OXENTIA

Oxford's Global Innovation Consultancy

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE

Identification and Valuation of Technology Portfolios in Research Centres

Michael Mbogoro, PhD

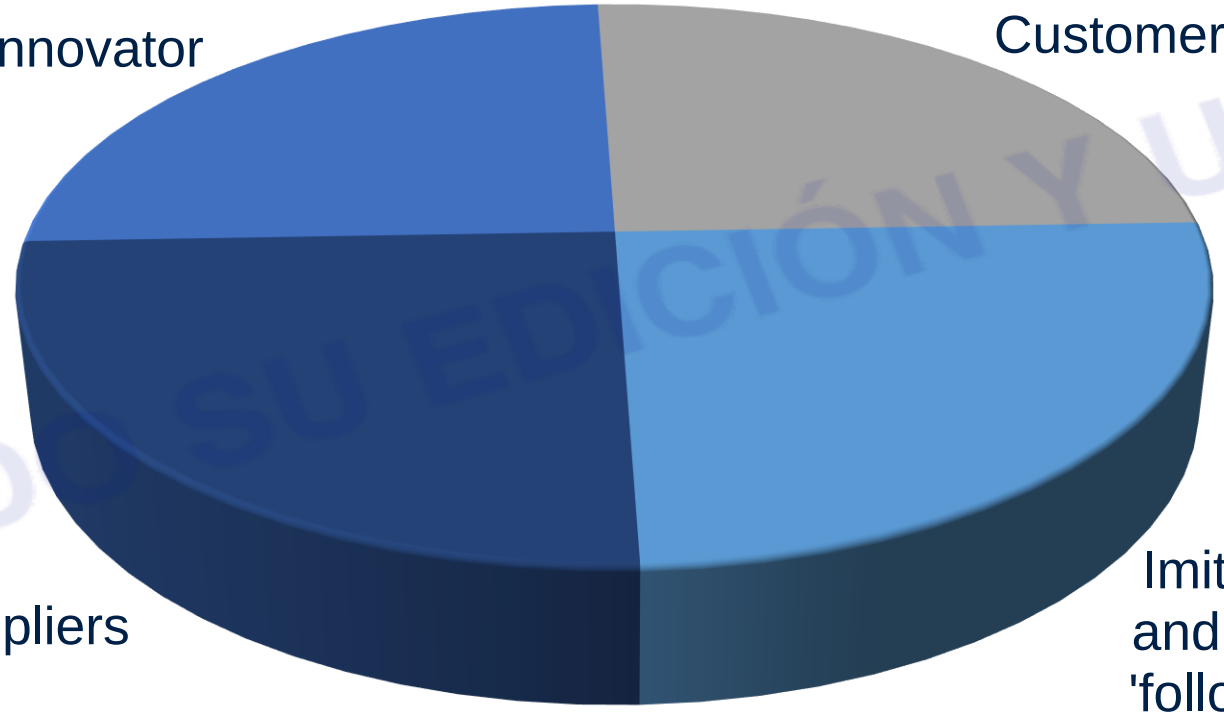
August 2017

Learning Topics & Outcomes

- Understand the importance of valuation of new technologies and new companies
- Understand different valuation techniques and the context in which they are used
- Develop skills in identifying and utilising the most appropriate valuation techniques for your project/inventions

Returns to Innovation – Appropriation of Value

- Inventors
- Contributors
- Funding bodies
- University department

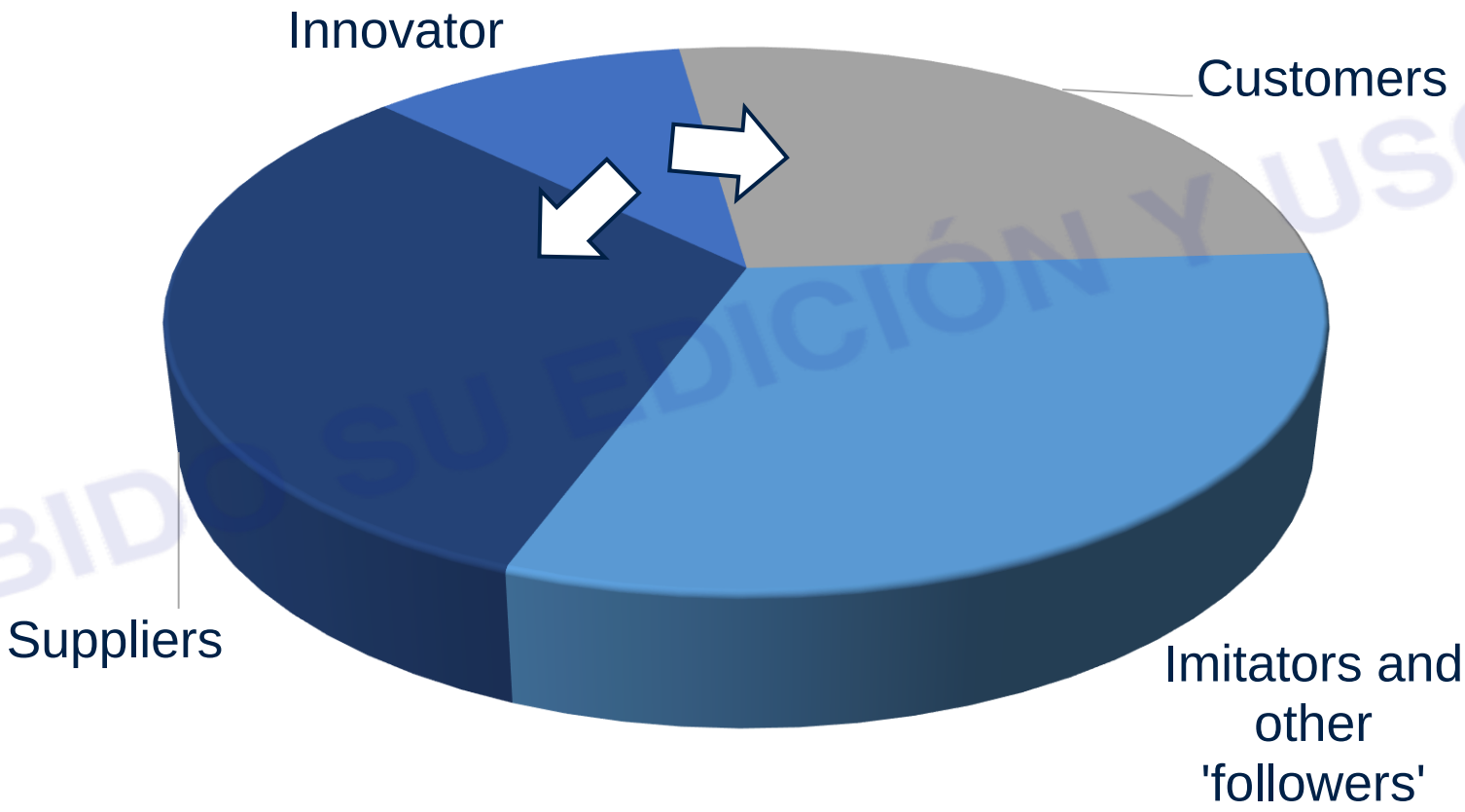


In a strong *regime of* ***appropriability***, the innovator can capture a substantial share of the value created

Innovation in academia - a Weak Regime of Appropriability

Universities typically:

- File patents **earlier** than is commercially desirable
- Lack the **complementary resources** required to commercialise innovations



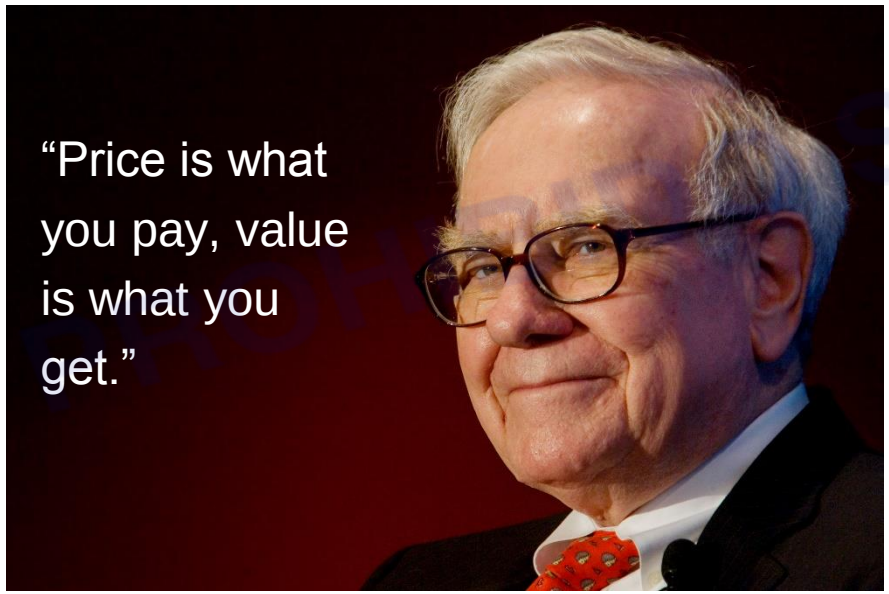
Universities can normally only appropriate a minority of the returns

4

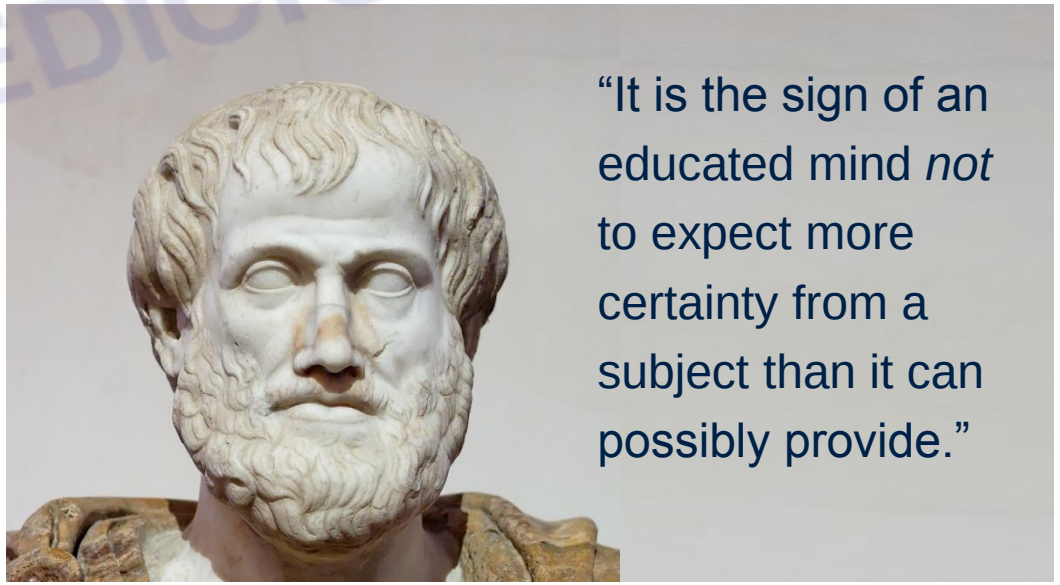

Valuation of a new invention is an art rather than a science

The Art of Valuing New Technologies

- Placing a value on technologies is like art. There is no strict method to do it. However, with more information and creativity there is less risk in assigning ‘wrong’ value.



Warren Buffet



Aristotle

 Image source: Jastrow, Huffington Post

Valuation in Technology Transfer

Key factors to consider

- What is the purpose of the valuation exercise?
- How much information is available to inform the process?
- How unique or complex is the IP asset being valued?

- **These are not typical skills that are traditionally associated with a technology transfer function at a university**

- **It is an important activity if you aim to obtain as much value from your research as possible**

Why?

- Structuring a licensing strategy/deal
- Establishing a spin-out company
- Non Deal Orientated & Portfolio Management
- Corporate valuation for shareholders
- Management buy-in/out
- Privatization and similarly, IPO
- Fund raising
- Assignment of IP asset
- Investment in a development of IP asset

Valuation in Technology Transfer

- Who are the stakeholders and who conducts a valuation exercise?

University and their technology transfer office

Companies looking to in-license technology

Investors seeking opportunities

- What is important to these stakeholders?
- How do their priorities shape their approach to valuations?

 Image source: Oxford University, no-zaku, Forbes

What do we Value?

What do we have to value?

- A piece of technology
- IP
- New company
- Expertise – know how

Is it exclusive? Is it confidential? Is it protected?

- Route to market…what is the plan?
  - Spin-out
  - License
  - Something else?

What questions we ask?

- How much I can charge for the technology?
- What is the demand for it?
- How many different alternatives are there?
- How is the innovation distinctive or better than existing?

The Effect of Risk

- The greater the risk, the higher the potential return needs to be
- Dependent on the Technology Readiness Level (TRL)

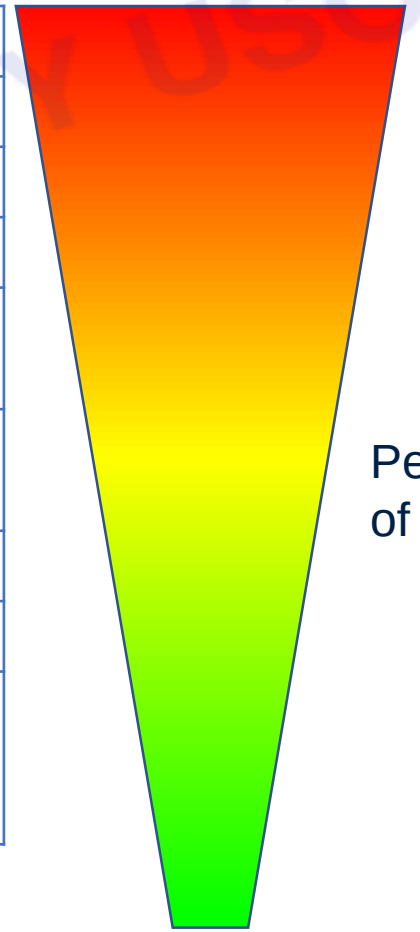
Success Rate

1 in 200?

1 in 20?

1 in 3?

TRL 1	Basic principles observed
TRL 2	Technology concept formulated
TRL 3	Experimental proof of concept
TRL 4	Technology validated in lab
TRL 5	Technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)
TRL 6	Technology demonstrated in relevant environment (industrially relevant environment in the case of key enabling technologies)
TRL 7	System prototype demonstration in operational environment
TRL 8	System complete and qualified
TRL 9	Actual system proven in operational environment (competitive manufacturing in the case of key enabling technologies; or in space)



Perception of risk

Technology (IP) Valuation Methods

Traditional IP Valuation Methods and their Variants

Cost Approach

- Sunk costs
- Replacement/
- Reproduction cost

Market Approach

- Benchmarking/ Comparator analysis
- Auction method

Income Approach

- Discounted Cash Flow (DCF) with Net Present Value (NPV) calculations
- Venture Capital method

Other methods: Value based, Asset based, brand value, snapshots of value, technology factor method, etc.

 Image source: AOL Finance, ti plans, workwithrichard

IP Valuation Methods - Cost Approach

- The value of IP is equal to the c ce it
- Typically based on historica niversity has spent to develop the technology

R&D Costs

Most potential licensees will not consider sunk costs as a valid way to determine the present (and future) value of a technology

Legal & Patent Costs

- How much money would nsee need to elop their own version?
- Do they have the time and rsion?
- How much are they likely to ma nse?

IP Valuation Methods – Value Based Approach

Value Based approach

How much is it worth to the buyer?

Technology can save companies money

- If you understand the value you offer to a business then you can charge a fee representing a fraction of that value

- **Example:** new software has been developed to reduce waste on a manufacturing line that currently loosing £1m per day in defective product; the company does not have the skills to develop their own version – and they have no time to learn how

Technology can rescue failing companies

- **Example:** a vaccine company announces a failure of their lead drug candidate; they urgently need to fill their product development pipeline; their share price is under pressure and they are subject to a hostile takeover approach; they may be prepared to pay extra for the additional value you offer

 Image source: managing americans

IP Valuation Methods – Market Approach

- The value of IP is equal to the average value as determined by an analysis of several similar transactions
- Applicable when the market for the technology is well established, and an analysis of similar transactions can be conducted, for IP used in an related application
- The Market Approach only works if there are several comparable transactions to benchmark against

 Image Source: International Insurance group

IP Valuation Methods – Market Approach

- Approach:
  - Identify several deals in a similar field and, at a similar maturity to the one being valued
  - Consider the market in which the technology is sold and the application area, geographical jurisdiction, time frame of comparable deals, other key terms (exclusivity, payment schedule, etc.)
  - Adjust for:
    - Risk related to technology development in that sector
    - When comparable deals were completed. Ideally, compare several deals completed within a short time frame (1-3 years)

Market Approach – Finding Comparators

- In the case of renting space, there will be several examples to reference and compare and ultimately it is possible to establish ‘an industry standard’
- A challenge in using this approach with early stage technologies is that they are usually unique and therefore there is a lack of comparable products.
- In addition, it is often difficult to find out what the financial terms such as the total value of comparable licensing or acquisition deals

 Image Source: Parcus Group

Market Approach – Finding Comparables

Surveys and Publications

Professional Networks

Company disclosures and published agreements

Disclosures to Regulatory bodies

Subscription or proprietary databases

Court Judgements

Finding comparators – Surveys

Primary Industry	0-2%	2-5%	5-10%	10-15%	15-20%	20-25%	>25%
Aerospace		40.0%	55.0%	5.0%			
Automotive	35.0%	45.0%	20.0%				
Chemical	28.0%	57.4%	23.9%	0.5%			0.1%
Computer	42.5%	57.5%					
Electronics		50.0%	45.0%	5.0%			
Energy		50.0%	15.0%	10.0%		25.0%	
Food/Consumer	12.5%	62.5%	25.0%				
General Manufacturing	21.3%	51.5%	20.3%	2.6%	0.8%	0.8%	2.6%
Government/University	7.9%	38.9%	36.4%	16.2%	0.4%	0.5%	
Pharmaceuticals	10.0%	10.0%	80.0%				
Health Care Equipment	1.3%	20.7%	67.0%	8.7%	1.3%	0.7%	0.3%
Telecommunications				100.0%			
Other	11.2%	41.2%	28.7%	16.2%	0.9%	0.9%	0.9%

Source: McGavock, et al., Factors Affecting Royalty Rates, les Nouvelles, June 1992, 107

Finding comparators – Surveys: Confidence Intervals

- Looking more closely at these survey data reveals that in some industries, royalty rates tend to concentrate around a certain range and therefore, can act as an appropriate measure of the industry standard for these sectors.

