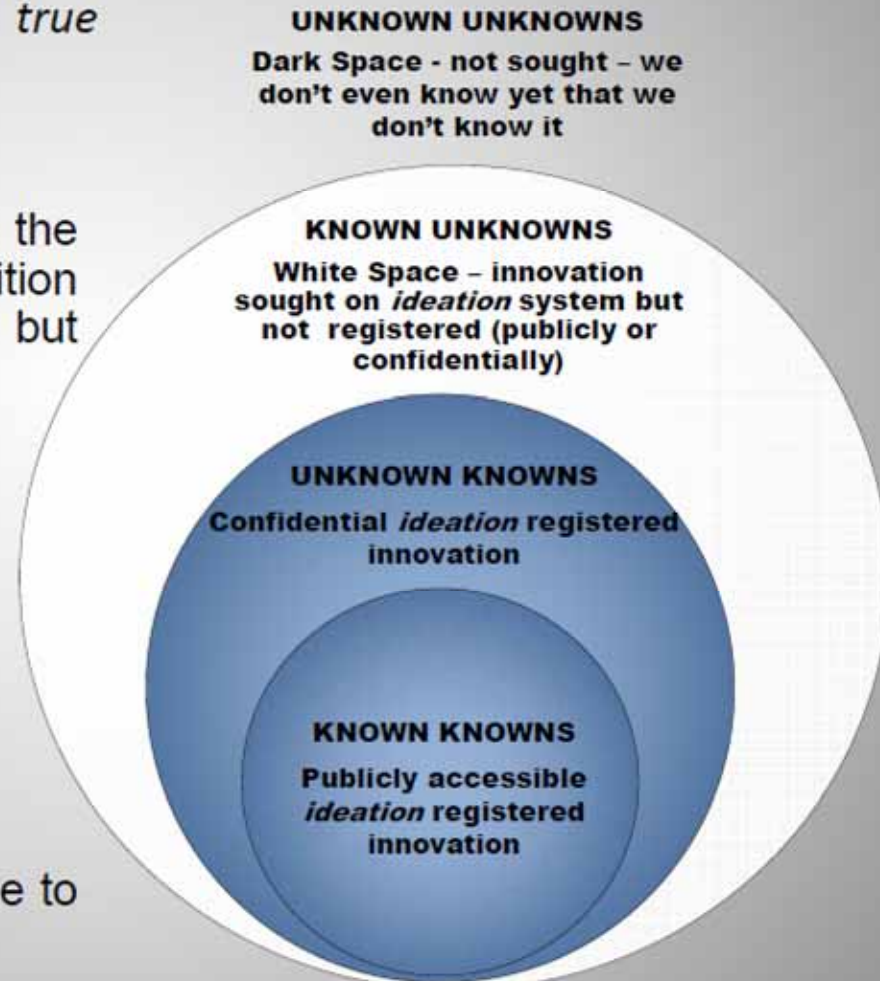
6. White space

“To know that we know what we know, and that we do not know what we do not know, that is true knowledge.”

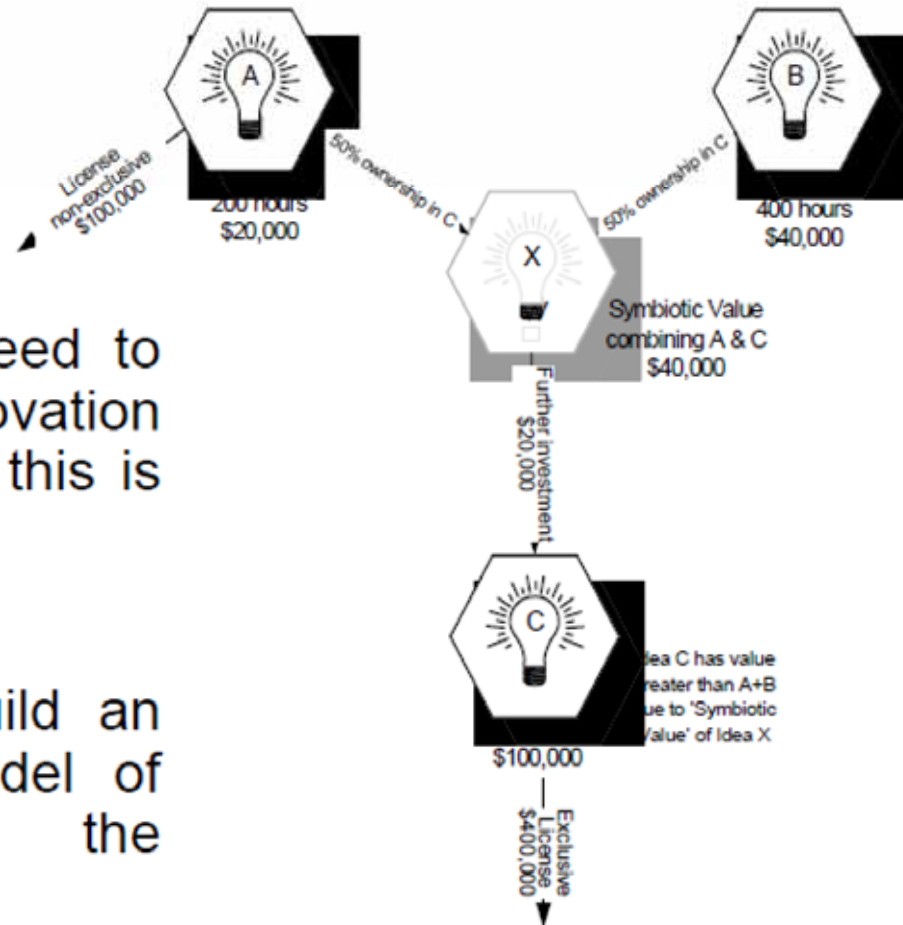
Confucius, ~500 BCE

Challenge: A major factor in the value of an intangible is its position not just in relation to other IP but also in relation to whitespace.

Solution: Map the white space to determine need of target IP.



7. Difficulty in regressing individual innovations

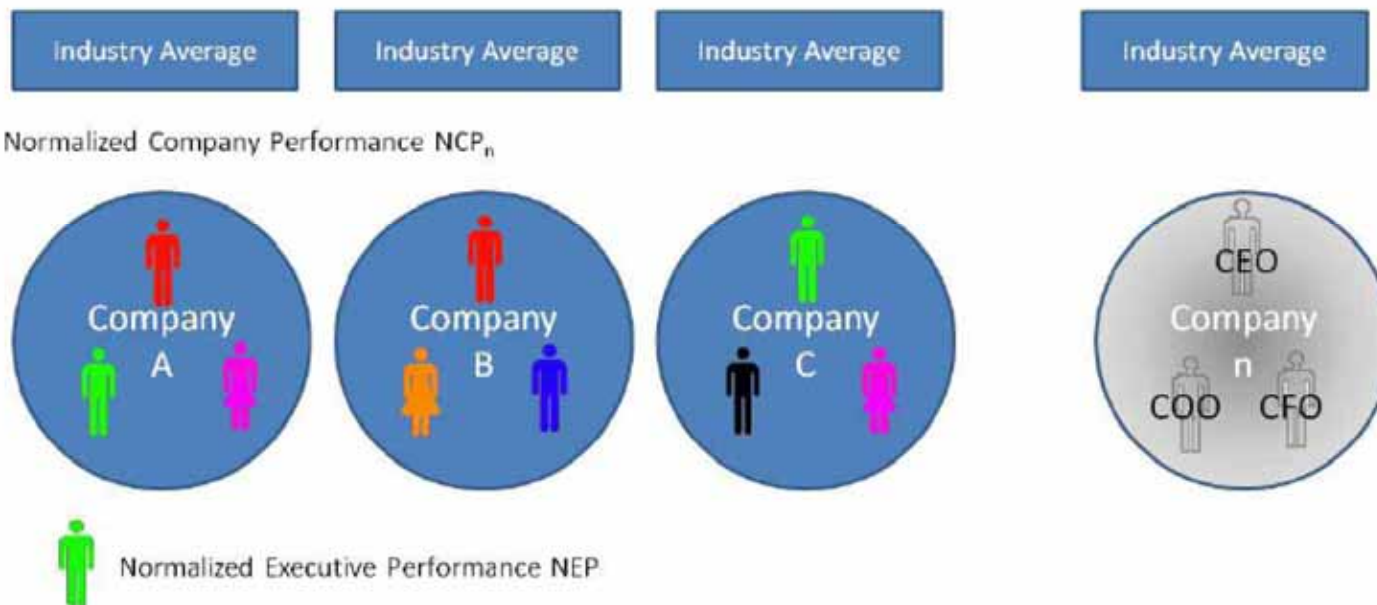


Challenge: We often need to know the value of innovation earlier in its lifecycle and this is very difficult to determine

Solution: Track the build an ongoing econometric model of innovation within the organization.

