The Abdus Salam
International Centre for Theoretical Physics

United Nations
Educational, Scientific and
Cultural Organization

IAEA
International Atomic Energy Agency

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Workshop on Entrepreneurship for Physicists and Engineers from Developing Countries

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Open Innovation and Entrepreneurship for Sustainability

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Open Innovation and Entrepreneurship for Sustainability

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Joint ICTP-TWAS Workshop on Entrepreneurship for Physicists and Engineers from Developing Countries
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What is open innovation?

A term promoted by **Henry Chesbrough** in his book **Open Innovation…**

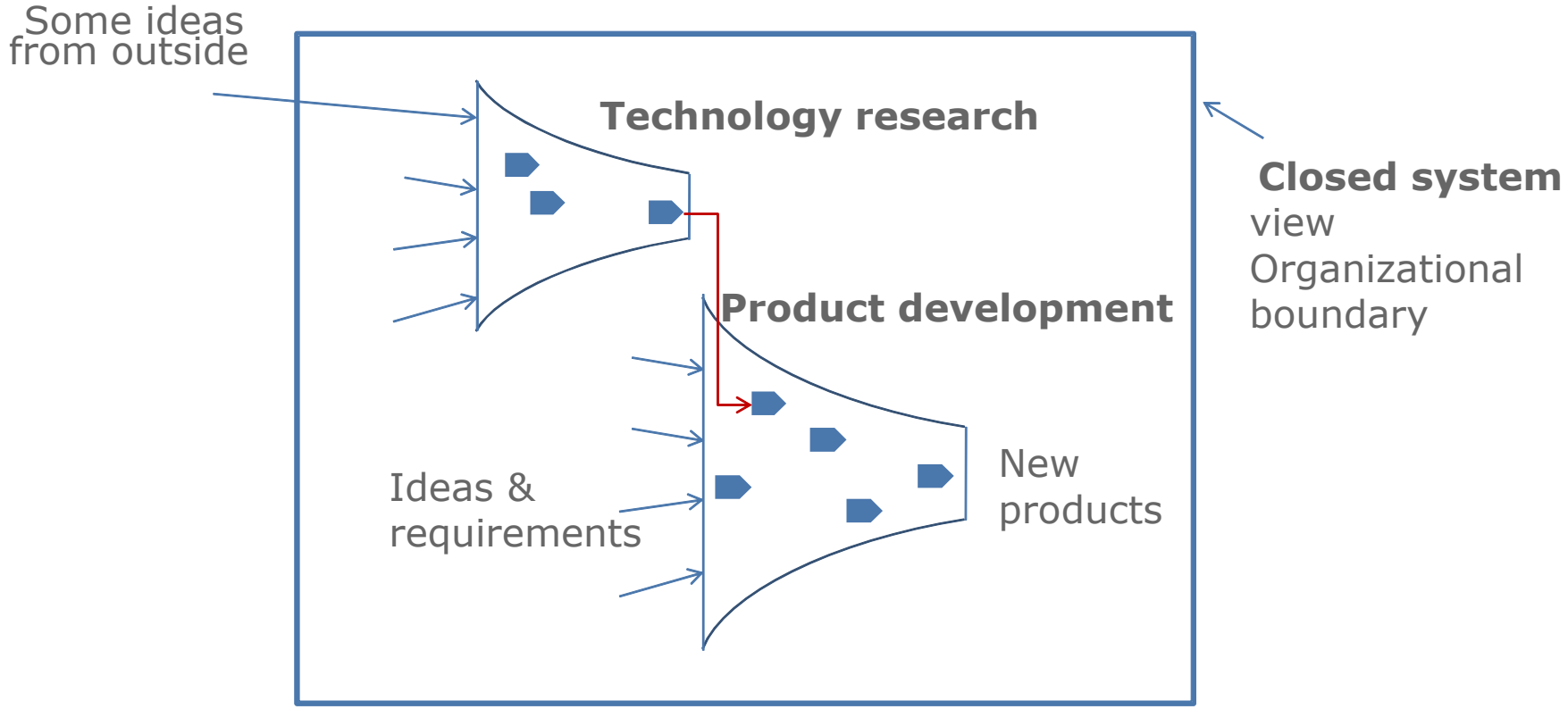
"Open innovation is a paradigm that assumes that firms can and should use **external ideas as well as internal ideas**, and internal and external paths to market, as the firms look to advance their technology."