			95% Confidence Interval	
Primary Industry	Number of Deals	Average Royalty	Lower Bound	Upper bound
Medical Device	77	4.35%	3.71%	5.00%
Pharmaceutical	90	5.66%	4.75%	6.57%
Chemical	21	3.70%	2.82%	4.57%

Source: les Nouvelles, March 2008

IP Valuation Methods – Market Approach: Benchmarking

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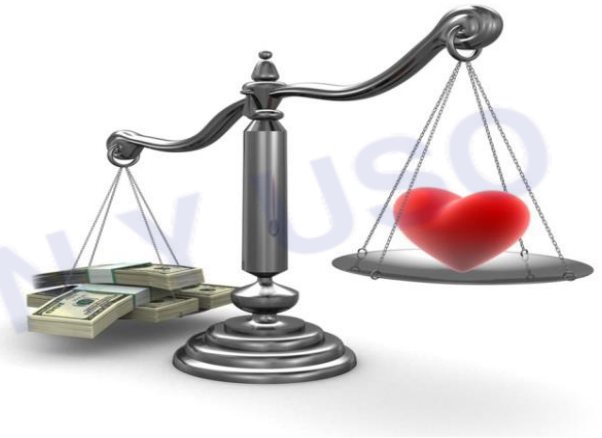
Typical royalty rates by industry

Industry	Low %	Average %	High %
Medical Device	3.71	4.35	5
Pharmaceutical	4.75	5.66	6.57
Chemical	2.82	3.7	4.57
Electronics	0.5		5
Machinery	0.33		10



Pharma royalty rates at different stages

Stage	Typical Royalty (%)
Pre-Clinical	0 – 5
Phase I	5 – 10
Phase II	8 – 15
Phase III	10 – 20
Approval	20% +

- Most University licences are at the pre-clinical stage
- Royalties for early stage technologies rarely exceed the 5% mark

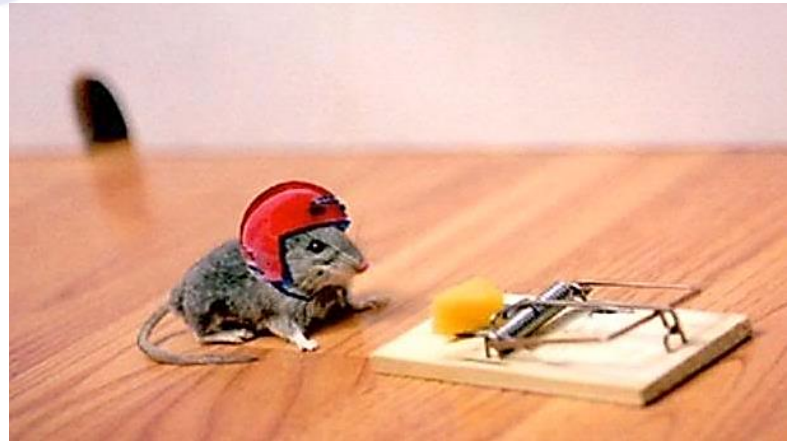
Source: Porter et al., *"Industry Norms and Reasonable Royalty Rate Determination"*, Les Nouvelles, March 2008. Parr, *"Determination of Royalty Rates"*, 2006.

IP Valuation Methods - Income Approach

- The value of IP is equal to the financial returns that will be generated over the remaining useful lifetime of the IP.
- The focus is on future cash flow derived from IP with the following considerations

Source of income

Useful lifetime of IP



Risk Factors

 Image Source: workwithricharddp, Huffinton Post, mitosystems

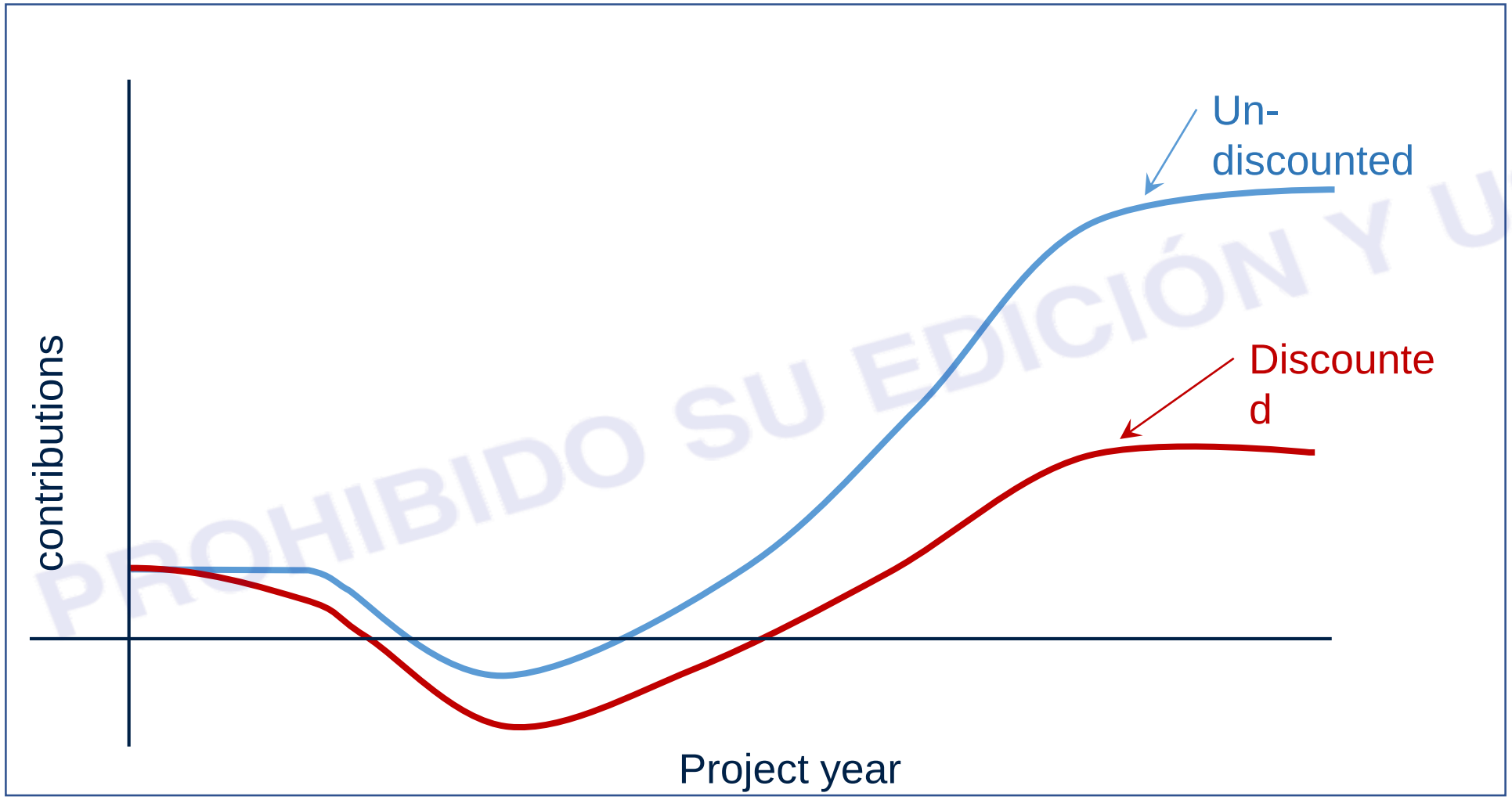
Discounted Cash Flow

Method:

- Determine all ***relevant*** future **Cash Flows** (revenues and costs)
- Consider an appropriate time horizon for your cash flow estimates
- Apply a **Discount** rate to these cash flows over the chosen time horizon by accounting for
  - The time it will take to receive the amounts
  - The associated risks of undertaking the project

- The sum of all Discounted Cash Flows (DCF) for the chosen time horizon yield the Net Present Value (NPV)
- ***Relevant*** = revenues and costs that change by virtue of carrying out the project and commercialising the technology

Discounted Cash Flow Vs undiscounted



Develop DCF model and determine NPV of your Technology (IP)

Developmental Product Valuation - Underpinning analyses

Technical analysis

The product:

- Application
- Regulatory considerations
- Costs

Market analysis

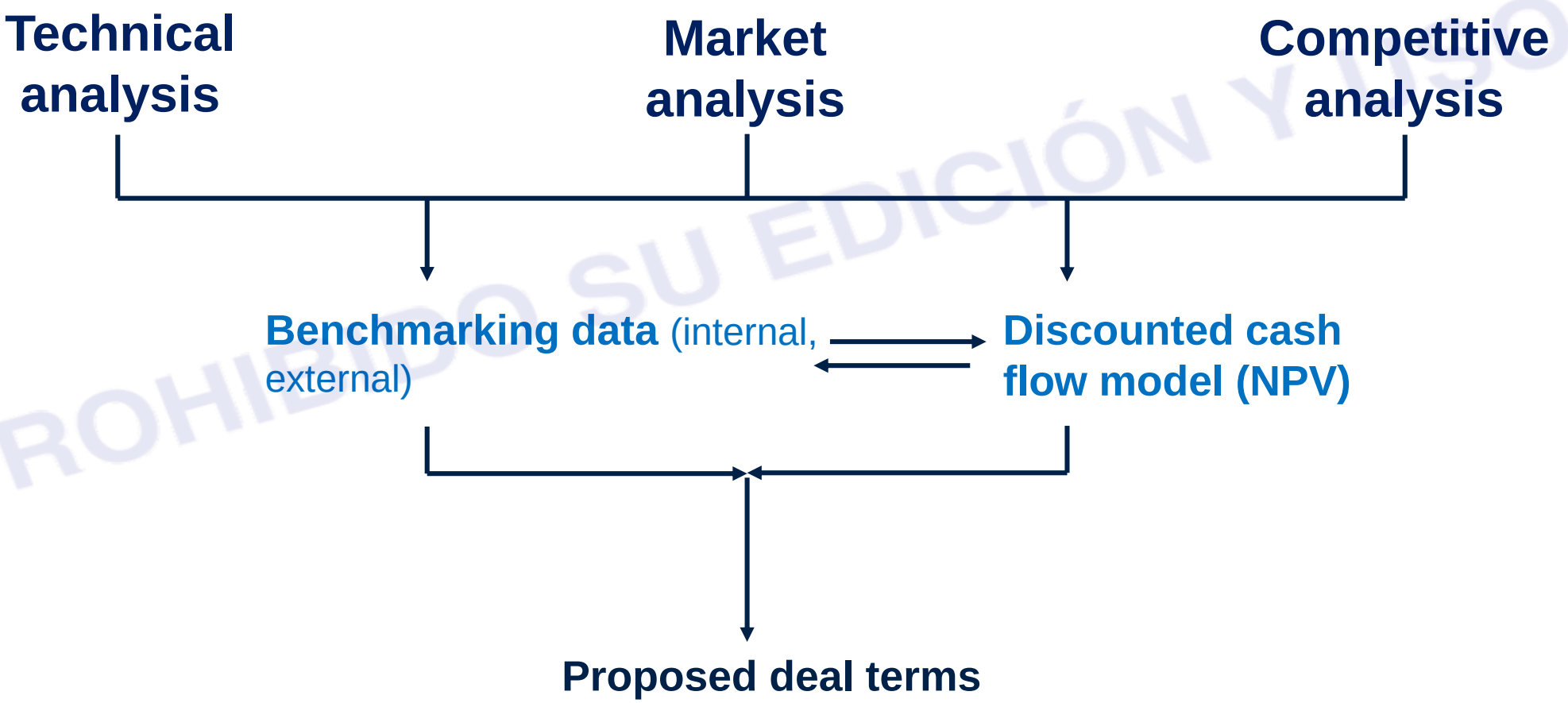
Market:

- Size/value
- Segmentation
- Trends
- Unmet need

Competitive analysis

- Main players
- Existing products
- New products
- Substitutes

Formulating proposed deal terms
Integration with benchmarking



Sources of Information

- To obtain the necessary information on potential costs and benefits, one needs to search as wide range of sources

Company Websites

Company annual reports

Discussions with inventors

Professional networks

Reports to regulators

Market reports

Meetings with potential licensees

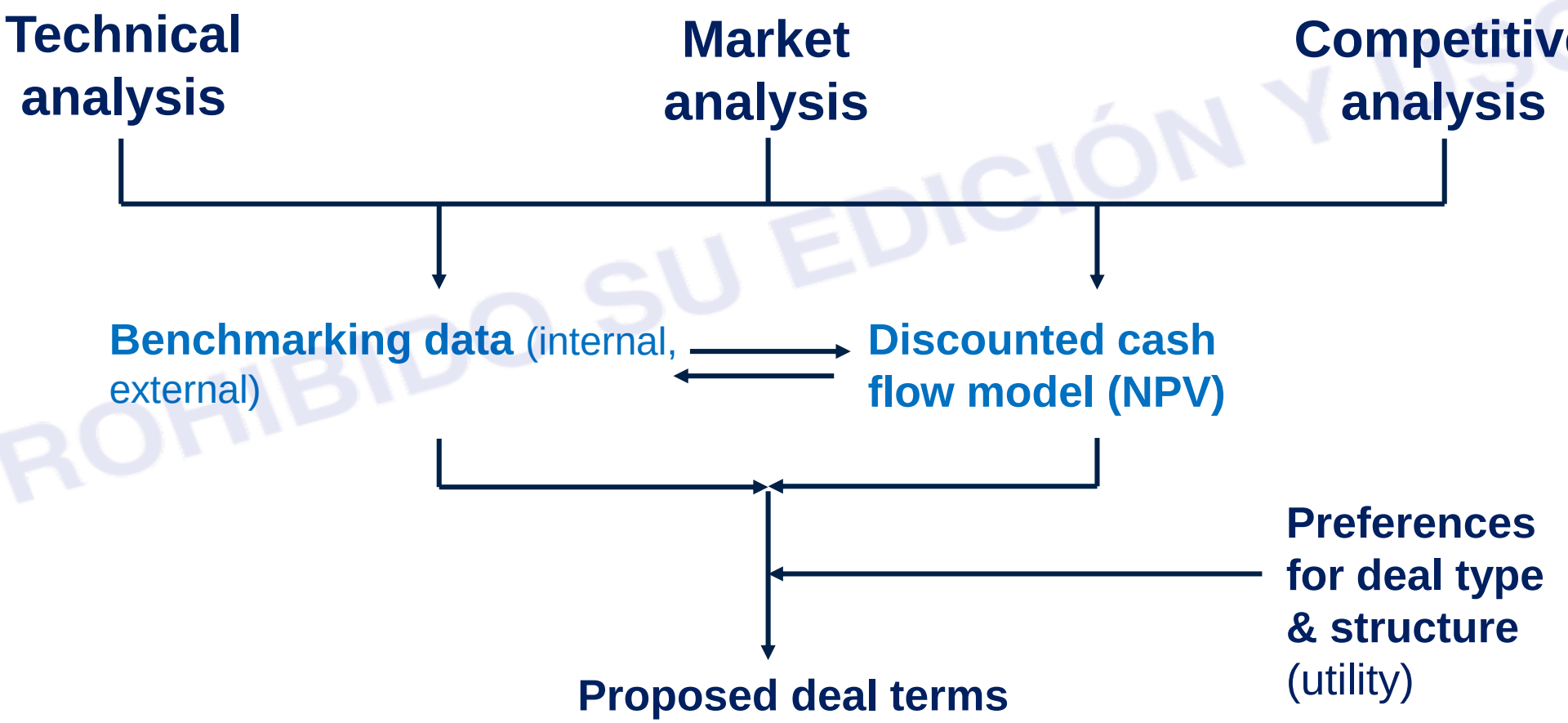
Discount Rate and Cost of Capital

- The rate used to discount future cash flows to the present is equivalent to the cost of capital.
- Discount rates varies across different industry sectors and typically range from 7 - 10%

Industry Name	Number of Firms	Cost of Capital
Aerospace/Defence	96	7.67%
Building Materials	41	7.20%
Business & Consumer Services	165	7.21%
Chemical (Specialty)	100	7.96%
Computer Services	117	7.08%
Computers/Peripherals	55	7.75%
Drugs (Biotechnology)	426	9.56%
Drugs (Pharmaceutical)	164	7.81%
Electronics (General)	164	6.90%
Engineering/Construction	48	7.78%
Food Processing	87	6.07%
Green & Renewable Energy	25	4.98%
Semiconductor	80	8.70%
Software (System & Application)	236	8.00%
Total Market (without financials)	6100	7.23%

 Source: Aswath Damodaran, Stern, NYU

Formulating proposed deal terms
Integration with benchmarking



Improving assumptions and accounting for risk

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- Can we improve our DCF model by making better assumptions for:
  - Sales projections
  - Cost Of Goods sold (COGS)
  - Sales & Marketing (S&M)
  - General and Administrative costs (G&A)
- How do we account for development risk?
  - Success/Attrition rates

Image source: uscibooks.com

Improving the model – Cost of Goods Sold (COGS)

- COGS assumed to be a simple percentage of sales
- What is included in COGS?