8. Human Factors

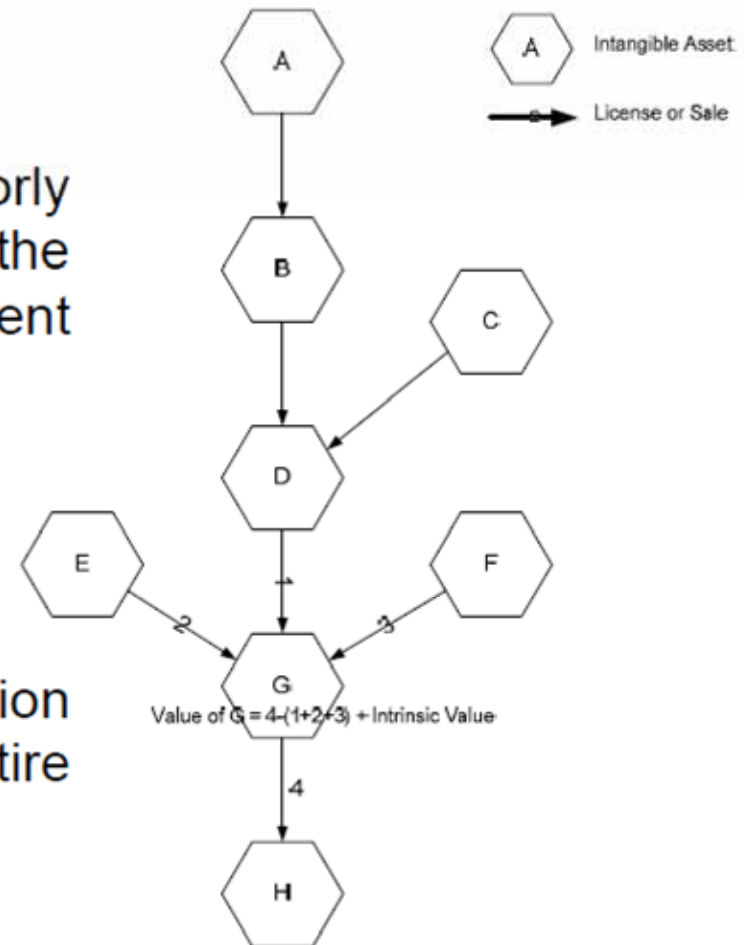
- **Challenge:** Human factors are very difficult to quantify and hence adjust for.
- **Solution:** Use market data to extract trends related to senior management.



9. Absence of aggregation of value data within the enterprise

Challenge: Organizations poorly identify their intangibles and the few they value use inconsistent methodologies and metrics

Solution: Manage innovation consistently across entire enterprise to enable metrics.





10. Absence of global aggregation of valuation activity

Challenge: Almost all valuation activity occurs in isolation preventing the development of cross industry and cross geography benchmarks.

Solution: Use the Ideation Innovation Manager and its 'White Labeling' feature to make it widely available to valuation professionals for use with their clients.



Value

IP has been very difficult to value

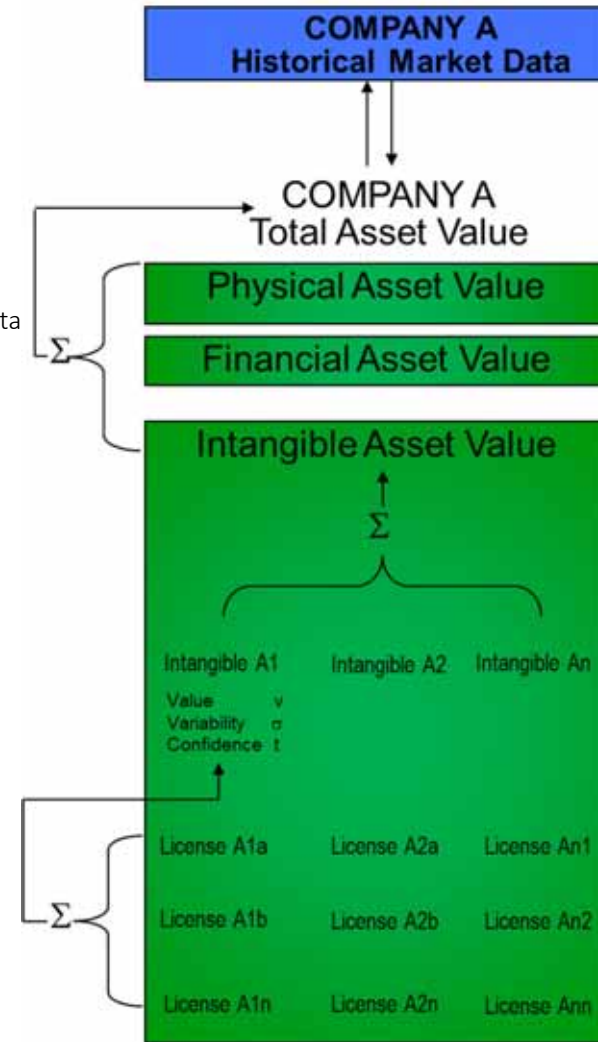
Valuing IP is a major challenge. We build a central valuation database based on all valuations with varying industry and geo conditions with input from multiple metrics which are compared to market data.

Data:
Market Data, Intellectual Property Data, Search Engines and Innovation Manager all provide input data for our multiple metrics

Metrics
Total Intangible Level
• Composite Ratio Metrics
• Manager Metrics

Individual Intangible Level
• Activity Index
• InnovationMetric
• CollaborationMetric
• Intangible Citation Index
• Academic Citation Index
• SE Hit Index
• White Space Metric
• Prior Art Metric
• Brand Recognition Metrics

Individual License Level
• Royalty Method, etc





REPORTS

Create econometric model of innovation

Need to inform R&D and other strategic decisions

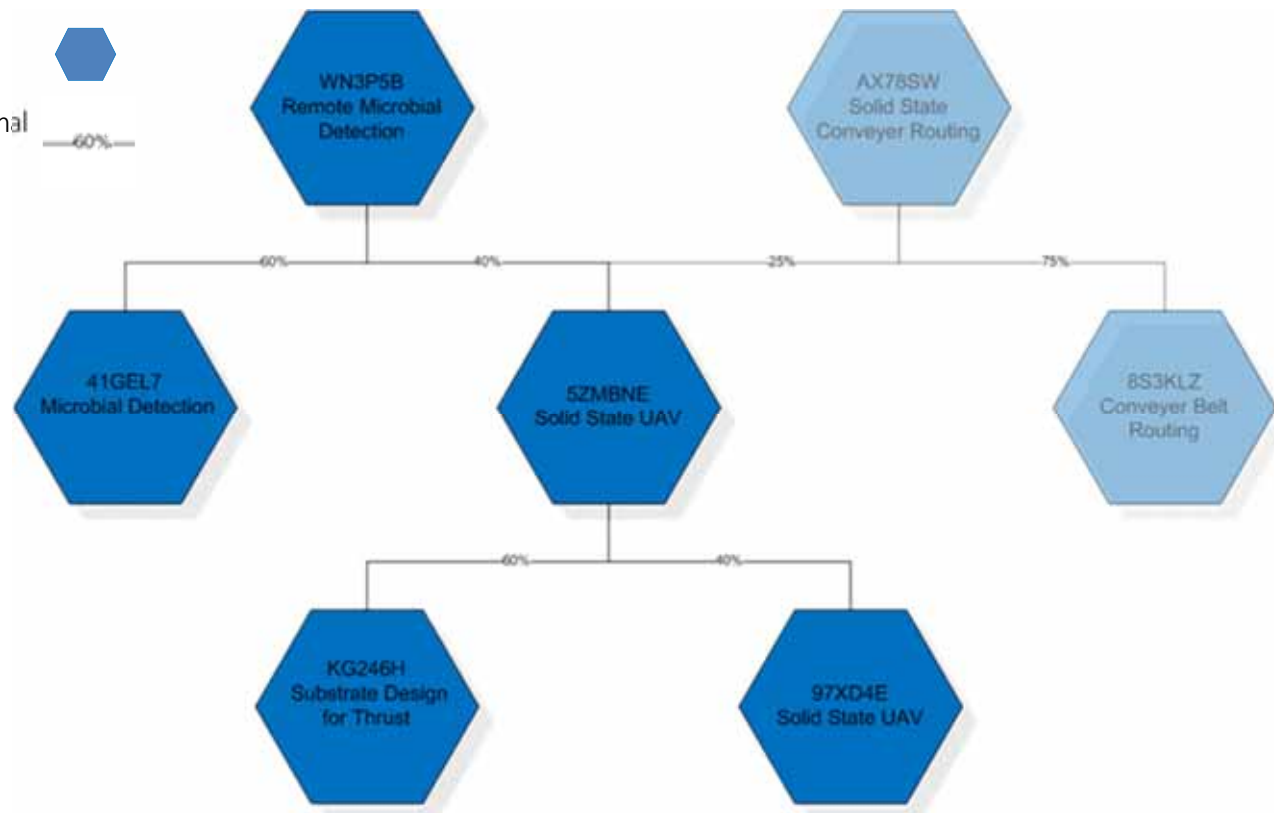
Using your innovations and the license agreements you can build an econometric model of innovation within their university and create metrics on both innovation and collaboration.