Raw Materials

Payroll and benefits

Depreciation

Storage

Logistics

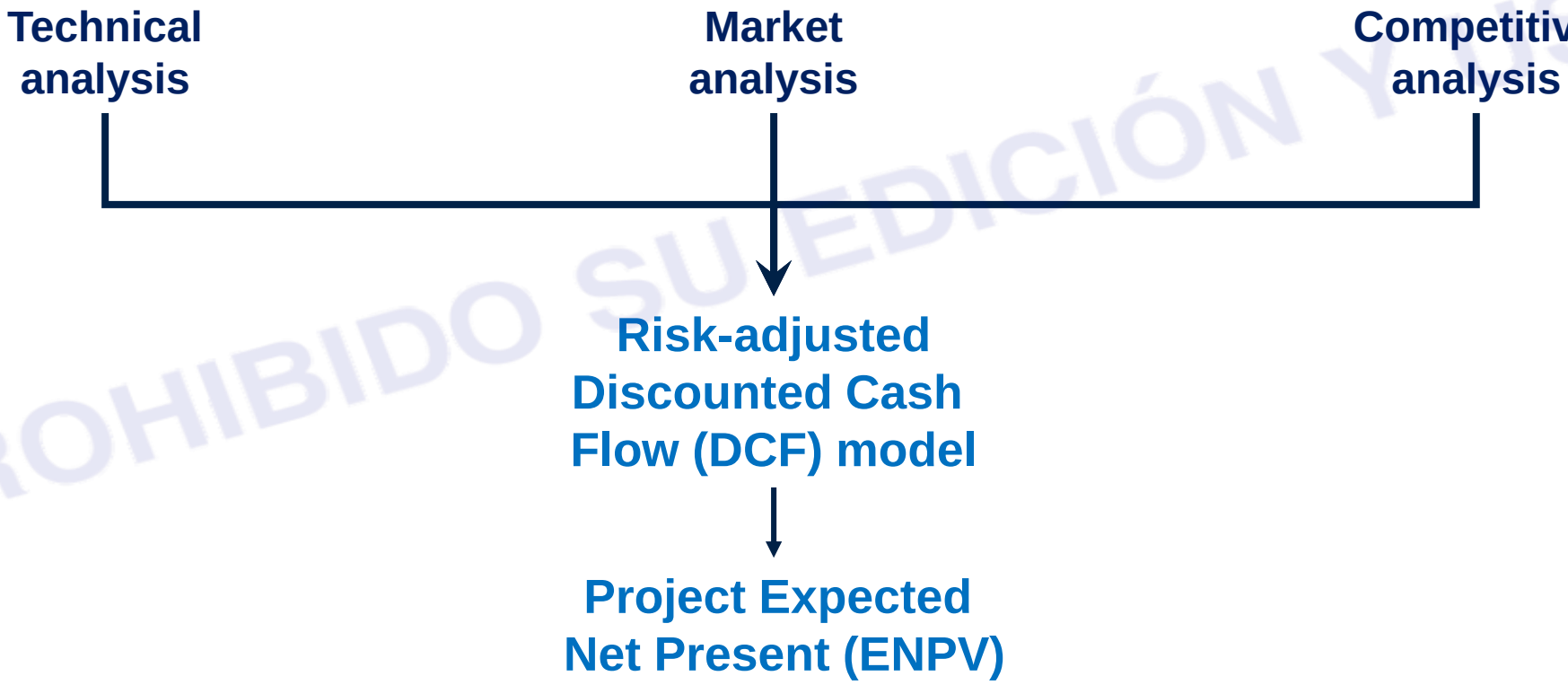
What other factors should we consider:

- Unit cost of manufacturing
- Economies of scale
- Manufacturing efficiencies
- Changing costs of raw materials and processes

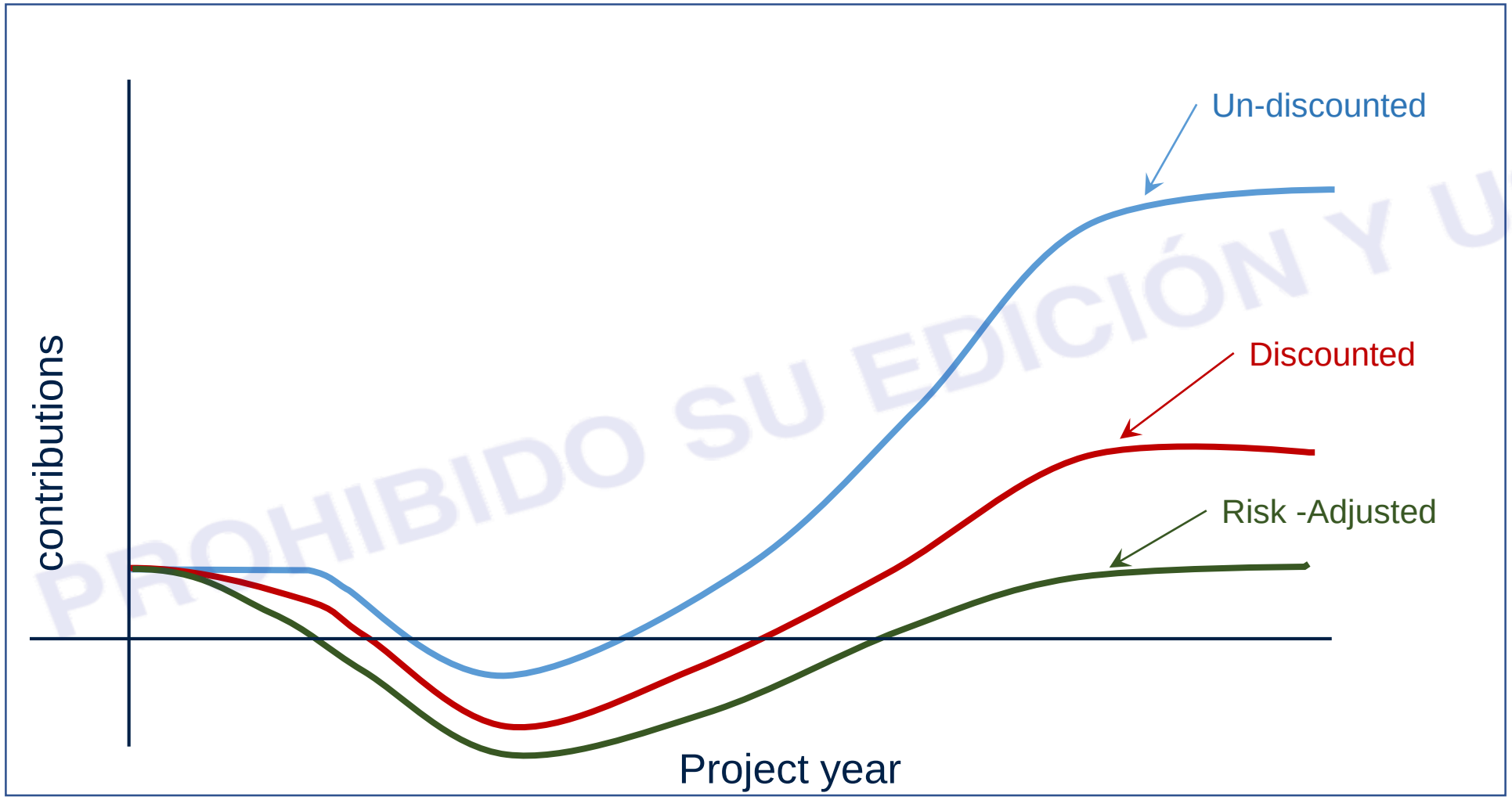
The closer the technology is to the market (high TRL) the easier it should be to calculate these costs

 Image source: DMCLS, LD Upholstery

Developmental product valuation
DCF models and ENPV calculation



Discounted Cash Flow Vs undiscounted



Develop DCF model and determine NPV of your Technology (IP)

Standard in-licensing process

Step	Find the Asset	Evaluate the Asset	Acquire the Asset	Develop, and sell asset successfully
Activity	• Identify opportunities • Initial technical evaluation	• Detailed technical and commercial evaluation	• More assessments • Contract negotiations	• Project implementation
Team involved	• Research strategy • Licensing • External TTO	• Corporate BD • Market research • Manufacturing/Process • Corporate finance • IP & licensing	• Corporate BD • Legal/Contracts • Marketing • Corporate finance	• Research • Manufacturing/Process

Regular review and approvals conducted and guidance from senior management

“…the general who wins a battle makes many calculations…..before the battle is fought……Thus do many calculations lead to victory and few calculations to defeat.”

Sun Tzu, Art of War

ENPV Split between Licensee and Licensor

Licensee (company)

Licensor (university)

ENPV
(Total value of the IP during its useful life)

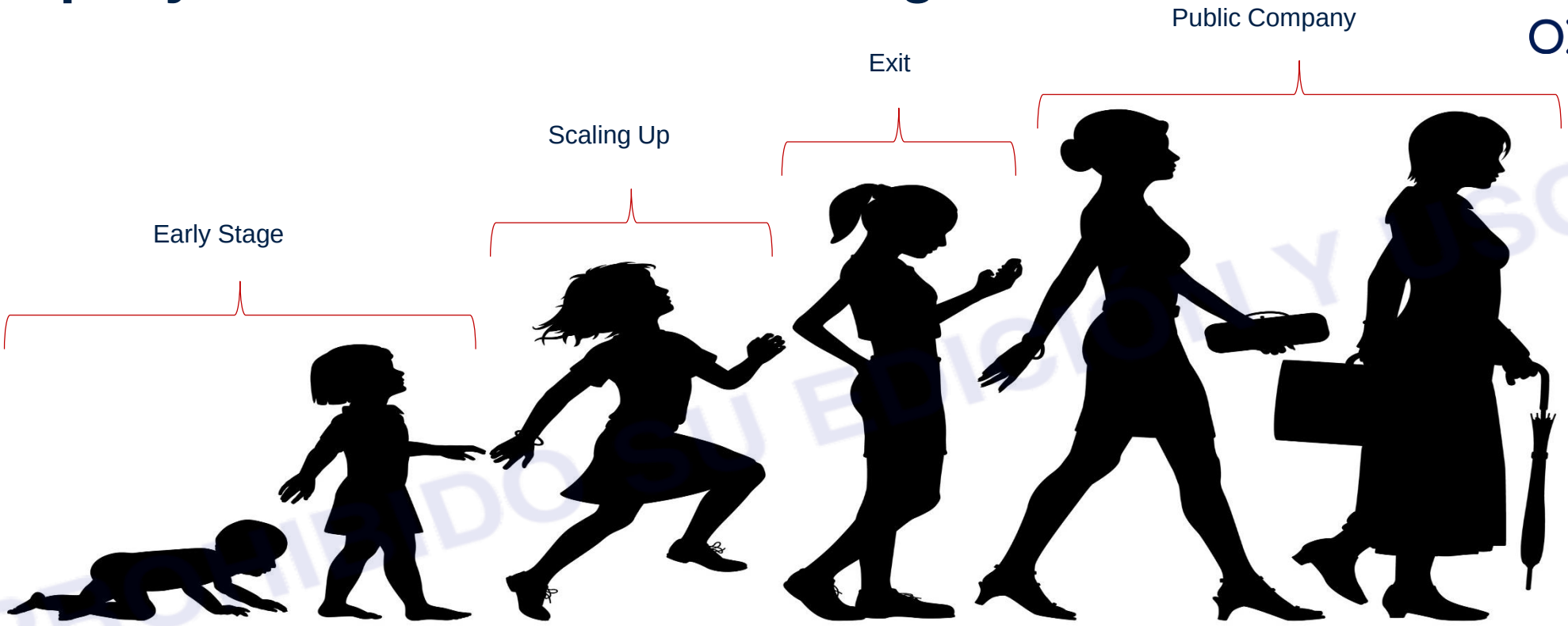
All financial terms are included in this share:

- Upfront payments
- Milestone fees
- Research funding
- Royalties (%) on sales
- Equity

 Image source: Robert Nunn

Valuation of spin-out companies and start-ups

Company valuation at different stages



	Early Stage	Scaling Up	Exit	Public Company
Funding sources	• Seed funds • Govt. grants • Angels • Micro-VC	• Angels • VC	• Angels • VC • Investment Banks	• Pension funds • Investment Banks • Asset management companies • Regular shareholders
Valuation Approach	Cost based	Market + income approaches	Market, income replacement cost	Income approach

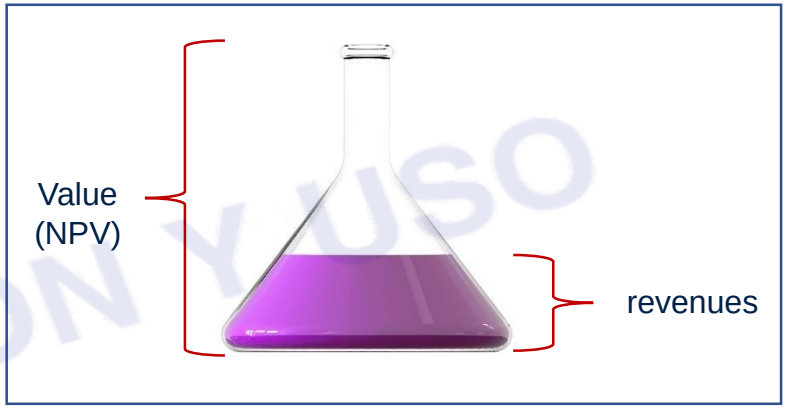
 Image sources: Shutterstock

Valuation – Scaling UP

Company value at scale up stage is based on a combination of:

- Market approach – comparables
- Income approach – DCF models

Find similar companies to compare

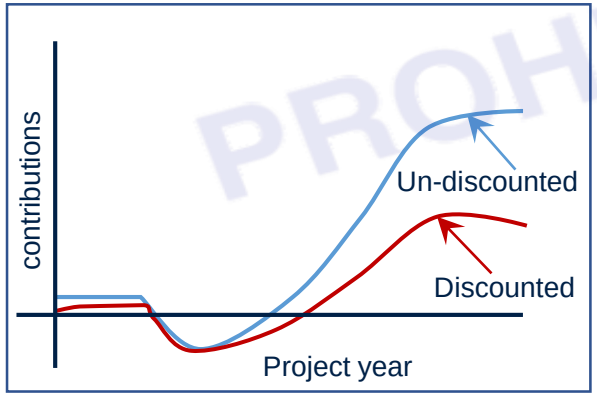


Determine their value/ revenues ratio (multiple)

Multiple **X**

Multiply your revenues with multiple

Project revenues to Exit



Develop DCF model and determine NPV of your company

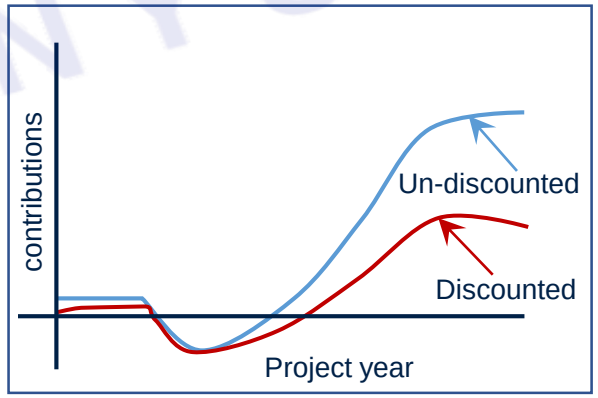
Valuation – Exit via Acquisition

- Acquisition is the most popular of all exit options
- Often the product has traction in the market but revenues are not high enough to qualify for an IPO

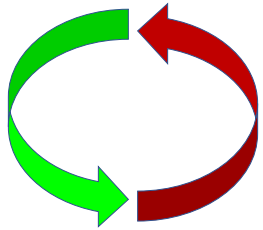
Acquirer values company via:

- Market approach – comparables
- Replacement cost method
- Income approach - DCF models

Market approach - comparables



Income approach – DCF models over a long time horizon (e.g. 10 years)



Replacement cost approach

 Image Source: NOAA, Unitec, Pixabay

Venture Capital Method

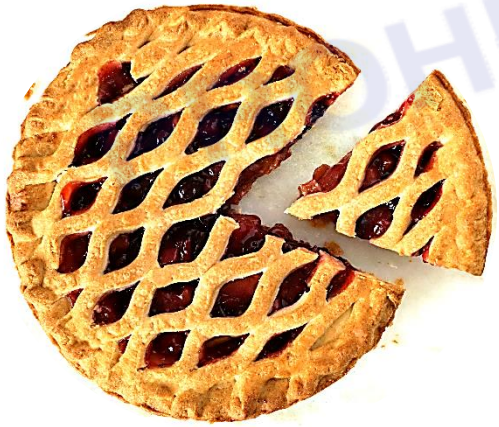
Company diagnostic

Revenue growth to Exit

Sustainable margin

Re-investment opportunity

Risk factors and Discounting



ENPV and price per share

 Image source: Program Success, BBC, Facilicom, Yahoo Finance, Robert Nunn

Conclusion

- Valuation is very challenging ☺ but ultimately rewarding when you realize the true value of your technology portfolio
- There are a number of different methodologies dependent on the maturity of the technology
- These methods should be used in combination wherever possible to ensure a robust and defensible ‘value’ is calculated.