Key

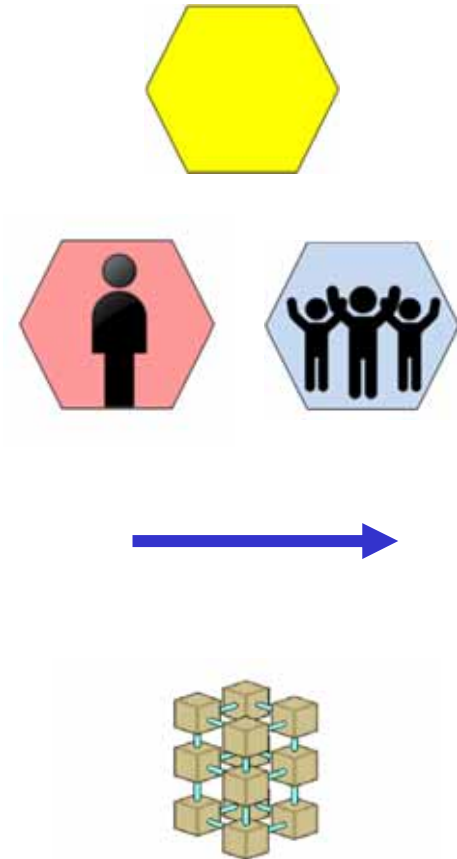
Innovations



Licenses (formal and informal)



Building Blocks for an Innovation Economy



Innovations

Each innovation when registered has the 'digital fingerprint' that proves the date and time of invention as well as the original metadata.

Participants

These can be individuals, organizations, virtual organizations or even other projects. Each participant has an innovation index that is just used internally to weight metrics.

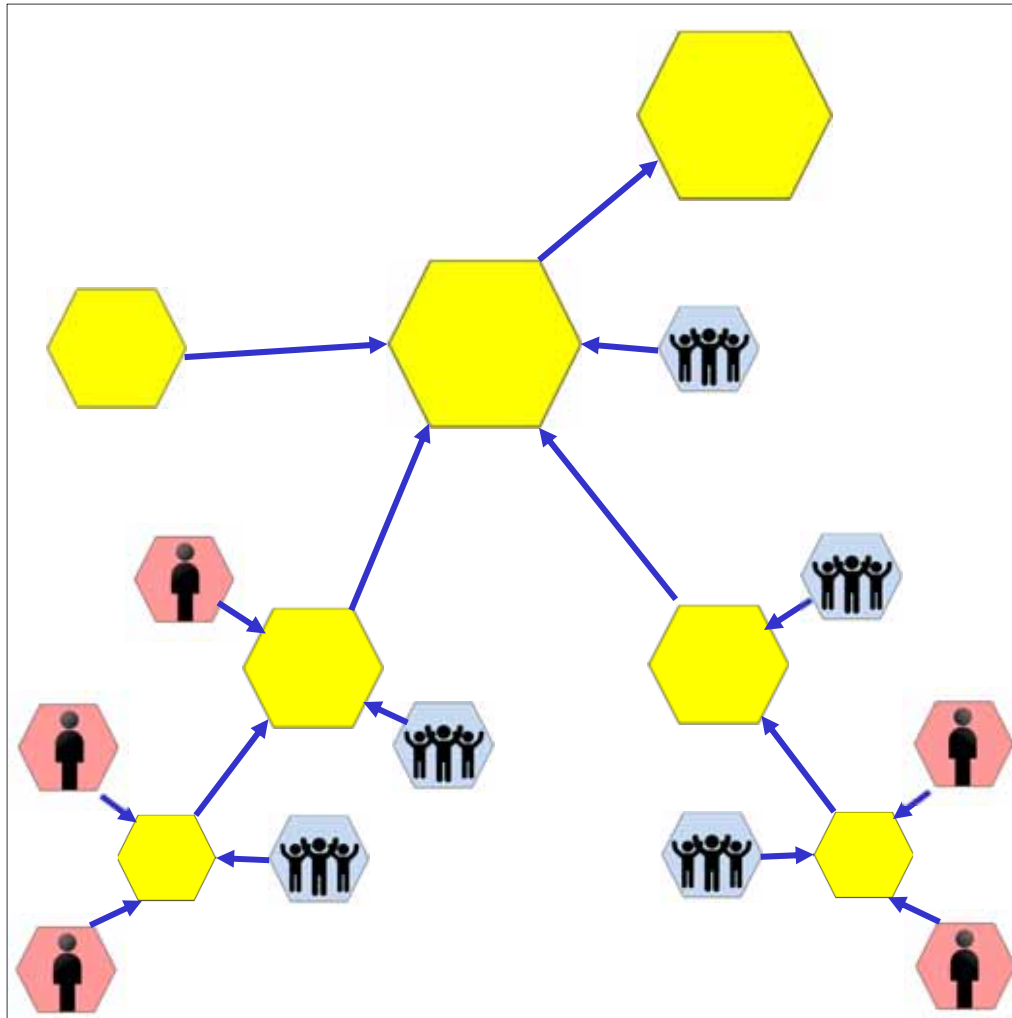
Transactions

Can be between any participant and can be a sale, license, or provision of a service for cash, IdeaCoin or a share of future royalties. By removing the need for intermediaries we enable microtransactions.

IdeaLedger

Provides an irrefutable record of every transaction – but usually not any of the proprietary information. This record is open to all.

Innovations grow in the ecosystem



Innovations once registered attract their own ad hoc, yet secure and trusted, networks.

They gain with inputs from SME's, service providers, partners, clients and investors.

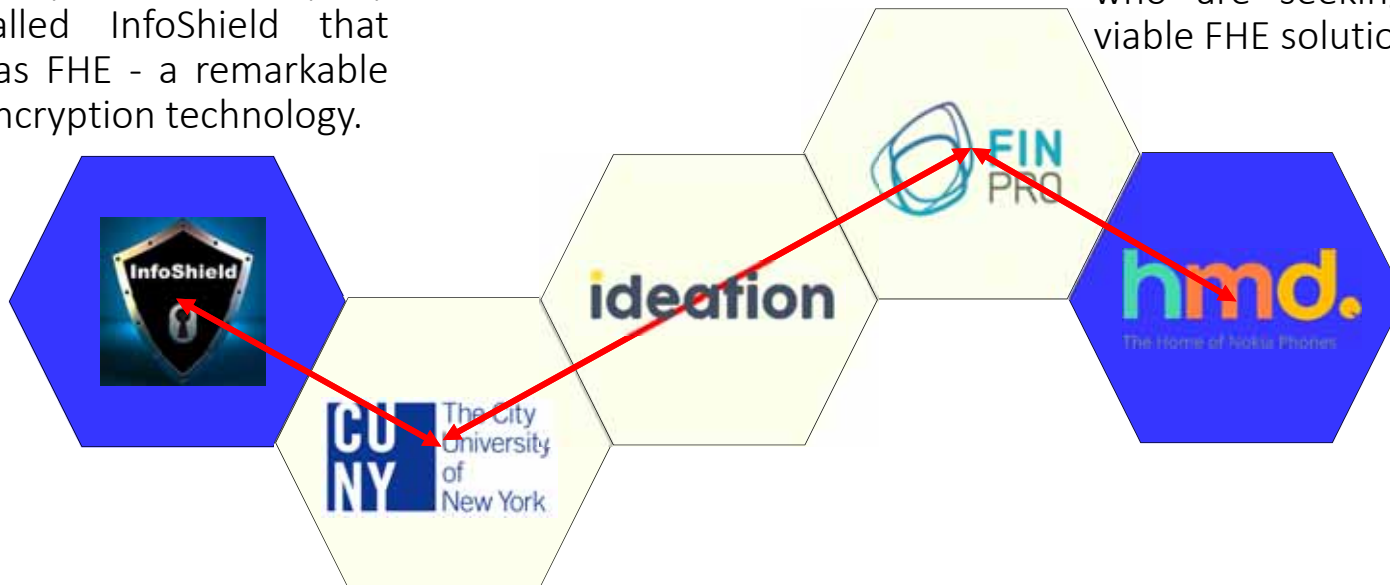
With time they are generating their own products, cash, technology and **jobs**.

Every transaction provides valuable metadata about the counterparty and the type of transaction that informs our valuation and analytics engine.