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THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE

Success Cases Demonstrating the Process of Technology Transfer

Michael Mbogoro, PhD

August 2017

Agenda – Success Stories

- Life Sciences - Oxford Nanopore
- Engineering – Stellenbosch Nanofibers
- Software – Onfido Identity check

Commercialising a Nanotechnology in Life Sciences

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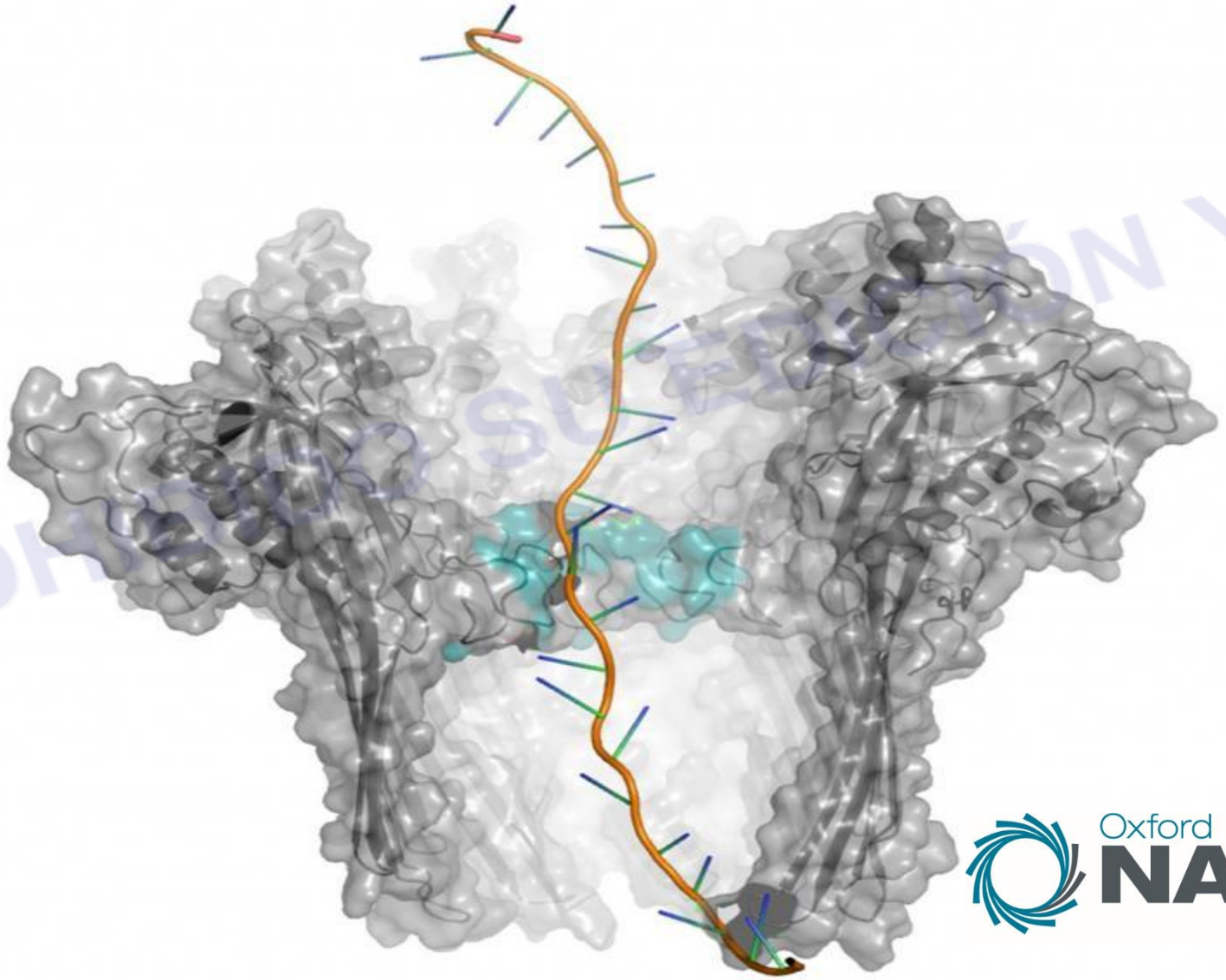
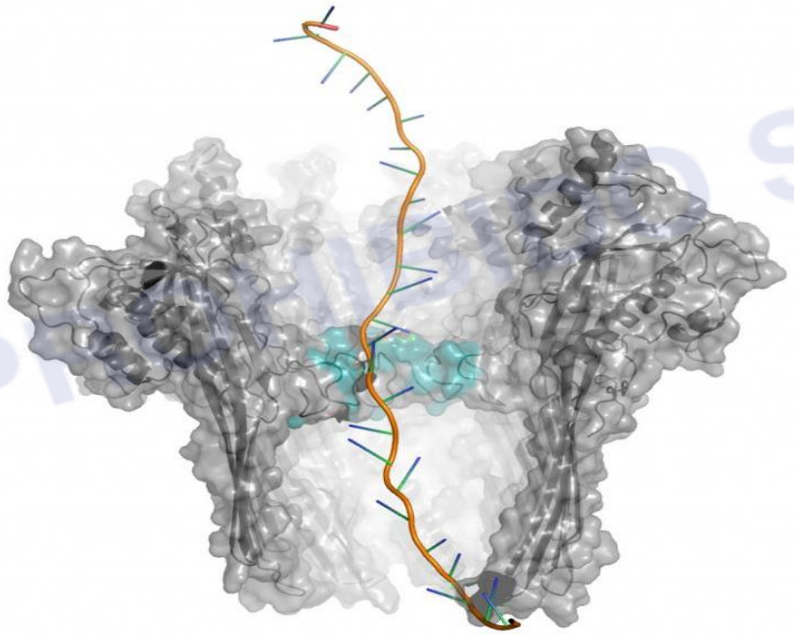


Oxford NANOPORE Technologies

The Founder

- Prof Hagan Bayley
- Professor of Chemical Biology, University of Oxford
  - 20 years in US at UMASS and TAMU
  - Fundamental properties and applications of nanopores

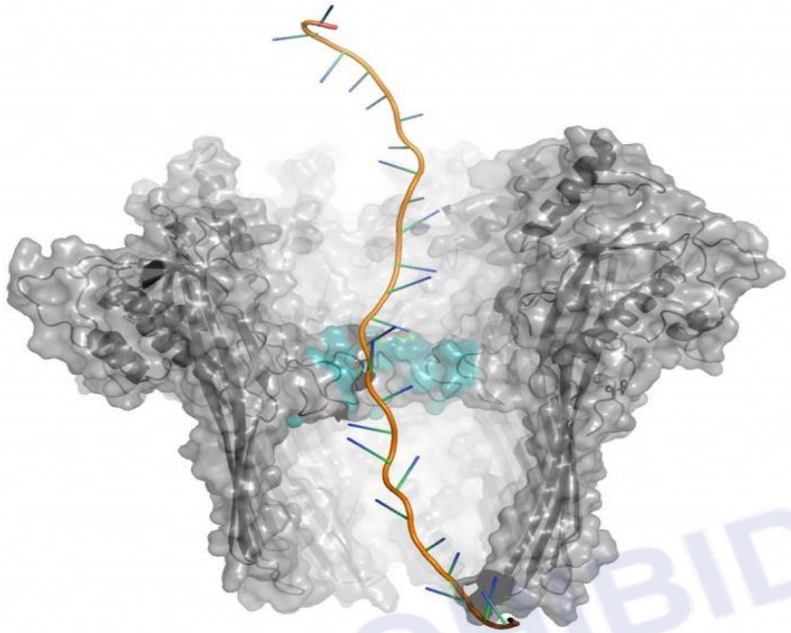


nanopore - a pore of nanometer size

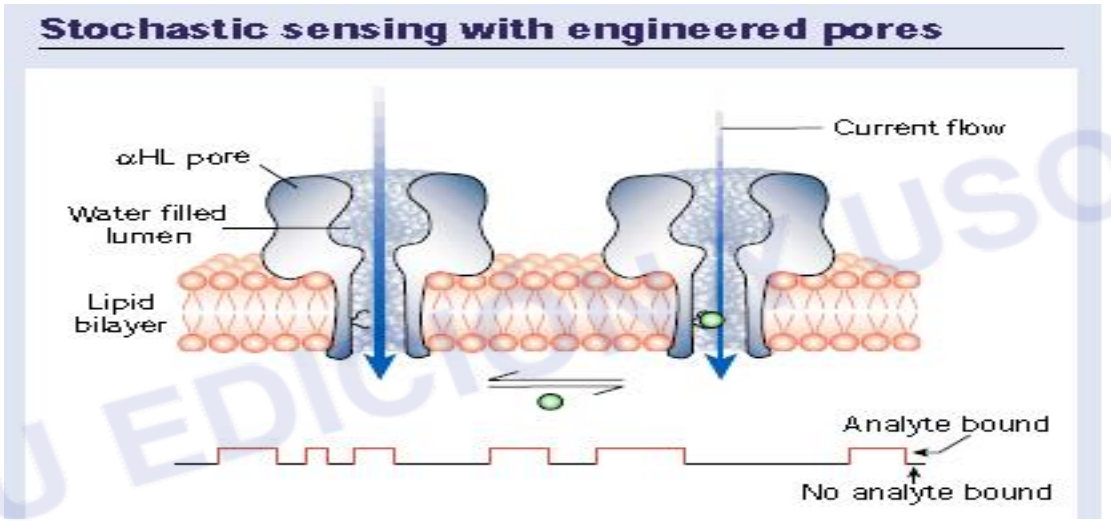
nanopores can distinguish all four bases of DNA

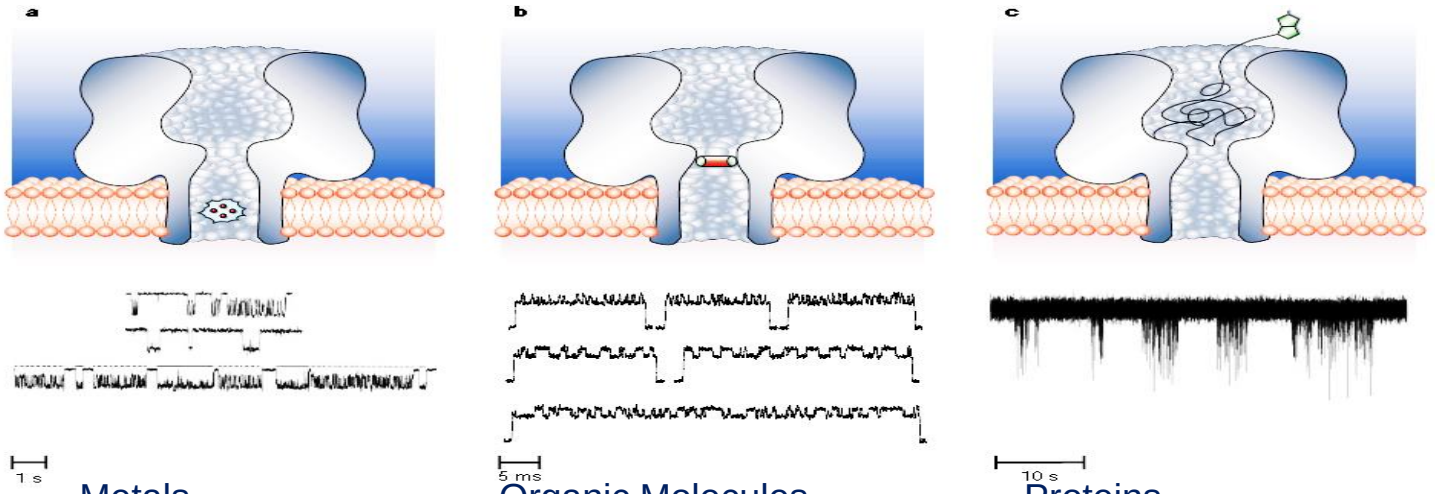
- Over 180 papers published, 9 patents
- h-index of 88
- Well funded - NIH, DARPA, NASA

The Original Research



Early ‘90s ⇒ Initial work on Nanopores
(Characterization of Proteins in Nature)





Metals | Organic Molecules | Proteins

NATURE VOL 413, 13 SEPTEMBER 2001

The Plan in 2005

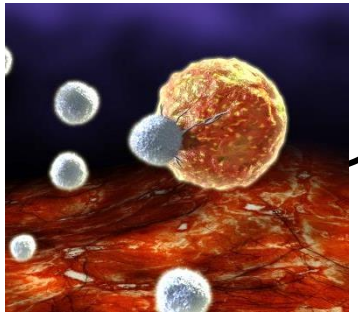
Use nanopores to develop a DNA sequencing platform that could deliver a $1K genome for personalised medicine

Market trends

Personalised medical care

DNA analysis

Technology trends



Nano-biotechnology

⇒ **Business plans MUST evolve over time !**

The Manager

- Over 20 years experience in the design development, manufacture and global launch of diagnostic biosensor devices.
- Extensive experience in manufacturing biosensor process development.
- Industrial experience ranging from small start up to multinational.
- Experience in Technical sales and marketing to clinicians.

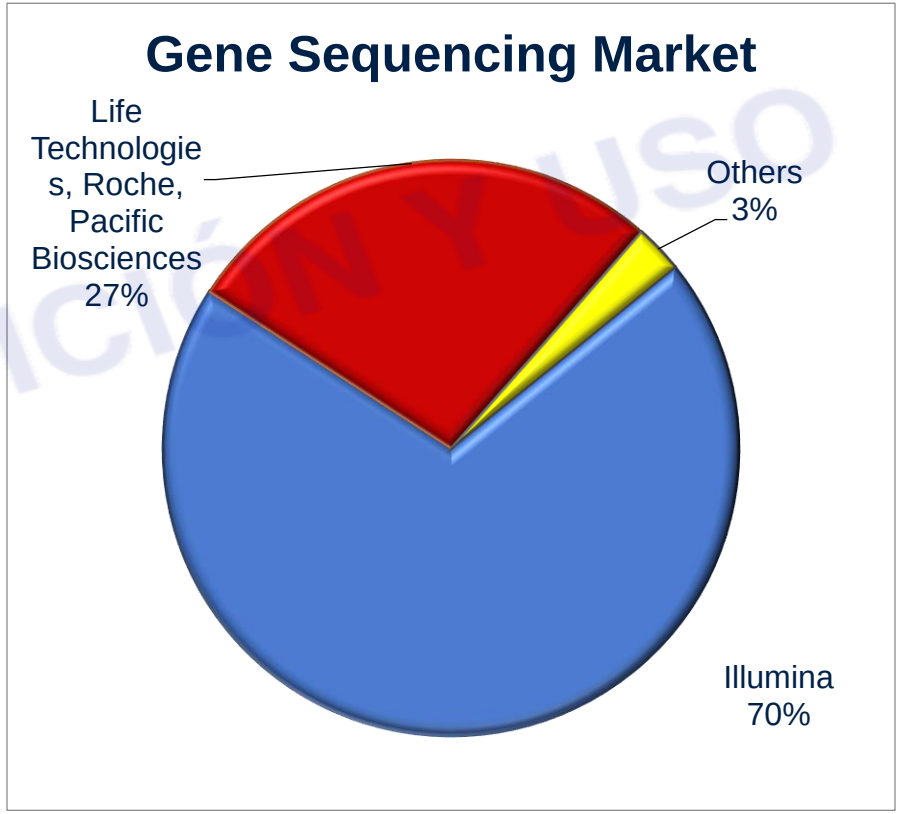
First product – Grid Ion

CEO: Dr Gordon Sanghera

Gene Sequencing Market

- Illumina market capitalisation of $US28bn & CAGR of 27 % the past seven years. Forecasted growth of 25-30 % CAGR to 2017.

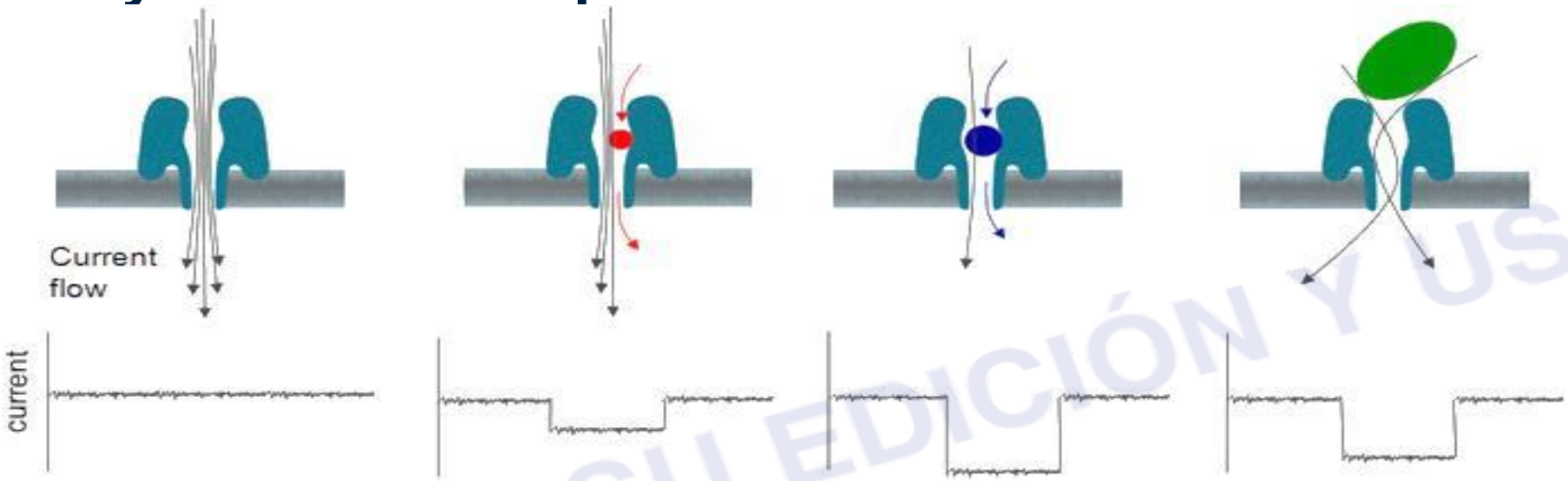
- Newest product ($US10 million), the HiSeqX Ten, is the most powerful sequencer created, and it can sequence genetic code for $US1,000.



*Frost & Sullivan 2014

Case Study: Oxford Nanopore

£350m funding to date



Seed Funding £17.5 m
IP Group
2005-2006

Illumina £11.9, plus deal, £2.1m private Investment
2009

£17.4m round existing + new investors
2010

£25m from existing + new investors
2011

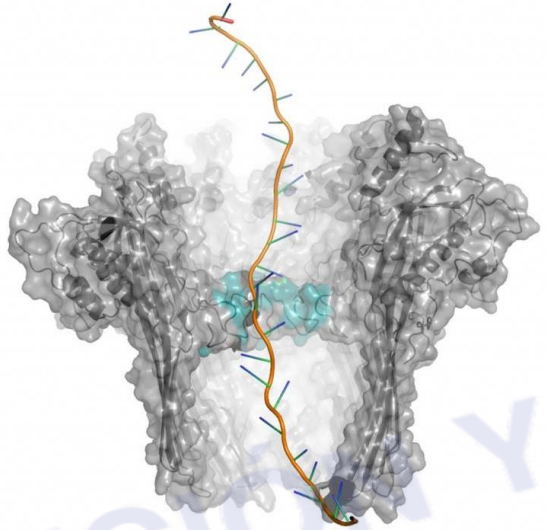
£34.1m from existing investors
2012

£75m from existing + new investors
2013-2014

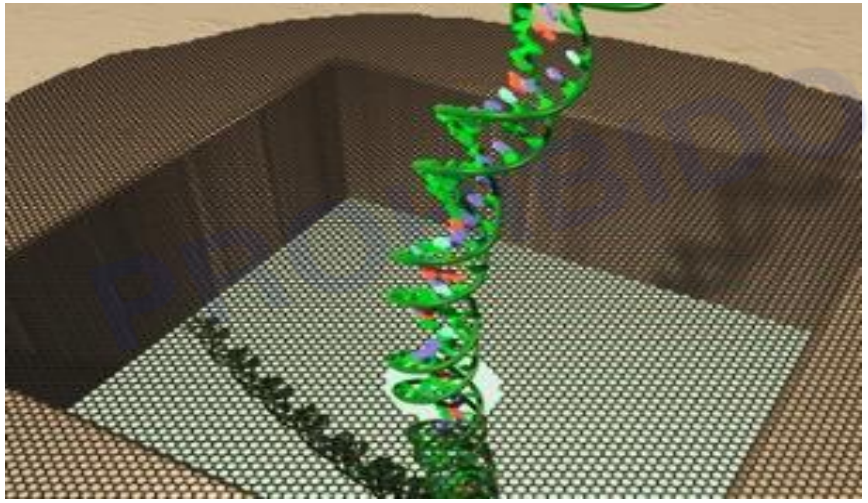
⇒Divested Illumina's stake (£18 m)

Where is Oxford Nanopore Now?

- Over 150 employees
  - Multidisciplinary backgrounds
  - Oxford, Cambridge, New York, Boston



Biological Nanopores



Solid State Graphene nanopores

- Over 600 Issued patents and patent applications (GB 68, WO 57, US 57, 107 patent families)
- Collaborations and exclusive licensing deals with leading institutions: University of Oxford, Harvard and UCSC.
- Funding programmes in these laboratories to support the science of nanopore sensing

Latest Developments

https://nanoporetech.com/news/movies#movie-28-minion

Latest Developments

PromethION

SmidgION

https://nanoporetech.com/news/movies#movie-29-promethion

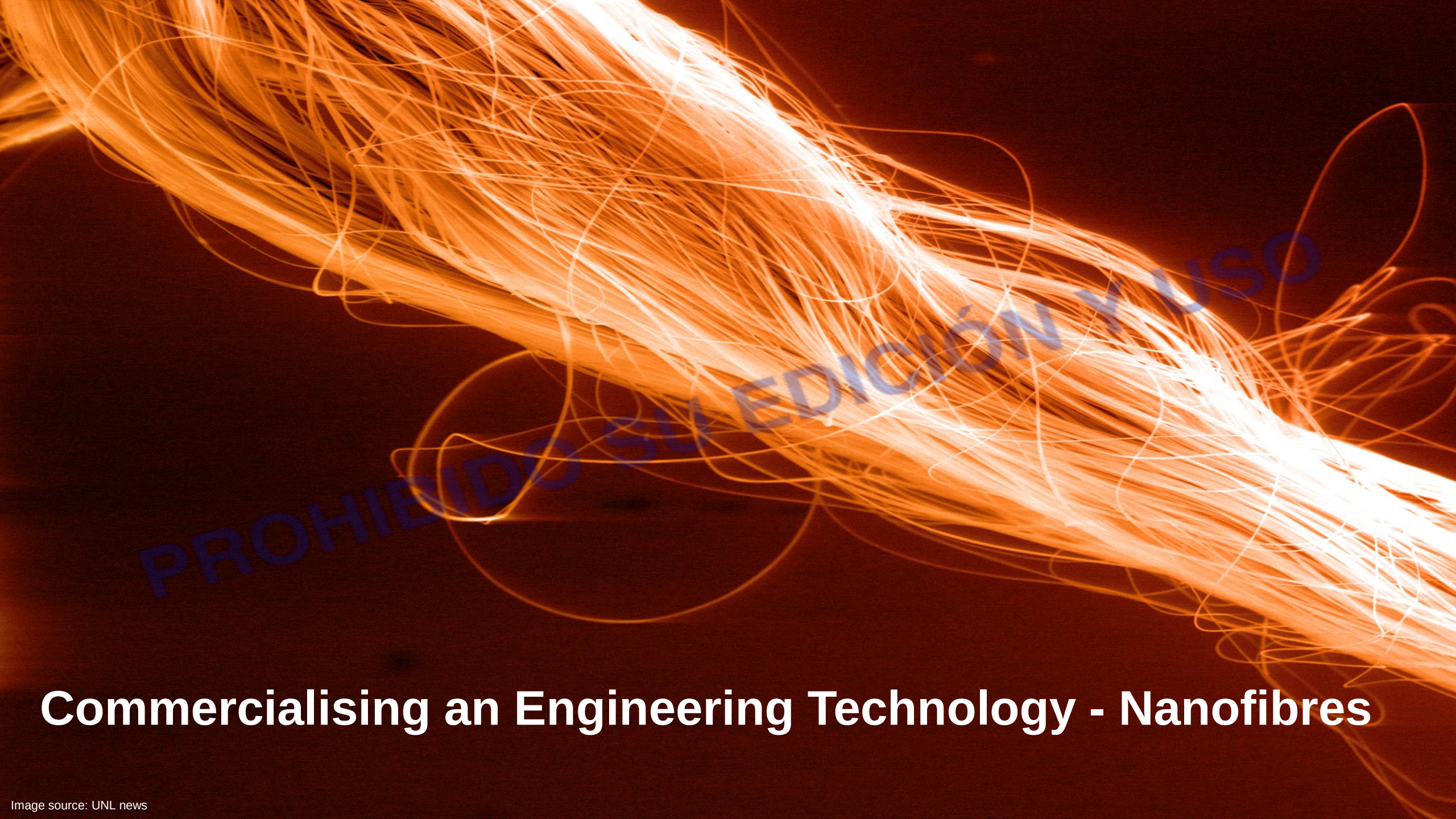
Key Lessons Learnt

- **Challenges of commercialising bio-technologies**
  - Long development phase
  - Disruptive potential
  - Technology uncertainty & ambiguity

- **Seed funding**
  - Important to raise enough cash

- **Rapid funding rounds**
  - Fuelled by adding value/experienced team/news management
  - Product Differentiation is key to attract investors

- Further information is available at their website: http://www.nanoporetech.com



Commercialising an Engineering Technology - Nanofibres

Image source: UNL news

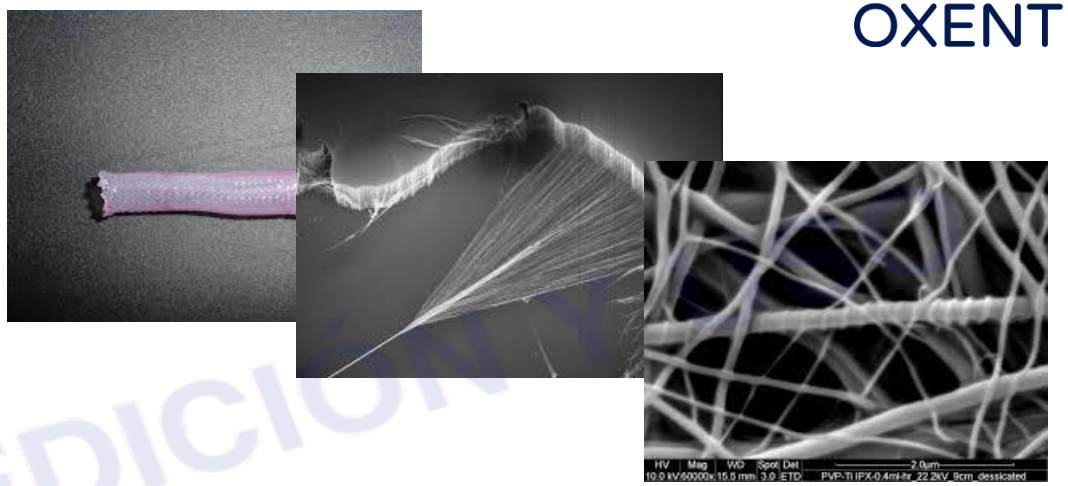
Stellenbosch University - South Africa

Stellenbosch - Western Cape, South Africa

- 36% Postgraduates of 26, 000 students
- 130 Postdoctoral Fellows
- 850 Academic Staff (200 professors)
- 10 Faculties
- 3 National Centers of Excellence
- 14 Endowed Research Chairs
- 30 % of university income from research (€250m)
- Highest national research productivity

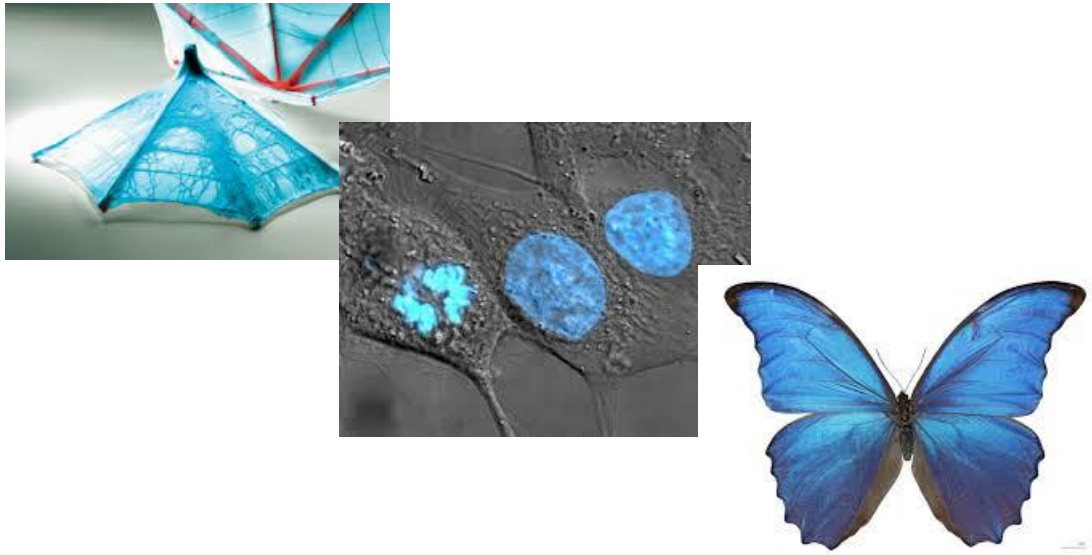
New method of producing nanofibers

Nanofibers are defined as fibers with **diameters less than 100 nanometers**.. They can be produced by interfacial polymerization, electrospinning, and forcespinning.

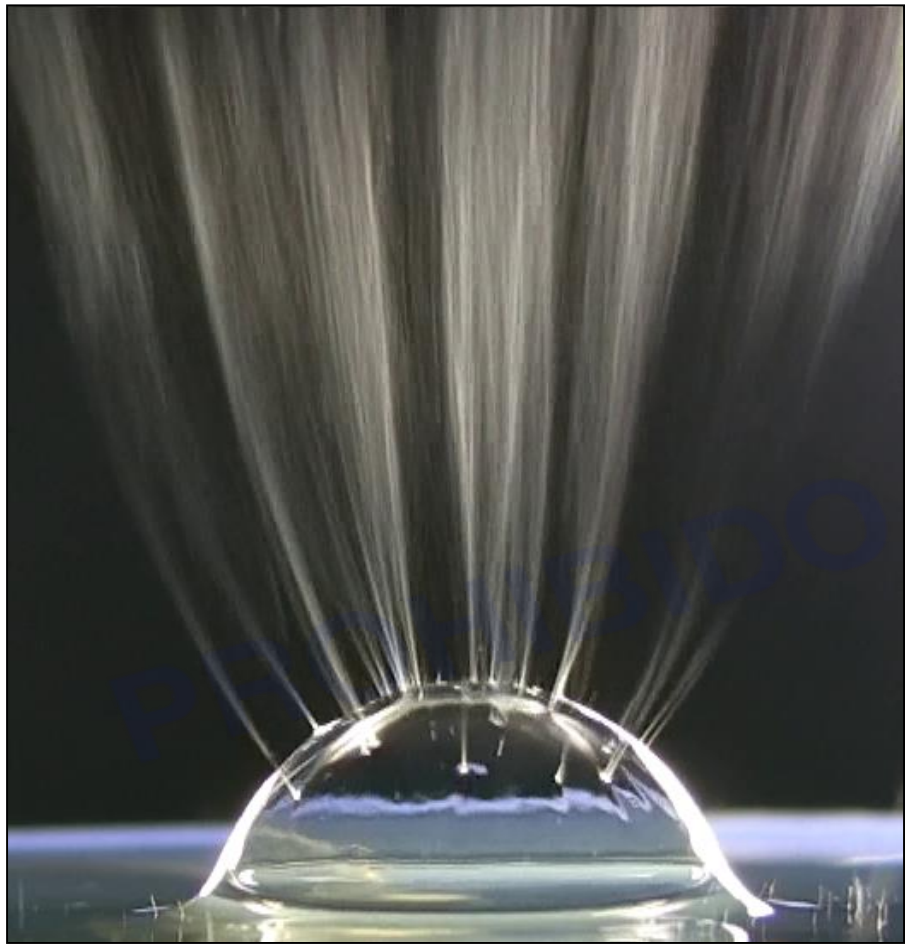


Two main types:

- **Inorganic nanofibers** (ceramic nanofibers) can be prepared from various kinds of inorganic substances (TiO2, SiO2, ZrO2, TiN, Pt, etc.
- **Organic nanofibers** prepared from a range of recipes containing polymers



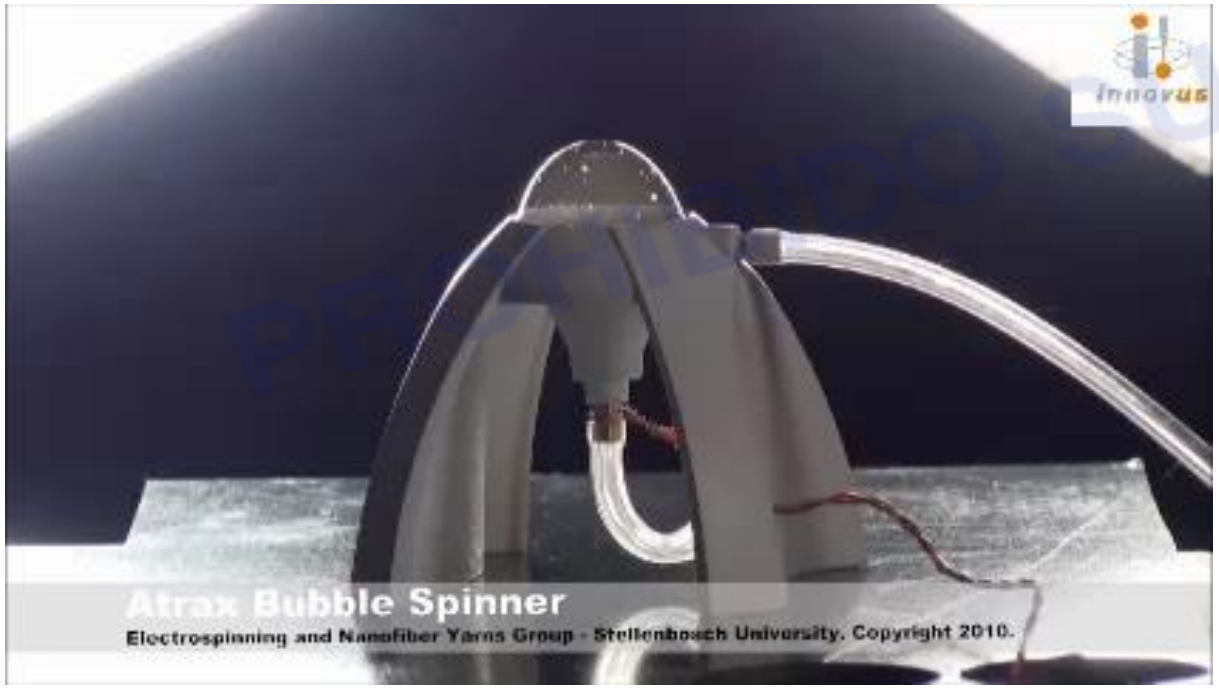
Nanofiber Technology – Stellenbosch Method



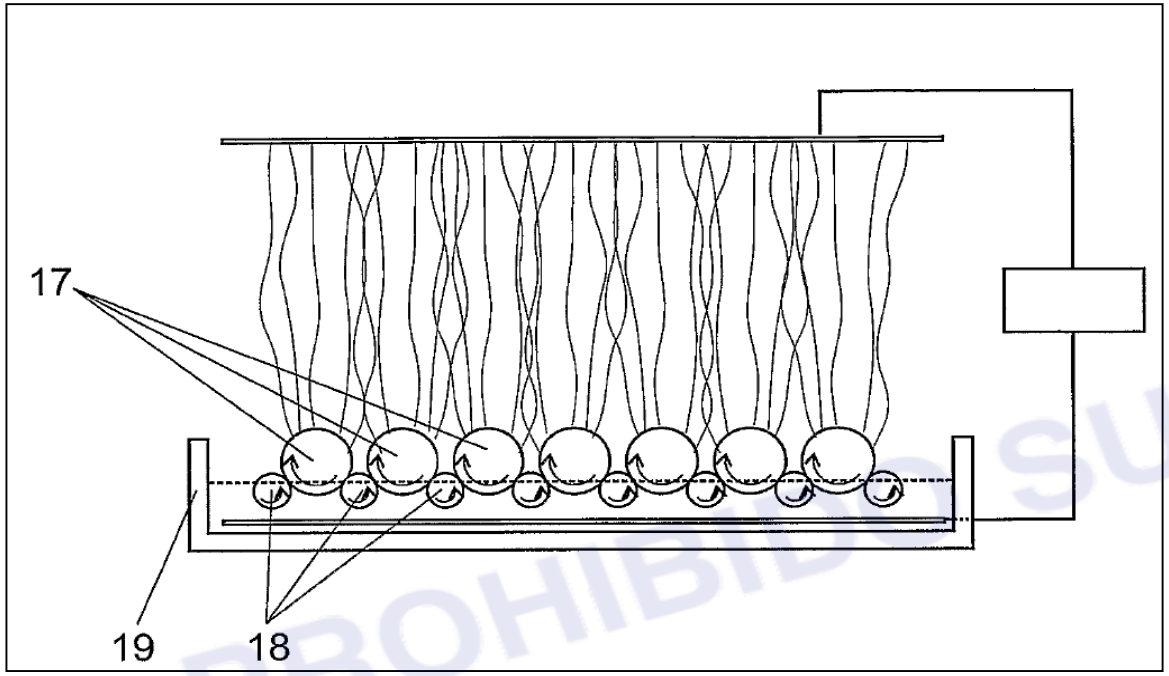
- A needle-less electrospinning process, wherein multiple jets are drawn off the surfaces of bubbles in a fiber forming solution
- The solution is treated with surfactants to stabilise the bubbles formed
- The bubble electrospinning process is highly scalable
- Increasing spinning rates only requires increasing the spin bath size and the number of bubbles

Translation – Scaling up

- Stable bubbles are usually larger and can support many jets per bubble. This means that space is used more effectively.
- Atrax Bubble Spinner™ – This small scale system is protected by a registered design, provisional patent and trademark



New Developments



High-throughput: Ball Electrospinning

- ‘Solid’ bubbles
- Reduced sputtering
- Precise control over bubble size
- Simple scaling