Each participant that enables a transaction is rewarded

CUNY includes in its ecosystem a company called InfoShield that has FHE - a remarkable encryption technology.

Finpro includes HMD in their ecosystem who are seeking a viable FHE solution.



As InfoShield is still in stealth mode, HMD would not have discovered this were it not for the ad hoc network created with three ecosystems.

Collective creativity

Keith Sawyer of Washington University has coined the term *Group Genius* to refer to the way groups are more creative than individuals working alone. We need to link innovators together while still protecting their confidentiality.





Innovators are more productive together

When Professor Richard Florida at the University of Toronto studied patent intensity by population density using images from space he found that 75% of patents came from the 10% of population in the most densely populated areas.

Why? Because the informal network that comes with proximity stimulates creativity. By creating an enterprise network for innovation organizations can increase this effect many times and allow your innovators to work together much more productively – even if geographically disparate. It even allows secure collaboration with others outside your organization. This avoids the current situation of endlessly reinventing the same innovations.



Physical Assets



Human Assets

PeopleSoft



Financial Assets

ORACLE®

Intangible Assets

... for the largest asset class of all we have nothing and the consequences are significant.

Economic Loss: CyberSec



According to a White House study over \$1 trillion of US IP is stolen every year primarily by state sponsored attacks. In most cases the organization is not even aware their IP has been compromised until they hear of a low priced competitor that seemed to come from nowhere. The Ideation Innovation Manager protects portfolio companies' IP with state of the art cybersecurity. There are three major components to this:

- SDP (Software Defined Perimeter) protects the IP while in motion
- FHE (Fully Homomorphic Encryption) protects the data at rest
- UBA (User Behavior Analytics) protects from a malicious authorized user



Insure

IP risk management is largely unavailable

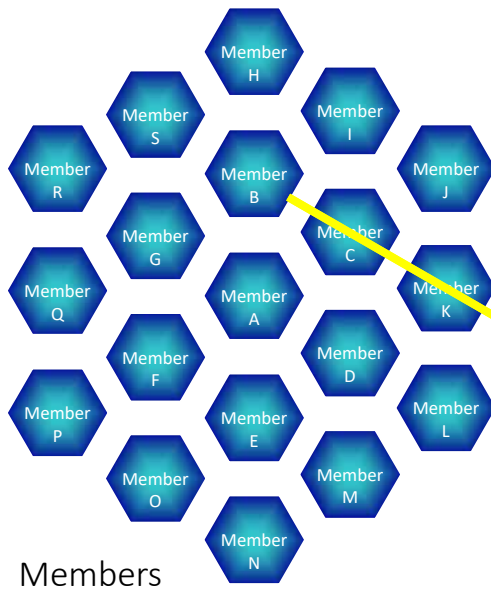
Robert Kearns invented the intermittent windshield wiper and showed it to Ford who promptly stole it. Unable to fund his litigation Kearns eventually pursued his case pro se before eventually prevailing in the Supreme Court with awards that totaled over \$30 million. This story was made into a movie titled "A Flash of Genius".

Ideation has developed affordable IP litigation insurance so that even SME's can assert their IP.

Flash of Genius

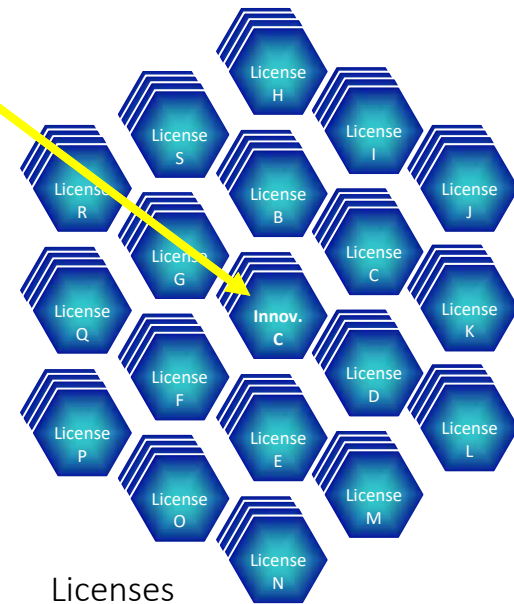
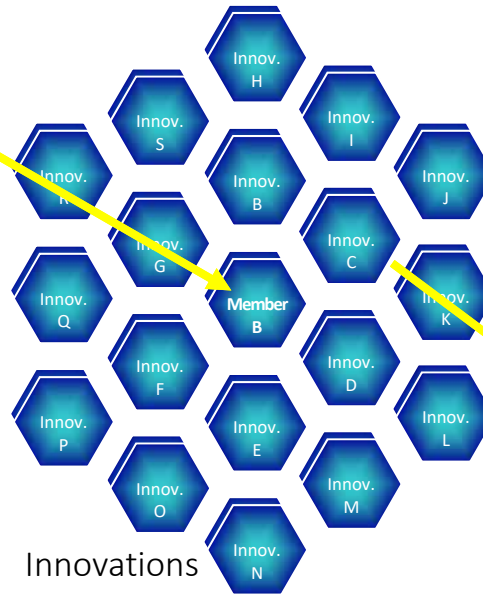
In Theaters October 3rd

Network Effect Cubed



Metcalf's Law

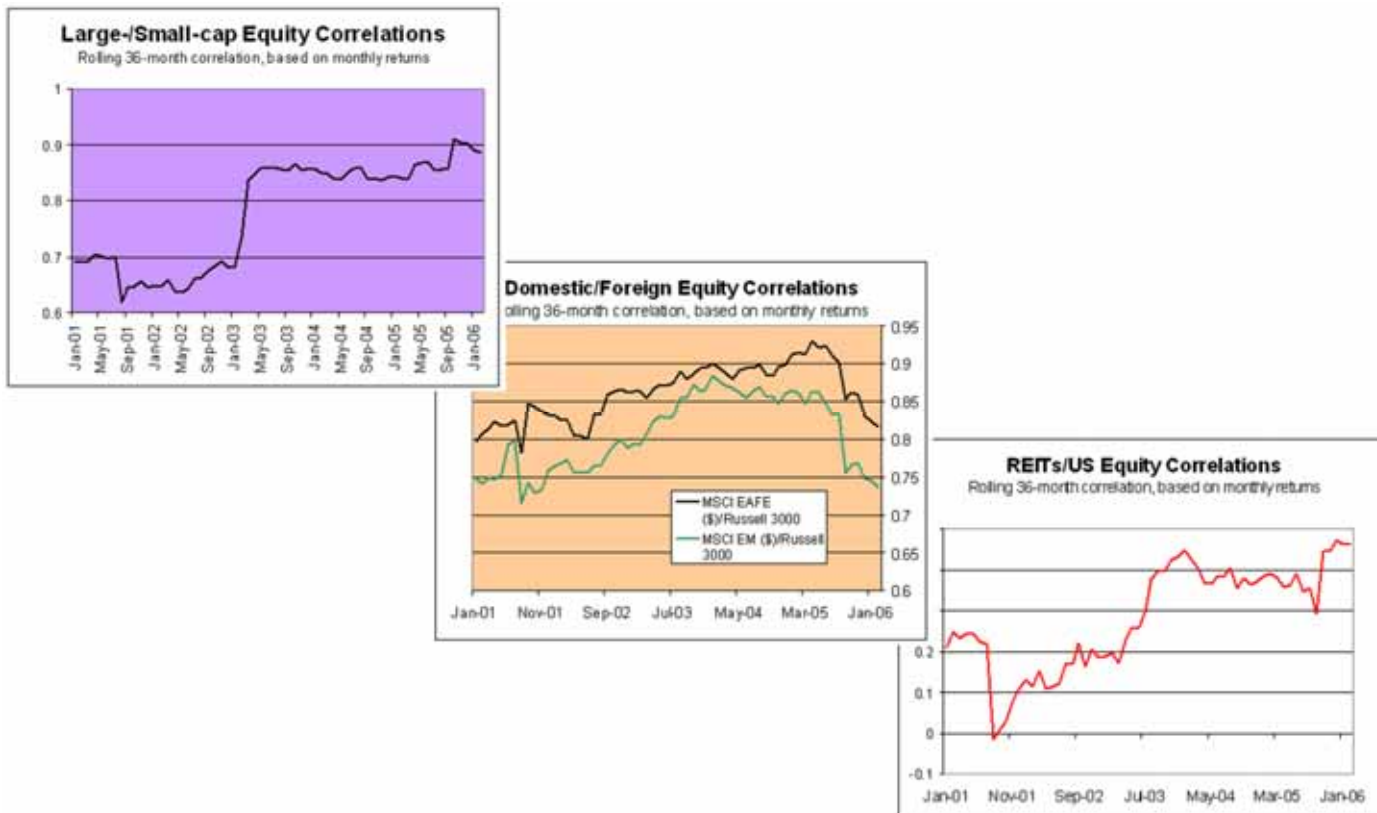
n	1	2	3	4	5	6	7	8	9	10
$n(n-1)/2$	-	1	3	6	10	15	21	28	36	45
$n(n-1)/2$ cubed	-	1	27	216	1,000	3,375	9,261	21,952	46,656	91,125