Market: Stellenbosch Technology Applications

Manufacturing

Healthcare

Aerospace

Transport

What happened - License/Spin-out

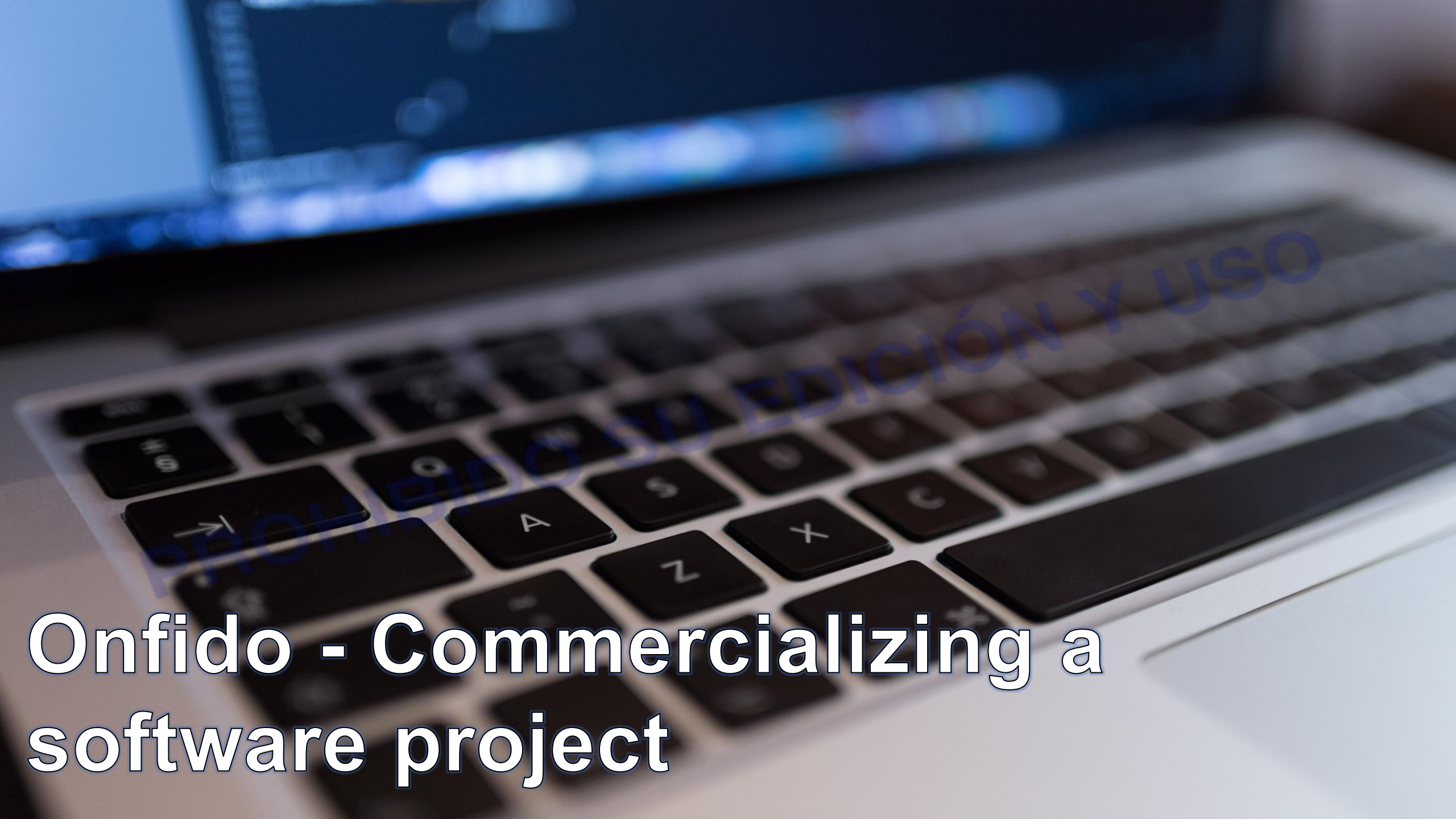
License deal for nanofiber manufacturing completed with a high value big name Japanese business

- Marketing material developed
- IE sourced the interested party
- University lead, Stellenbosch and IE presented to the company

Spin-out: Stellenbosch Nanofiber company

- Commercialisation and further development of the various nanofiber processes from the University
- Applications include:
  - biomedical materials - wound dressings, and tissue engineering scaffolds
  - energy - electrodes for next-generation batteries and fuel cells, super-capacitors
  - lightweight structural composites for automotive and aerospace applications

http://www.sncfibers.com/



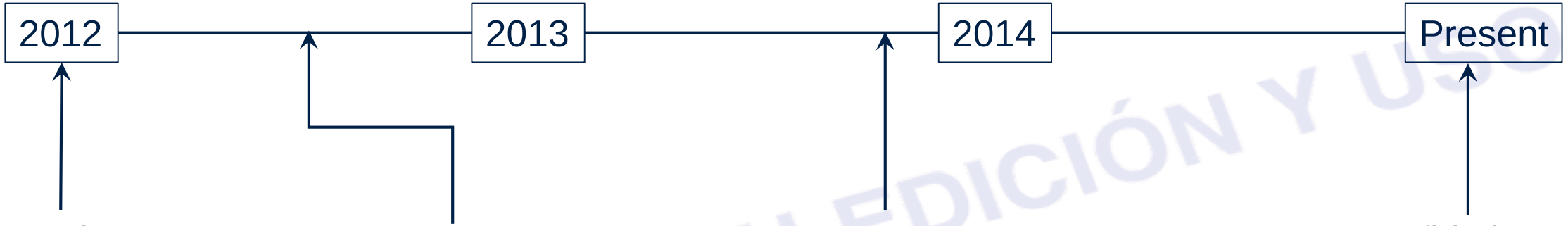
Onfido - Commercializing a software project

Case Study onfido

Onfido delivers next-generation background checks, helping businesses across the world verify anyone, anywhere.

onfido

OXENTIA



- Students at oxford identify a market problem

- Founders participate in the Isis Accelerator programme
- Project receives seed investment and secure a 1 room office in London

- Onfido begins to generate revenues while housed in their tiny London office
- Investment reaches £4.5 million

- Onfido has raised over $30 million in funding from a number of VC firms
- The company has over 1,000 clients globally

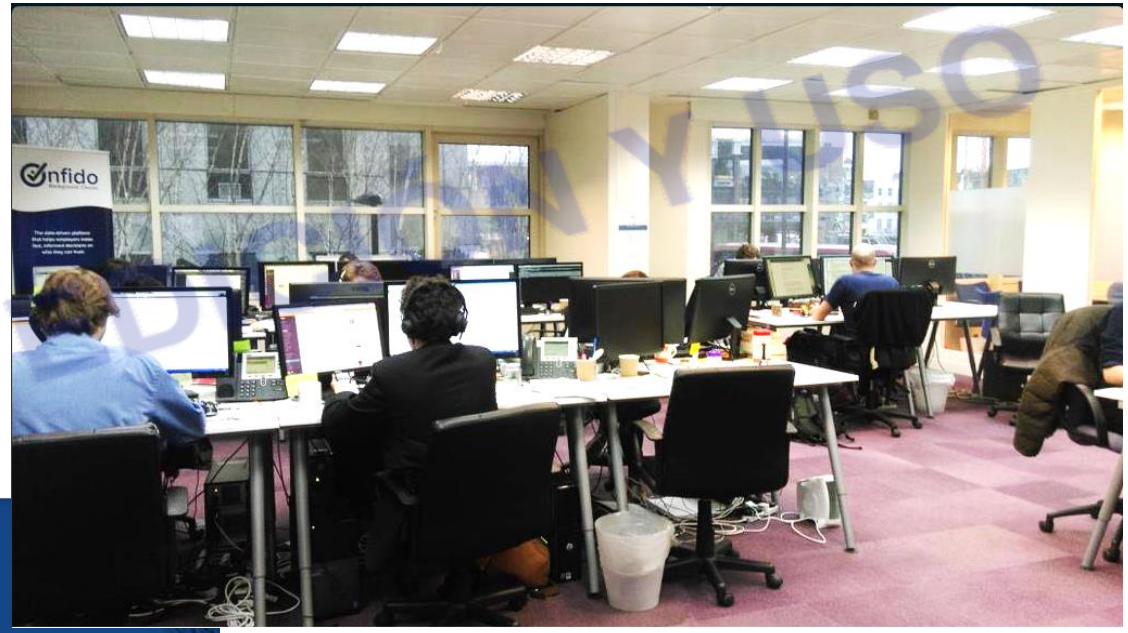
2013 - Building it

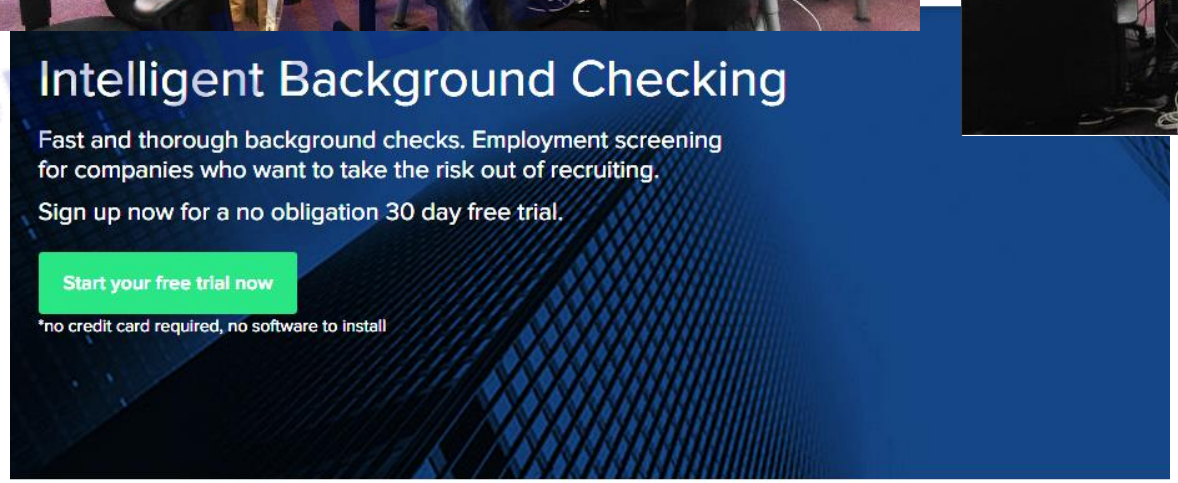
- Total revenues at the end of year 1 - £1,000

- CEO in his first post incubator office – Shoreditch basement,

no windows (but with 1 bed where he slept)

2014 - Growing the business





Clients and Partners

2015 - Growing the business

February 2015

Onfido Raises $4.5 Million To Take Its Automated Background Checks Global

Posted Feb 17, 2015 by Ryan Lawler (@ryanlawler), Contributor

0 SHARES

http://techcrunch.com/2015/02/17/onfido/

September 2015

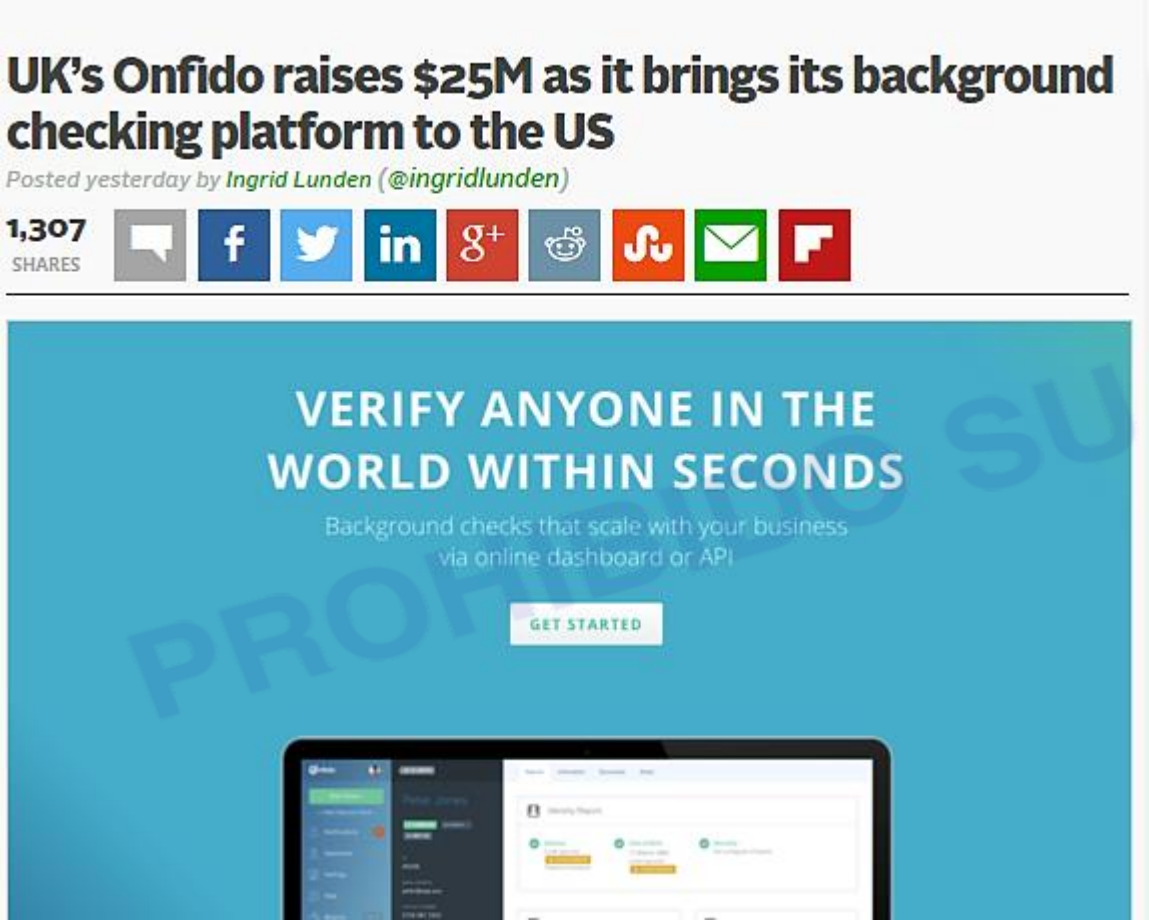
A Google exec just jumped ship to join an identity-checking startup founded by three 20-somethings

Oscar Williams-Grut
Sep. 23, 2015, 11:15 AM 2,144

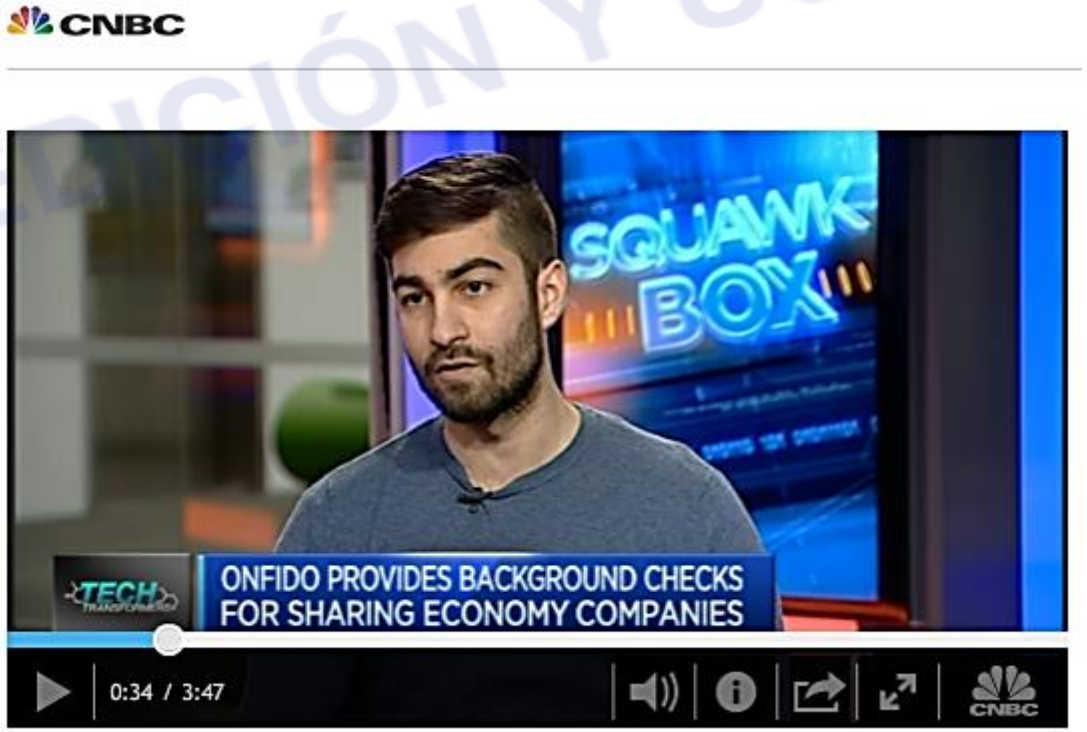
http://uk.businessinsider.com/onfido-hires-googles-ed-ungar-to-lead-expansion-2015-9

2016 - Scaling up

April 2016



http://techcrunch.com/2016/04/14/uks-onfido-raises-25m-as-it-brings-its-background-checking-platform-to-the-us/



http://www.cnbc.com/2016/04/14/onfido-a-background-check-startup-for-uberized-world-raises-25-million.html

Present Day – Where they are now?

OXENTIA

$30 million Funding from

wellingtonpartners VENTURE CAPITAL

TALIS CAPITAL

UNIVERSITY OF OXFORD

idinvest PARTNERS

More than 1,000 clients including

Bla Bla Car

deliveroo

UBER

nutmeg

JustGiving™

zipcar

OXENTIA

Oxford's Global Innovation Consultancy

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE

Thank you for listening

Michael Mbogoro, PhD

michael.mbogoro@oxentia.com

UNIVERSIDAD NACIONAL MAYOR

DE SAN MARCOS

Universidad del Perú, Decana de América

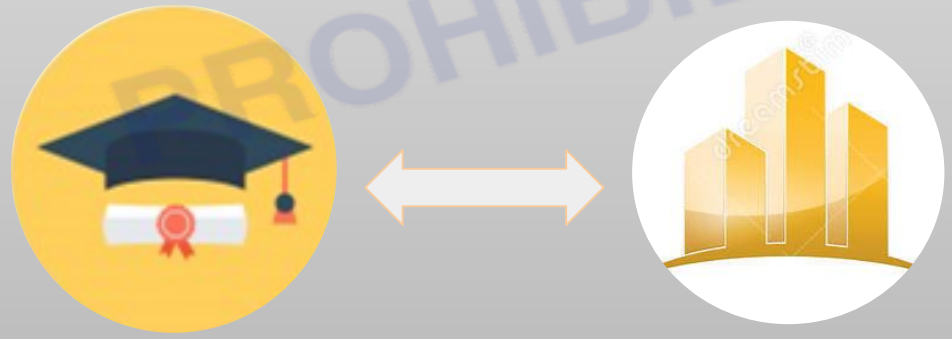
TECNOLÓGICA

Gestión de la Investigación en la UNMSM

Vicerrectorado de Investigación y Posgrado

VICERRECTORADO DE INVESTIGACIÓN Y POSGRADO

Dirección General de Investigación y Transferencia Tecnológica



Promueve y gestiona:

La vinculación entre la Universidad y la sociedad Peruana

La transferencia tecnológica hacia el sector productivo y público a través de:

- **+ licenciamiento de patentes.**
- **+ contratos de investigación,**
- **+ asesorías,**
- **+ prestaciones de servicios.**

Estatuto UNMSM, art. 65, literal f. Reglamento General UNMSM, Numeral 07.5.