Three network effects (members, innovations per member and licenses per innovation) combine to create rapidly increasing value for all participants

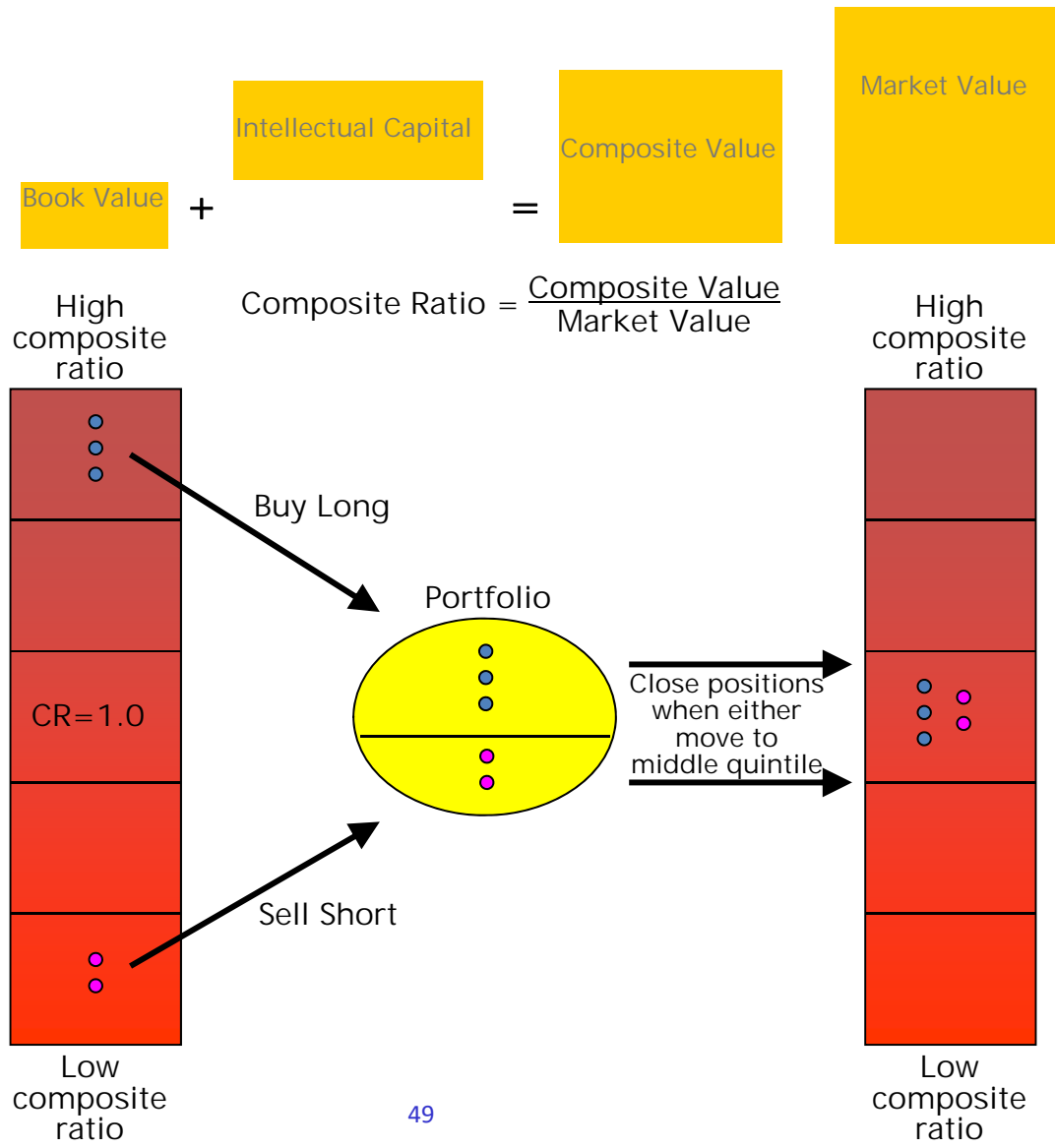
No Correlation with Equities

Not only are intangibles the largest asset class but they are un-correlated with any other asset class all of which are becoming increasingly correlated with each other:



Source: The Capital Spectator March 20th 2006

Intangible Value Fund

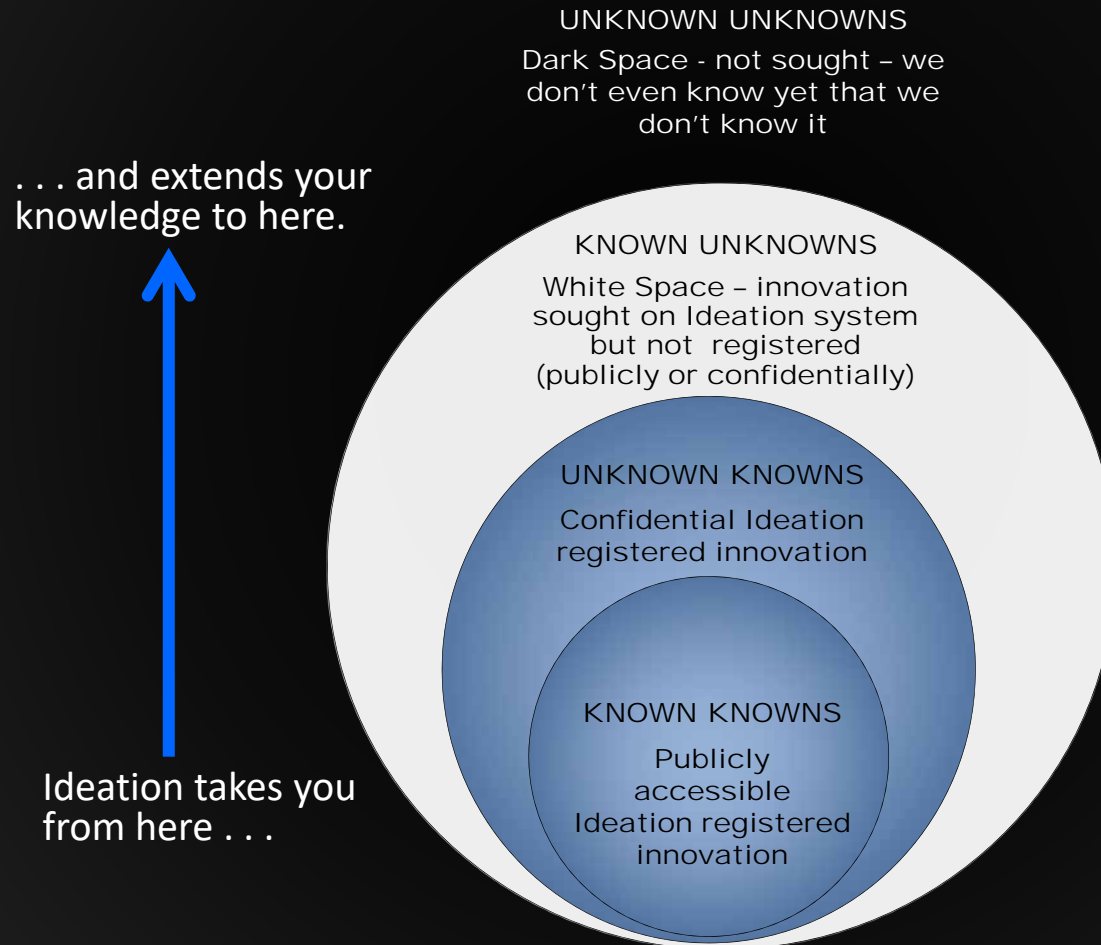


Researched and tested by Baruch Lev

“To know that we know what we know, and that we do not know what we do not know, that is true knowledge.”

Confucius,

~500 BCE



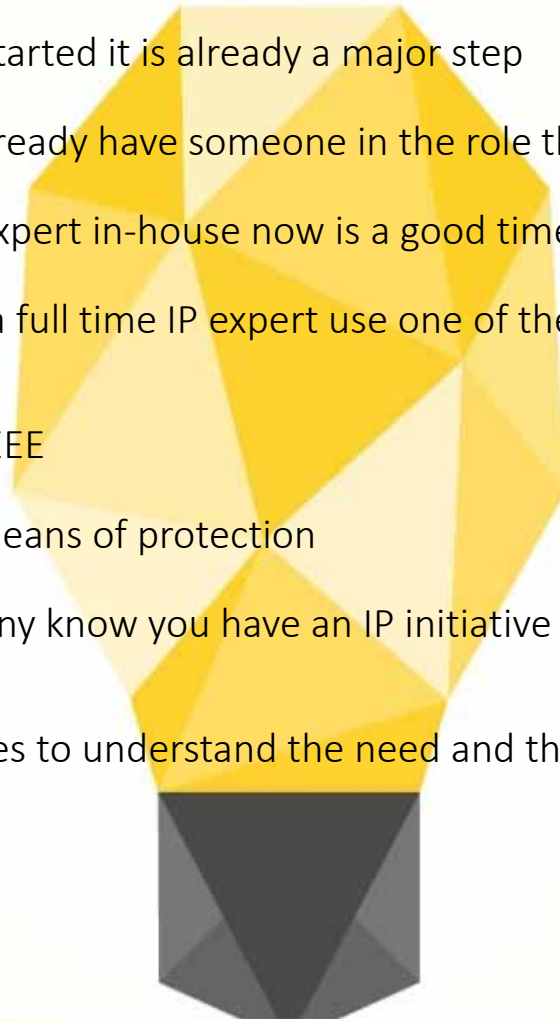


“Between the idea and the reality falls the shadow”

T. S. Elliot

Getting Started

- Start – it is not easy but once started it is already a major step
- Assign responsibility – if you already have someone in the role then train and empower them
- Hire – if you don't have an IP expert in-house now is a good time to get one as they are few
- Consult – if you cannot afford a full time IP expert use one of the many advisory firms (or call us as the first hour is free)
- Join – it is essentially free for IEEE
- Prioritize - Trade Secrets as a means of protection
- Communicate – Let the company know you have an IP initiative underway and how it helps them
- Motivate – see following 3 slides to understand the need and the opportunity



IP Best Practices

Most of the problems associated with poor IP Management can be avoided by simply following best practices. These vary with the type of IP asset and are summarized in this table.

All IP Types	Patents	Trade Secrets	Trademarks	Copyrights
<ul style="list-style-type: none"> • Audit assets 	<ul style="list-style-type: none"> • Protect ancillary information and know how 	<ul style="list-style-type: none"> • Confidentiality • Agreements including all vendor contracts 	<ul style="list-style-type: none"> • File in all current and anticipated classes 	<ul style="list-style-type: none"> • Register for irrefutable attestation trail
<ul style="list-style-type: none"> • Disaster recovery 	<ul style="list-style-type: none"> • Track infringers 	<ul style="list-style-type: none"> • Limit and Track Access 	<ul style="list-style-type: none"> • Assert aggressively 	<ul style="list-style-type: none"> • Timestamp submission
<ul style="list-style-type: none"> • Maintain records 	<ul style="list-style-type: none"> • Track access 	<ul style="list-style-type: none"> • Always display confidentiality notices 	<ul style="list-style-type: none"> • Always use as proper modifying adjective 	<ul style="list-style-type: none"> • Control electronic copies
<ul style="list-style-type: none"> • International caution 	<ul style="list-style-type: none"> • Arbitration preference 	<ul style="list-style-type: none"> • Exit reports 	<ul style="list-style-type: none"> • Never use in plural or possessive form or as a verb 	<ul style="list-style-type: none"> • Track 'fair use'
<ul style="list-style-type: none"> • Divide critical information 	<ul style="list-style-type: none"> • Attestation trail 	<ul style="list-style-type: none"> • Track origins 	<ul style="list-style-type: none"> • Don't use with additions, deletions, prefix, suffix 	<ul style="list-style-type: none"> • All copies should include accurate attribution and copyright notice
<ul style="list-style-type: none"> • Employee education 	<ul style="list-style-type: none"> • Witnessing 	<ul style="list-style-type: none"> • Publish Criminal Nature of IP theft 	<ul style="list-style-type: none"> • Use registration symbol ® or informal notice™ 	<ul style="list-style-type: none"> • Track versions

Best Practices by Stage

Capture Innovation



REGISTER

Use eLabNotebook to build a secure repository of your IP and an irrefutable attestation trail is recorded on blockchain.



PROTECT

Set general access controls and also include or exclude specific organizations or individuals (e.g. competitors).



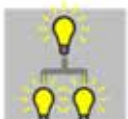
COLLABORATE

Ensure contributors get the kudos by tracking all collaborative suggestions, and allow PI to witness inventions.



SOURCE

Utilize R&D outsourcing from everywhere in the world while maintaining confidentiality. Pay in flat fee or royalty.



COMBINE

Combine innovations to create new innovations or virtual companies (to minimize bureaucracy). Track economics.



VALUE

Comply with International accounting rules that require you to identify, value and report all intellectual assets.

Manage Innovation



MANAGE

Use tools to inform and apply best practices and to automatically implement with Smart Contracts.



FUND

Use 'InnoFunding', to leverage affinity groups, matching funds and link to regional Economic Development Funds.



LEGAL

Use tools for internal/external GC's such as Smart NDA's, Smart Licenses, patent clocks and family management.



INSURE

Close the risk management gap for SME's and startups by using available and affordable IP litigation insurance.



METRICS

Inform decision makers, rank and prioritize portfolio, incent innovation and collaboration and implement automatically.



REPORTS

Use for each functional area in organization. 'Exit Report' documents invention and accesses to trade secrets.

Deploy Innovation



MARKET

Market innovation early while still protecting its secrecy, and if you wish your anonymity. Find potential licensees.



LICENSE

Create licenses based on your or our template. Use to build econometric model of innovation in your organization.



SECURITIZE

Consider securitization of all or part of IP portfolio to raise funds and protect assets. Greatly reduce advisory costs.



SPIN OUT

Eliminate cost and time of creating traditional spin-outs. Use virtual companies to track economics of new projects.



OFFER

Make IP available for license at pre-established terms. Embraces 'Open Innovation'. Offer entire portfolio or subset.



CONTRACT R&D

Utilize your knowledge and experience to generate revenues from either Contract R&D or Portfolio Review.



Physical Assets



Human Assets

PeopleSoft



Financial Assets

ORACLE®

Intangible Assets

... for the largest asset class of all we have nothing and the consequences are significant.

The Problematic Patent

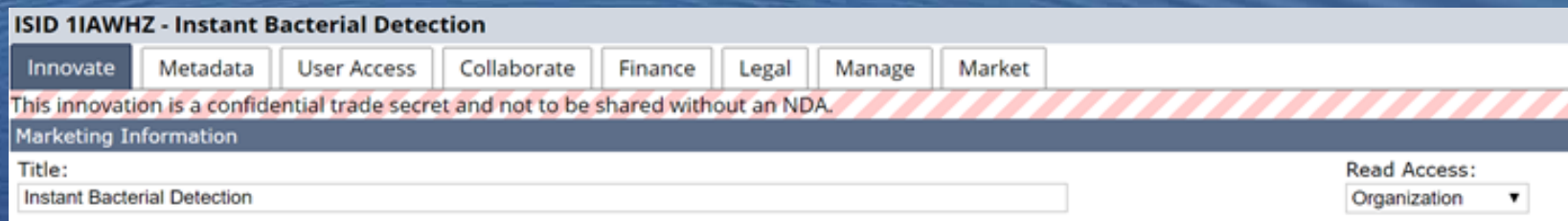
The patent has served technology well for the last few hundred years but there are signs it may have outlived its usefulness. The current challenges to the global patent system include the fact that they are:

- **Illiquid** – less than 1% are ever licensed
- **Slow** – designed for past technology cycles not today's
- **Expensive** – many companies and even countries are completely excluded from global markets due to cost
- **Indefensible** – SME's cannot assert their patents against large company infringers
- **Complex** – the patchwork of international rules make the system unnecessarily expensive

Trade Secrets: An Alternative

Protecting secrecy

Trade secrets lose their protected status if they are not treated as secrets. To protect against this loss of status Ideation displays a banner (below) whenever a trade secret is viewed reminding the viewer of its status. Administrators can also not allow access without an NDA being in place.



Still be found by potential licensees

With proprietary encryption we allow users to ‘have their cake and eat it too’. They can maintain the secrecy of their trade secrets and yet be potentially found by those seeking the technology.

Protecting transparency

While maintaining secrecy potential licensees still need to be assured that the rights they are purchasing are actually available – particularly if the rights are exclusive. To enable this we maintain a global blockchain registry that tracks every transaction for every trade secret without compromising its secret. This provides the basis of an open and trusted marketplace for secrets.

IP Best Practices

Timeline (months)

1. Register

Prove authorship and time of authorship. Track accesses. Protect Trade Secrets. Be found i(f you want) while maintaining confidentiality.

2. Provisional

Inexpensive 1 year option. Extends protected period. Ensures patentability. Automatic option.