Nueva política de investigación en la UNMSM

Innova San Marcos

- **Fondos** → VICERRECTORADO DE INVESTIGACIÓN Y POSGRADO
- **Requisito obligatorio** → **Carta de vinculación con empresa**
- **Objetivos**
  - Incrementar la transferencia tecnológica UNMSM-EMPRESA.
  - Generar patentes con potencial de licenciamiento.

6 proyectos presentados, 2017

Titularidad de creaciones en la UNMSM

TITULARIDAD
UNMSM

+ Invenciones
+ Obras (científicas, literarias, artísticas, software y otras),
+ Nuevas variedades vegetales

→creadas por los docentes e investigadores, como resultado de:

vínculo laboral, contractual

Convenios específicos

(Art. 9, 14, 25 del Reglamento de PI. Concordancia arts. 36, 37 y 38 del Decreto Legislativo 1075).
Si la UNMSM no desea ser titular, los creadores puede solicitarlo.

La UNMSM y Propiedad Intelectual

Aplicable a toda creación intelectual desarrollada por personas naturales o jurídicas, vinculadas a la UNMSM, sea por una relación contractual o mediante algún acuerdo o convenio interinstitucional.

La UNMSM es pionera en el Perú en materia de reglamentación (RR 05343-R-08).

Tipos de Propiedad Intelectual

Derechos de autor ©:

- Fotografías
- **Software (01)**
- Páginas web
- **Obras literarias**
- Bases de datos

Secretos comerciales:

- Invenciones secretas
- Métodos
- Herramientas

Patentes:

- **Invención (8)**
- **Modelo de utilidad (5)**
- Diseños

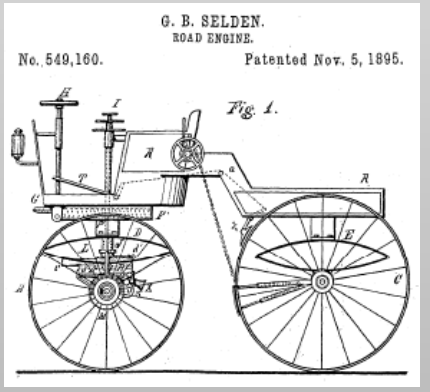
Google

Derechos de obtentor

- Nuevas variedades de plantas

Marcas registradas

- **Marcas (01)**
- Nombres comerciales
- Imágenes comerciales

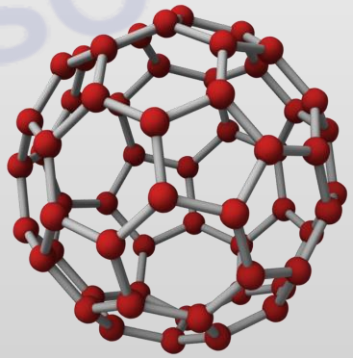


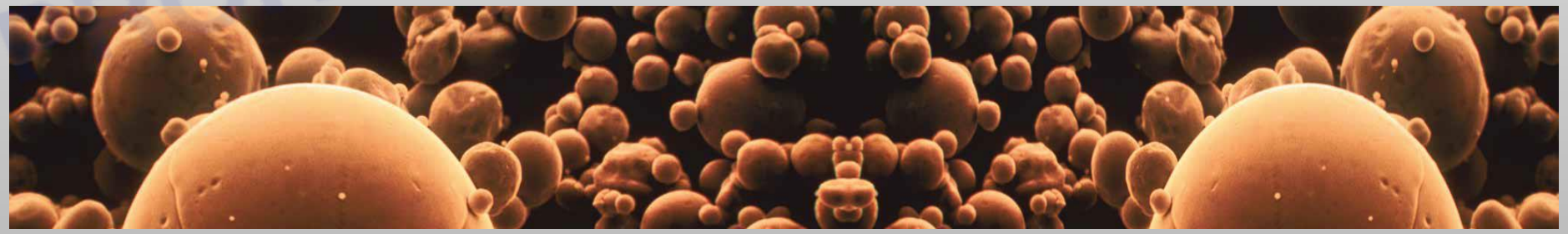
Cartera de patentes

ATMÓSFERA Y TECNOLOGÍA AÉREA	1. **Modelo de utilidad:** Dispositivo inhibidor y separador para fuselaje de **cohete de propulsor sólido, 5 años**. 2. **Modelo de utilidad:** Avión de superficies deslizantes con **dispositivo sustentador dispuesto** en las alas o en el fuselaje, **5 años**.
ENERGÍAS LIMPIAS Y MEDIOAMBIENTE	1. **Modelo de utilidad:** **Mototaxi** accionado por un motor eléctrico que utiliza energía solar, **7 años**. 2. **Modelo de utilidad:** **Bicicleta con mecanismo** de transmisión mejorado, **6 años**.
INGENIERÍA Y SOLUCIONES PRÁCTICAS	1. **Invención:** Procedimiento para obtener **agregado de construcción** a partir de relaves polimetálicos y ladrillos o baldosas obtenidas de dicho agregado, **8años**.

Cartera de patentes

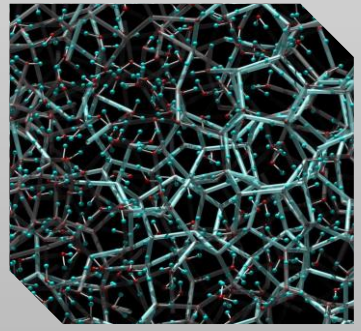
NANOTECNOLOGÍA	1. **Invención:** Obtención de **nanopartículas de cobre (0)** mediante la síntesis asistida vía ultrasonido y microondas, **6 años**. 2. **Invención:** Método de estabilización de **nanopartículas de cobre (0)** mediante síntesis solvotermal, **6 años**. 3. **Invención:** **Síntesis rápida de nanocobre (0)** vía microondas-ultrasonido estabilizado con oligomeros tipo tereftalato de bis-2-hidroxietilo (bhet), **5 años**. 4. **Invención:** Desarrollo de **espumas poliuretanicas bactericidas** con nanoplata obtenido por reducción química in-situu vía ultrasonido, **4 años**.





Cartera de patentes

BIOLOGÍA APLICADA	1. **Invención**: Procedimiento para la **escarificación de semillas de tara** (caesalpinia spinosa), **6 años**. 2. **Invención**: **Método de congelamiento de espermatozoides de zánganos** con aplicación en la industria apícola, **6 años**.
TECNOLOGÍA DE MATERIALES	1. **Invención**: Método y **dispositivo para limpieza de materiales** de alumina sin contaminantes, **6 años**. 2. **Modelo de utilidad: Dispositivo para medir la resistividad** de materiales superconductores, **5 años**.



Valuación de tecnologías (Patentes)

1. Método basado en los ingresos
2. **Método basado en el mercado**
3. **Método basado en el costo**

- A veces utilizan diferentes nombres o aparecen métodos nuevos, sin embargo todos tienen su origen en estos tres enfoques fundamentales.

- Lo que los diferencia es la fuente de información que utiliza cada uno para generar su resultado.

Licenciamiento de patentes

- Maximizar ingresos?
- Maximizar el impacto social?
- Alinear los intereses del licenciatario y el licenciante?
- ✓ **Maximizar el desarrollo del mercado con una distribución justa de los ingresos**

Consideraciones para la universidad pública:

- Ser **coherente con los ideales de servicio público** de la universidad.
- Proporcionar apoyo a la investigación y educación en la universidad.

Transferencia de tecnología en la UNMSM

Contratos

- Licenciamiento (patentes):
  - Hasta el momento no se ha licenciado ninguna.
- Asociación
  - Contratos de asociación.
- Cesión de tecnologías
  - Tecnologías desarrolladas en la UNMSM.

En universidades públicas existe prácticas de transferencia de tecnología no formales que no se registran.

Negociación

Tipos de negociación:

1. **Regateo sobre el precio**

- ✓ No vislumbra una relación a largo plazo
- ✓ Elementos culturales: trueque y comercio, etc.

2. **Ganar-ganar (win-win):**

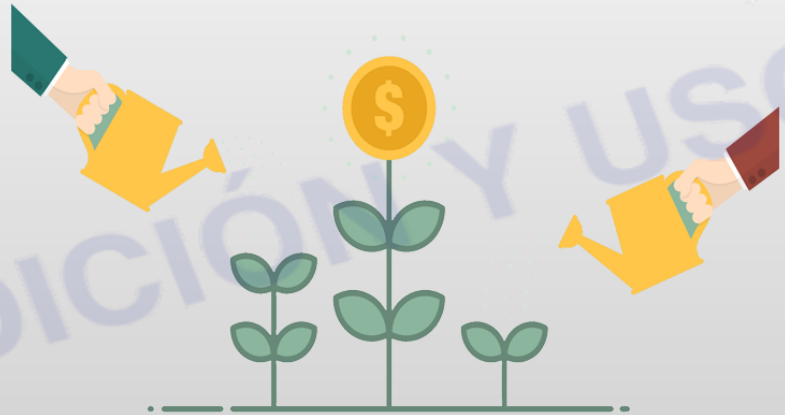
- ✓ Ventaja para ambas partes
- ✓ Conduce a una relación a largo plazo
- ✓ Necesidad de preservar la buena voluntad, etc.

Reglas de distribución de regalías en la UNMSM

Inventos (Patentes) y variedades vegetales:

50%
UNMSM
(20% Administración central, 50% al instituto de investigación, 30% VRIP)

50%
investigadores/ docentes.



Explotación de derechos de autor: Obras

- 10 % ventas netas, autor(s)
- 10% ejemplares editados hasta 100 u para el autor(s).

- En convenios o acuerdos con entidades o personas físicas ajenas, el porcentaje se define por **contrato de co-titularidad**.

EXPERIENCIAS DE CONTRATOS DE TRANSFERENCIA TECNOLÓGICA

Contratos de desarrollo tecnológico

Proyecto: Desarrollo del sistema mecánico-óptico para mejorar el proceso de selección de castañas peladas para la exportación mediante la detección de aflatoxinas en la línea de producción a escala piloto.
Empresa: “LA NUEZ S.R.L.”
Rubro: Industria Alimentaria
Tiempo de vigencia: 24 meses

LA NUEZ S.R.L.
EMPRESA AGROINDUSTRIAL
Madre de Dios

Consideración: Beneficios de la propiedad inteletual compartida en 50% para LA NUEZ SRL y 50 % a la UNMSM.

Contratos de desarrollo tecnológico

Proyecto: Protector solar natural bajo la forma de crema y loción enriquecidos con extracto de Camu Camu, con factor de protección solar medible mediante prueba *in vitro*, con calidad e inocuidad que cumplan los estándares internacionales.

Empresa: AYRU COSMETIC SAC

Rubro: Industria cosmética.

Tiempo: 12 meses

Consideración: Beneficios de la propiedad intelectual compartida, AYRU COSMETIC SAC (75 %) y UNMSM (25%).

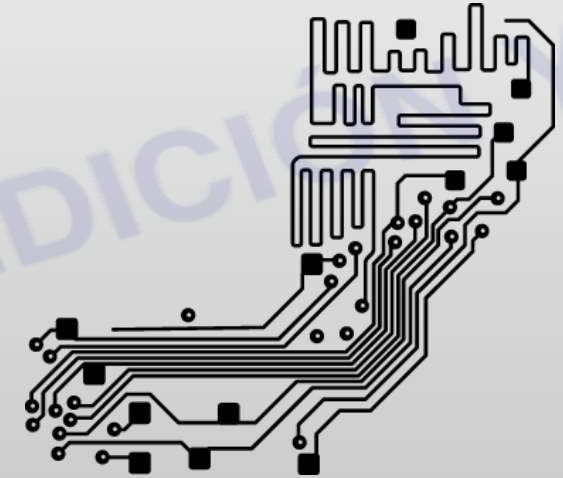
Contratos de desarrollo tecnológico

Proyecto: Desarrollo de prendas en tejido de punto con hilado de alpaca con propiedades mejoradas mediante proceso de acabado, aplicando tecnologías no contaminantes con radiación UV y lavado enzimático posterior.
Empresa: Empresa Artesanal Samar de Lao S.R.L.
Rubro: Textil
Tiempo: 20 meses.

Consideración: Propiedad intelectual del nuevo proceso de tratamiento UV de la UNMSM y transfiere los derechos por 10 años a Samar.

Contratos de desarrollo tecnológico

Proyecto: Diseño y construcción de un mototaxi eléctrico.
Empresa: PERÚCETU S.A.
Rubro: Mecánica y Electrónica
Regalias: 30% de ventas para UNMSM
Año: 2016



La oficina técnica realiza las propuestas y gestiones, sin embargo, muchas veces el expediente no prospera debido a que la oficina de asesoría legal desconoce los procedimientos.

Otros casos de contratos de desarrollo de tecnología

EMPRESA	TITULO
2RR SAC.	Obtención de **compósitos constituidos por plásticos reciclados (polietileno, propileno, PET) y fibras agro-vegetales** mediante el uso de un prototipo de extrusora doble husillo para incorporarlo en la producción de escoba de plástico.
Asociación de Apicultores Agroecológicos Abejas de Pichanaki	Validación in situ de una **tecnología de crío preservación de espermatozoides para inseminación artificial de abejas** reina proveniente de zánganos selectos para el mejoramiento genético del plantel apícola de la Asociación de Apicultores de Pichanaki.

Casos de contratos de transferencia de tecnología no concretados

EMPRESA	PRODUCTO REQUERIDO	OBSERVACION
Calzado Chosica S.A.C	Implantación tecnológica de fluidos térmicos para el mejoramiento del **sistema de intercambio de calor de la línea engomada de telas para calzado** a nivel piloto para ser aplicado en el distrito de Lurigancho-Chosica.	Empresas **no aceptaron condiciones de derechos de propiedad intelectual** con la universidad.
HAC SA	Fabricación de un **adhesivo sintético** en base acuosa y cero solventes orgánicos.	
Masfilter	Diseño de prototipo de **máquina vulcanizadora de calzado y bota de jebe automático** hidráulico para la industria de calzado peruano.	

Gracias!!!

Dirección de Promoción
Dirección General de Investigación y Transferencia Tecnológica
Vicerrectorado de Investigación y Posgrado

VINCULACIÓN
EMPRESA - UNIVERSIDAD

Experiencias en Transferencia de Tecnología

UNIVERSIDAD PERUANA
CAYETANO HEREDIA
VICERRECTORADO DE INVESTIGACIÓN

Fundada, el 22 de setiembre de 1961 como:
Universidad de Ciencias Médicas y Biológicas.

Desde su fundación la UPCH ha apostado por la formación superior y la investigación científica de calidad, convirtiéndose en líder en estos campos.

"*Spiritus Ubi Vult Spirat*" - "**El Espíritu donde quiere se infunde".**

UNIVERSIDAD PERUANA
CAYETANO HEREDIA

Universidad temática

1. **Medicina, 41%**
2. **Estomatología, 13%**
3. **Enfermería, 10%**
4. **Psicología, 6%**
5. **Ciencias y filosofía, 14%**
6. **Salud pública y administración,**
7. **Educación, 6%**
8. **Veterinaria y Zootecnia, 10%**

4,095 estudiantes pre-grado aprox.