3. Review

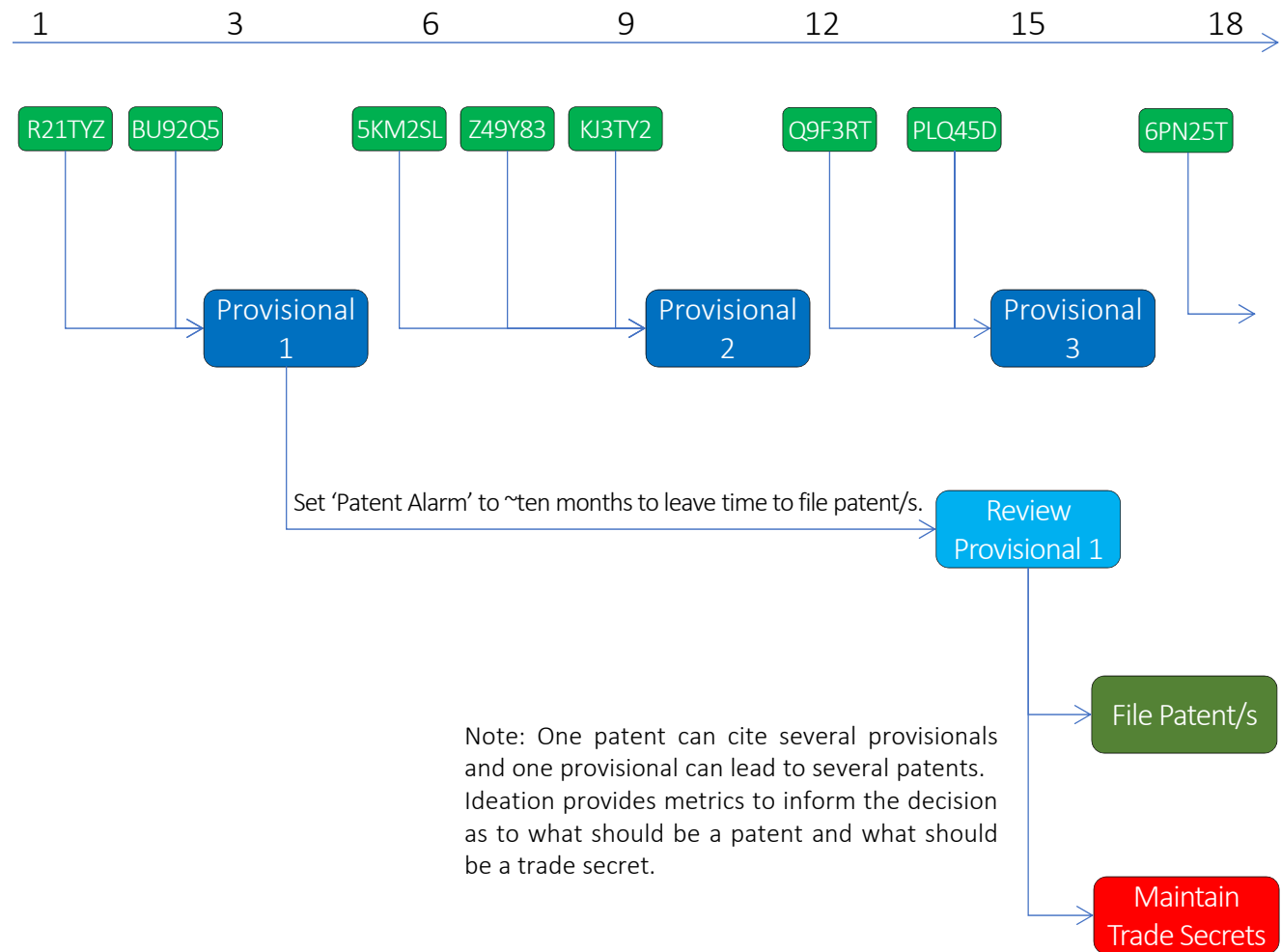
Use metrics to review provisional filings before expiry

4. File Patents

File patents claiming priority to any number of provisionals.

5. Trade Secrets

Maintain everything not filed as patent as trade secret.



IP Best Practices (cont.)

6. Holding Company

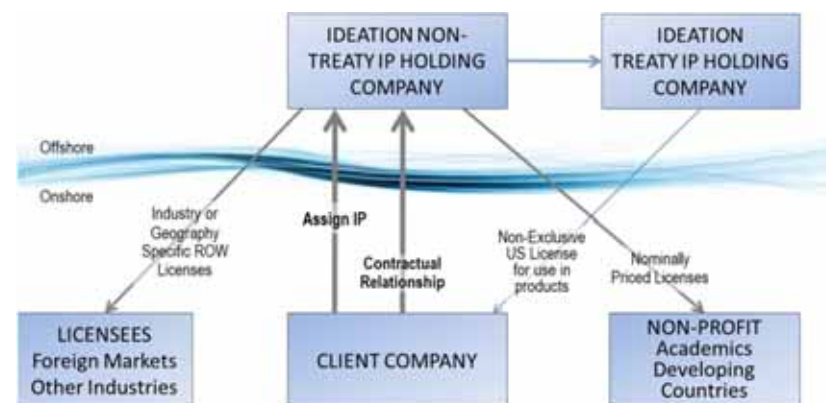
- Co-ordinate administration and licensing
- Maximize Symbiosis
- Protect core assets
- Optimize global tax
- Anonymity

7. IPaaS

- Maximize licensing revenue
- Minimize R&D costs
- Minimize administration costs
- Focus on core differentiators