Investigación

BIOLOGÍA MOLECULAR, BIOTECNOLOGÍA Y BIOINFORMÁTICA

CAMBIO CLIMÁTICO, ECOLOGÍA Y AMBIENTE

LÍNEAS DE INVESTIGACIÓN

PRODUCTOS NATURALES Y NUTRICIÓN

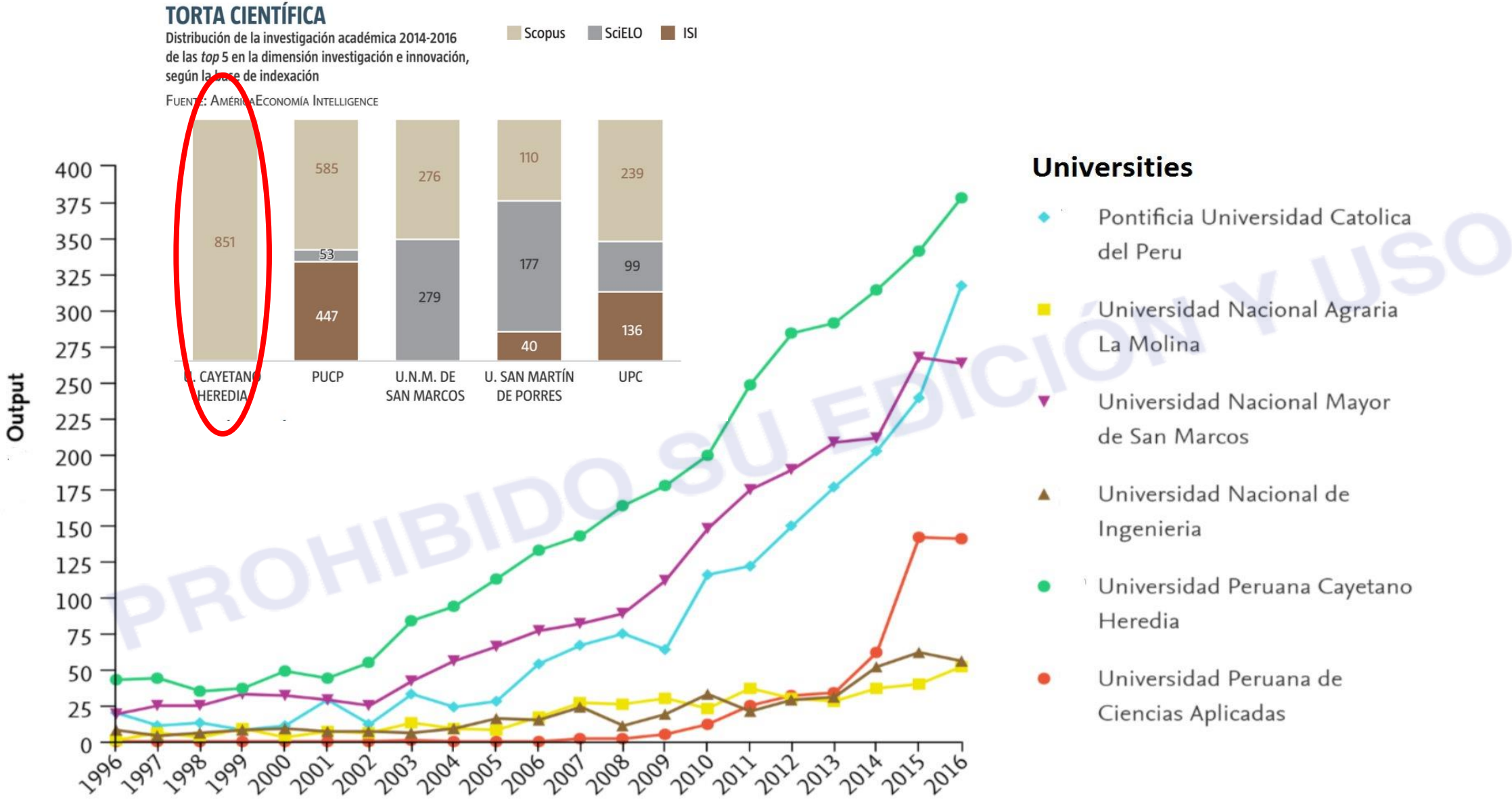
EDUCACIÓN Y CIENCIAS SOCIALES

SALUD INTEGRAL

Institutos de investigación: 3

Centros de investigación: 4

Unidades y laboratorios de investigación: ˜80



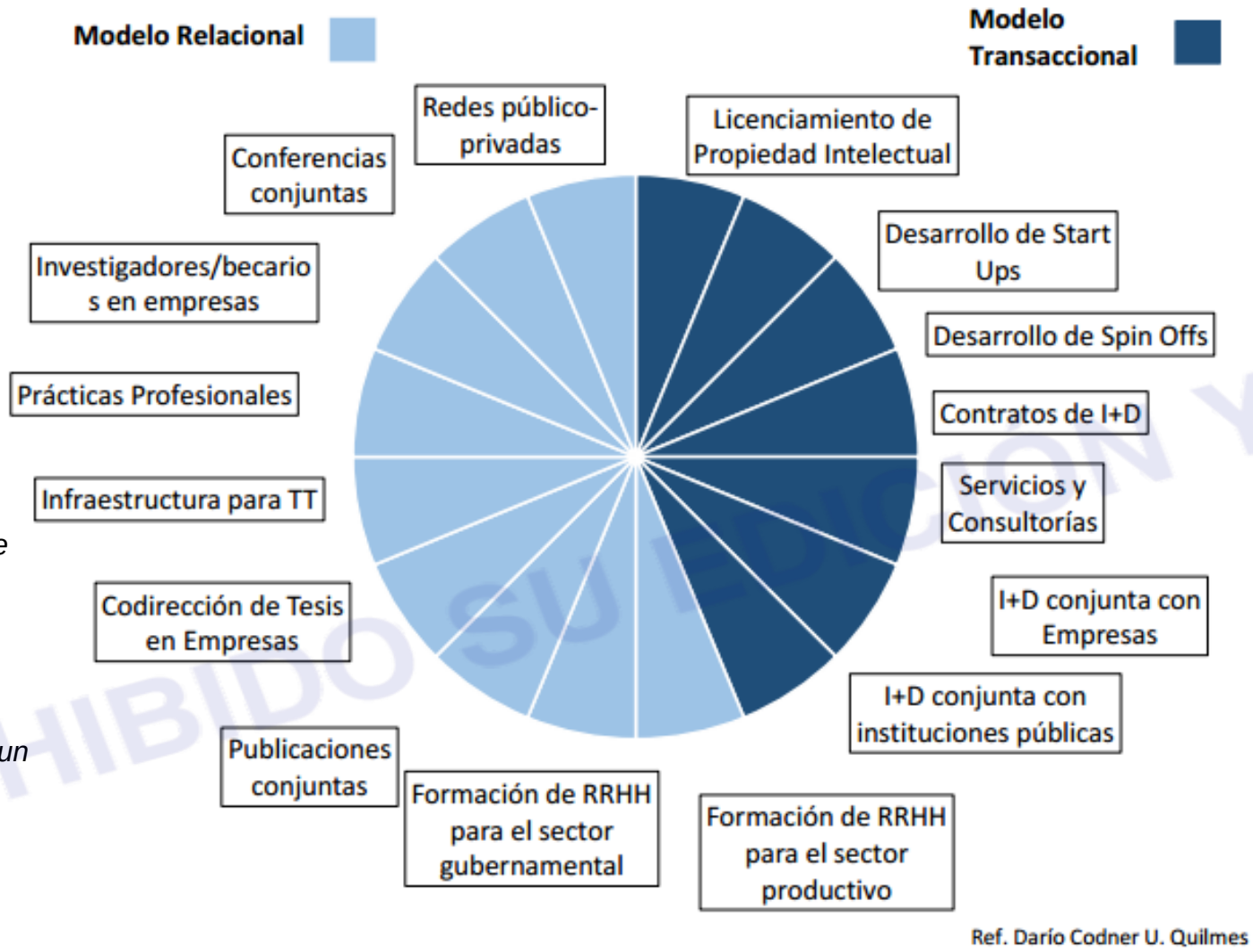
Evolution of the six first Peruvian universities by scientific output. @Scopus @Scimago (1996-2016) pic.twitter.com/rTB6NY94lb

UNIVERSIDAD PERUANA
CAYETANO HEREDIA
VICERRECTORADO DE INVESTIGACIÓN

1ra Misión	• EDUCACIÓN
2da Misión	• INVESTIGACIÓN
3ra Misión	• **TRANSFERENCIA DEL CONOCIMIENTO Y TECNOLOGÍAS**

Promover la generación y **transferencia de conocimiento científico – tecnológico** alineando los resultados de investigación con las necesidades del país.

En el modelo relacional, lo que prima es la actividad que vincula a las personas de las diversas instituciones de un sistema de innovación



En la transaccional se realizan intercambios de conocimiento y hay una retribución por el intercambio.

Figura 19: Darío Codner: Clasificación de actividades de las OTT

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- Servicios académicos Pre-posgrado
- Atención clínica - académica
  - Odontología
  - Veterinaria
- Atracción e inserción de talento humano
- Educación continua
- Proyección social
- Desarrollo de I+D+i

PRODUCTOS Y SERVICIOS DERIVADOS

- Servicios y consultorías Tecnológicas/ Especializadas
- Servicios de laboratorio (ensayos)
- Infraestructura para TC e innovación
  CICEA
- Desarrollo de Start ups o Spin off
- Licenciamientos
  PI
- Fortalecimiento de Capacidades Sector público y privado.

La vinculación con la empresa es un proceso basado en la confianza y experiencias de éxito.

Grupo Alimenta

ilender

La Ibérica

Inversión conjunta.

TASA

pluspetrol

Desarrollo de actividades de I+D+i conjunta.

Transferencia de tecnología

INTEROC
UNA EMPRESA DE LA CORPORACIÓN CUSTER

Servicios tecnológicos o consultorías especializadas.

Servicios académicos o de laboratorio.

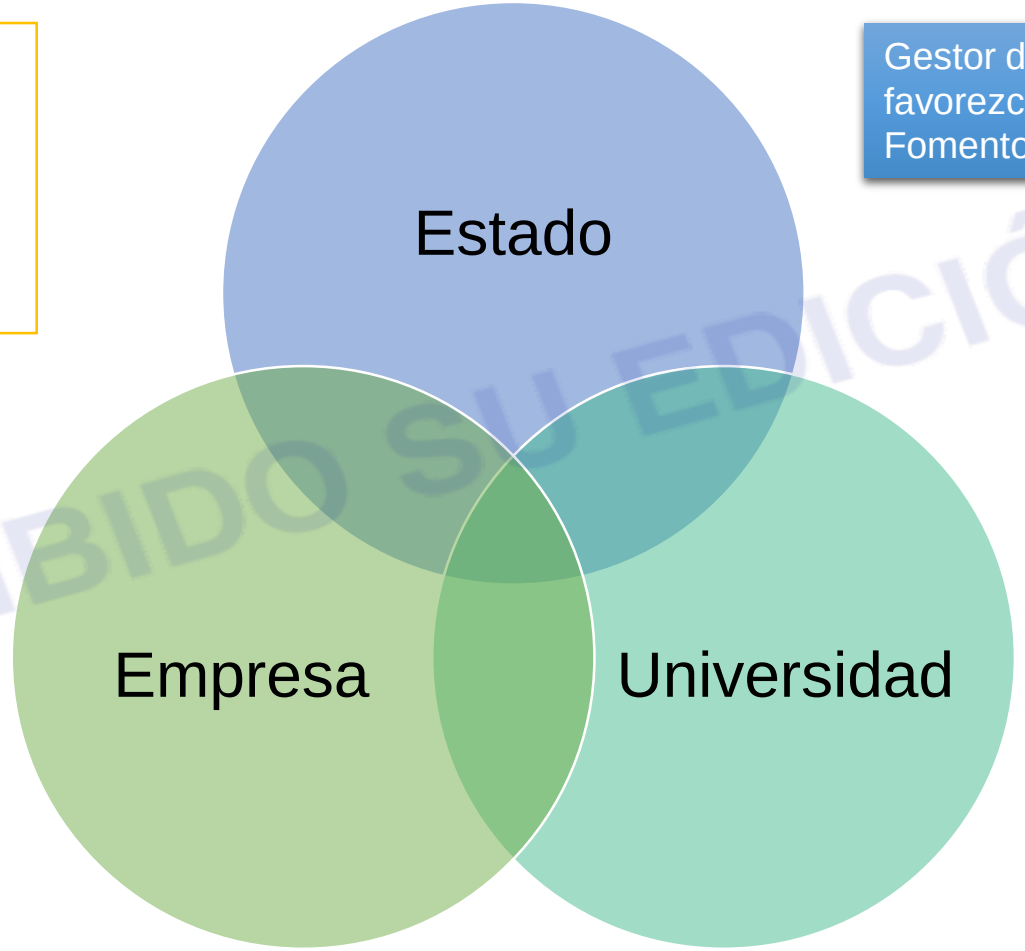
Transferencia de know how

sanfernando
La buena familia

UNIVERSIDAD PERUANA
CAYETANO HEREDIA

Modelo de la Triple Hélice de la Innovación

Vinculación de actores para el fomento de innovación en pro del crecimiento económico del país.



Gestor de políticas públicas que favorezcan la I+D+i.
Fomento de aportes financieros.

Demandante de conocimiento y tecnologías.
Mejora de productos y servicios

Desarrollador de I+D+i .
Énfasis en su tercera misión

UNIVERSIDAD PERUANA
CAYETANO HEREDIA

Algunas experiencias de vinculación Empresa - Universidad

LUNES 26 DE DICIEMBRE DEL 2016 | 16:43

EE.UU. piensa elaborar suplementos en base al yacón y la maca

Firma estadounidense obtuvo licencia de una solución patentada por la U. Cayetano Heredia para la diabetes e infertilidad

Twittear Compartir 0 Pin it 0

Investigación y desarrollo tecnológico …

Cartera de patentes

http://elcomercio.pe/economia/negocios/eeuu-piensa-elaborar-suplementos-base-al-yacon-y-maca-noticia-1955652

Nuevas oportunidades de negocio se abren:

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Licencia de Patente

PRODUCT
O FINAL

Asesoría en la producción de la materia prima.

Empresa Peruana Productora de Maca y Yacón

CIC

CENTRO DE INNOVACIÓN
DEL CACAO

ECOM

La Ibérica

Café & Cacao

UNIVERSIDAD PERUANA
CAYETANO HEREDIA

Universidad Nacional Agraria
LA MOLINA

THE PENNSYLVANIA STATE UNIVERSITY
1855

Grupo Alimenta

ilender

IRD
Institut de recherche
pour le développement

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PONTIFICIA
UNIVERSIDAD
CATÓLICA
DEL PERÚ

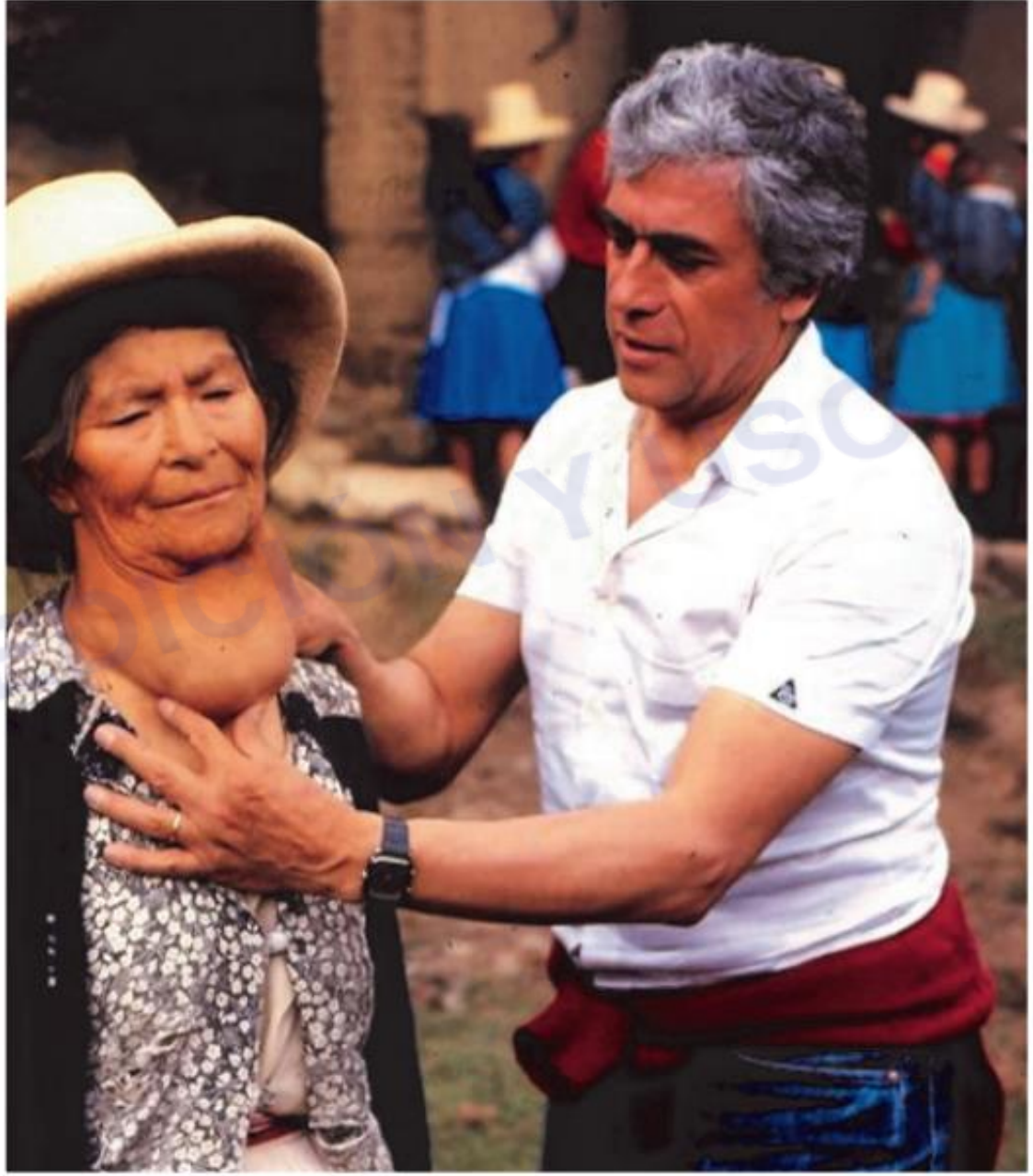
Bioactiva

Ayudar a convertir al Perú en una superpotencia en
Bioactivos Naturales
para la producción Agropecuaria

El Centro de Innovación Productiva y Transferencia Tecnológica Acuícola Privado de la Universidad Peruana Cayetano Heredia (CITEacuícola UPCH) es una empresa de base tecnológica orientada a los sectores acuícola y pesquero, que opera en el marco del Centro de Investigación para el Desarrollo Integral y Sostenible (CIDIS) de nuestra universidad. La constitución del CITEacuícola UPCH fue aprobada por el Instituto Tecnológico de la Producción (ITP), del Ministerio de la Producción. El CITEacuícola UPCH tiene como finalidad contribuir a la mejora de la productividad y competitividad de las empresas, asociaciones y organizaciones del sector acuícola y pesquero, a través de la prestación de servicios de capacitación, información, investigación, innovación y desarrollo.

Transferencias de resultados de investigación en favor de la sociedad.

Investigaciones que generan impacto en la sociedad y economía del país.



INVESTIGADOR PERUANO DE CAYETANO LOGRA ELIMINAR EL DÉFICIT DE YODO EN LAS AMÉRICAS

Dr. Eduardo A. Pretell

Google premia a investigador peruano Mirko Zimic

Emprendimiento ganador del Grand Challenge Cana

Beneficios Tributarios
para empresas innovadoras

9 disciplinas autorizadas:

UNIVERSIDAD PERUANA
CAYETANO HEREDIA

- Ciencias Veterinarias
    - Pediatría
    - Gerontología
    - Salud Pública y ambiental.
    - Biotecnología ambiental
    - Odontología, Cirugía Oral y Medina Oral
    - Ciencias del medio ambiente
    - Química orgánica
    - Biotecnología en salud

UNIVERSIDAD PERUANA
CAYETANO HEREDIA

Aliado empresarial para el desarrollo tecnológico e innovación.

Oficina de Transferencia Tecnológica y Propiedad Intelectu
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UNIVERSIDAD PERUANA
CAYETANO HEREDIA

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