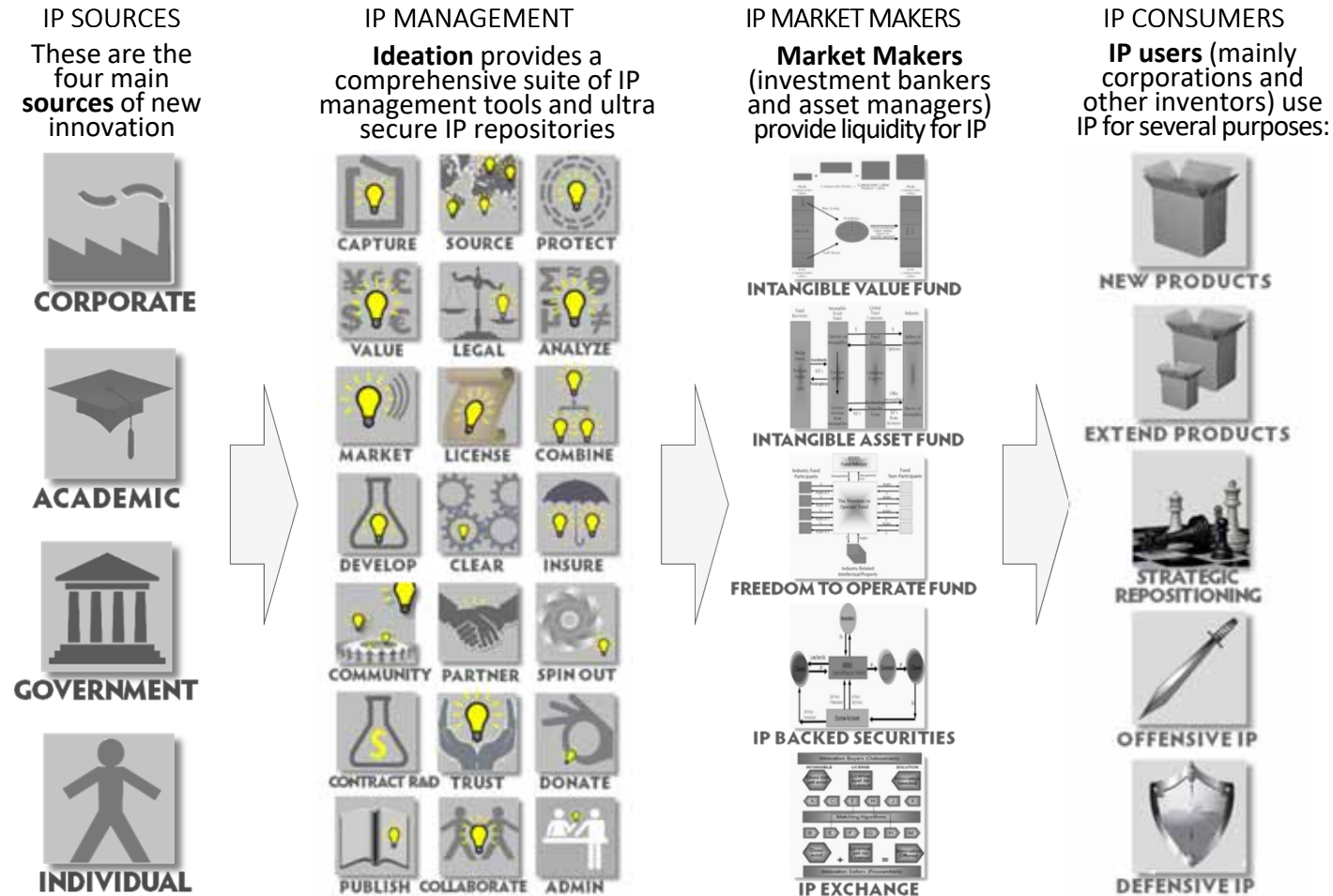
8. Metrics

- Maintain
- Inform
- Focus
- Prune



The Innovation Ecosystem: Government

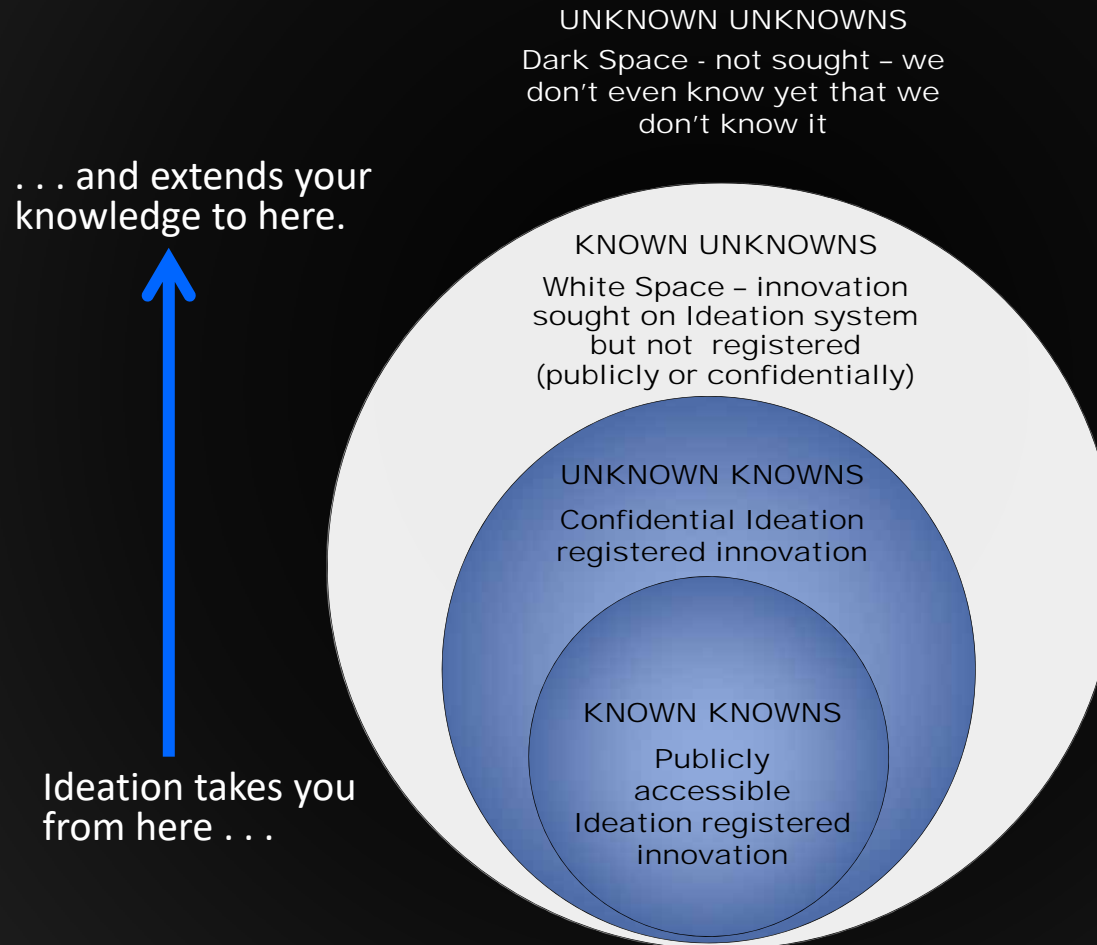
Ideation allows each organization to participate fully in the innovation ecosystem while still maintaining confidentiality and, if wished, anonymity.



"To know that we know what we know, and that we do not know what we do not know, that is true knowledge."

Confucius,

~500 BCE



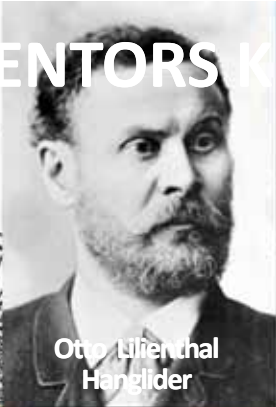
HOMAGE TO INVENTORS KILLED TESTING THEIR INVENTIONS



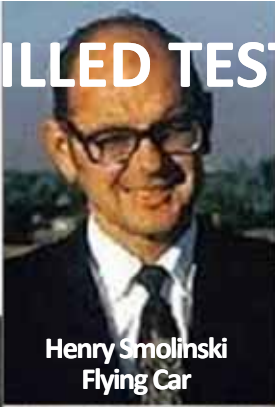
Karel Soucek
Shock Absorbent Barrel



Sylvester Roper
Steam Powered Bicycle



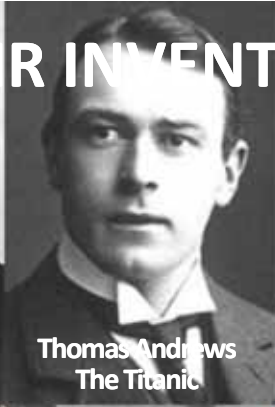
Otto Lilienthal
Hanglider



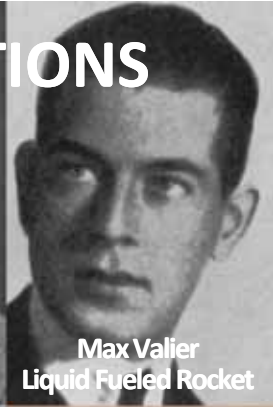
Henry Smolinski
Flying Car



Alexander Bogdanov
Blood Transfusion



Thomas Andrews
The Titanic



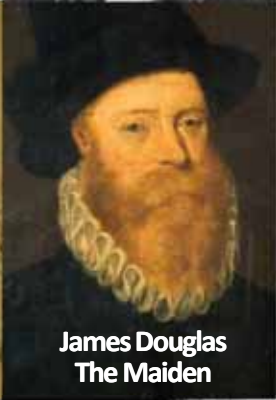
Max Valier
Liquid Fueled Rocket



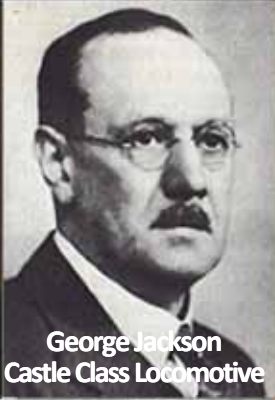
Harry Daglian
Co-Inventor A-Bomb



Hammad al-Jawhari
Winged Flight



James Douglas
The Maiden



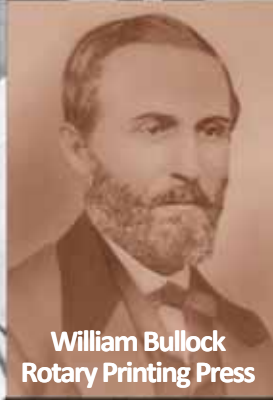
George Jackson
Castle Class Locomotive



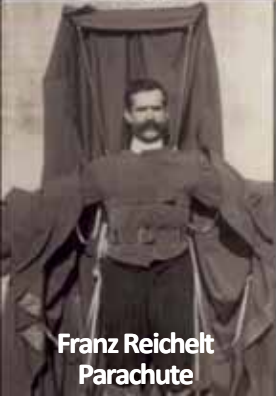
Jean Francois de Rozier
Hybrid Balloon



Valerian Abakovskiy
AeroWagon



William Bullock
Rotary Printing Press



Franz Reichelt
Parachute



Thomas Midgely
Leaded Gas



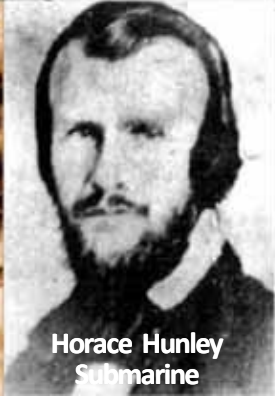
Madame Curie
Radium



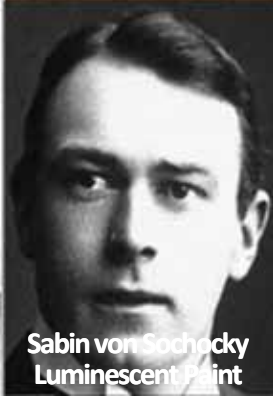
William Nelson
Motorized Bicycle



Wan Hu
Rocket Propelled Chair



Horace Hunley
Submarine



Sabin von Sochocky
Luminescent Paint



Thank you
for listening!

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