"The use **of purposive inflows and outflows of knowledge** to accelerate internal innovation, and expand the markets for external use of innovation, respectively."

…The new imperative for creating and profiting from technology.

Traditional or 'closed' technology & product development

Organizations seek to enhance technology & product delivery…



…mainly optimizing internal flows of knowledge & information.

Drawbacks & drivers for change

Drawbacks

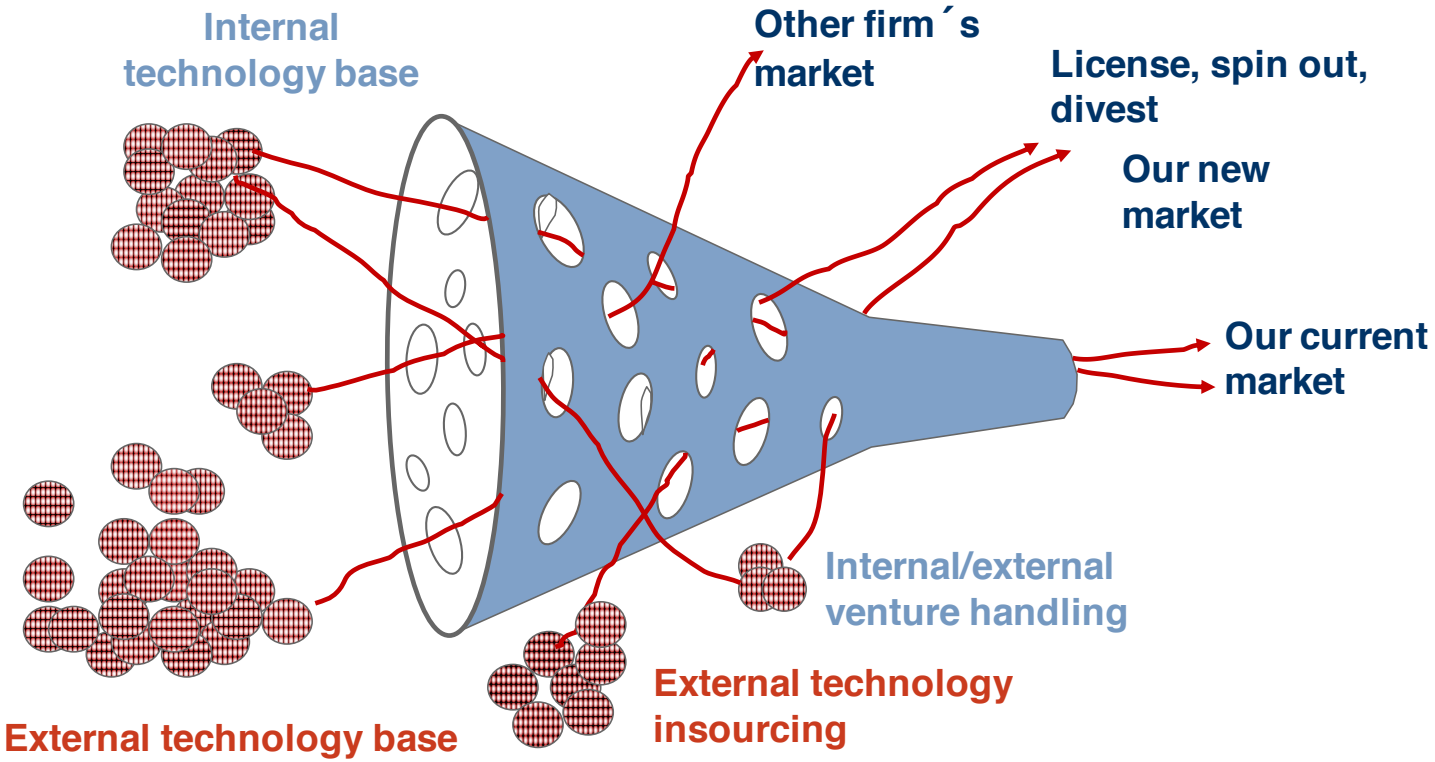
- Manager centric
- Insular, not responsive to the external environment
- Focus too much on efficiency to detriment of innovation & creativity
- May discourage an 'entrepreneurial or creative spirit'

Drivers for change

- Increasing competitiveness
- Increasing development costs
- Increased mobility of skilled workers – leaving corporate R&D
- Expansion of venture capital
- External options for unused technologies

Open innovation

Where the firm's boundaries are 'porous'…

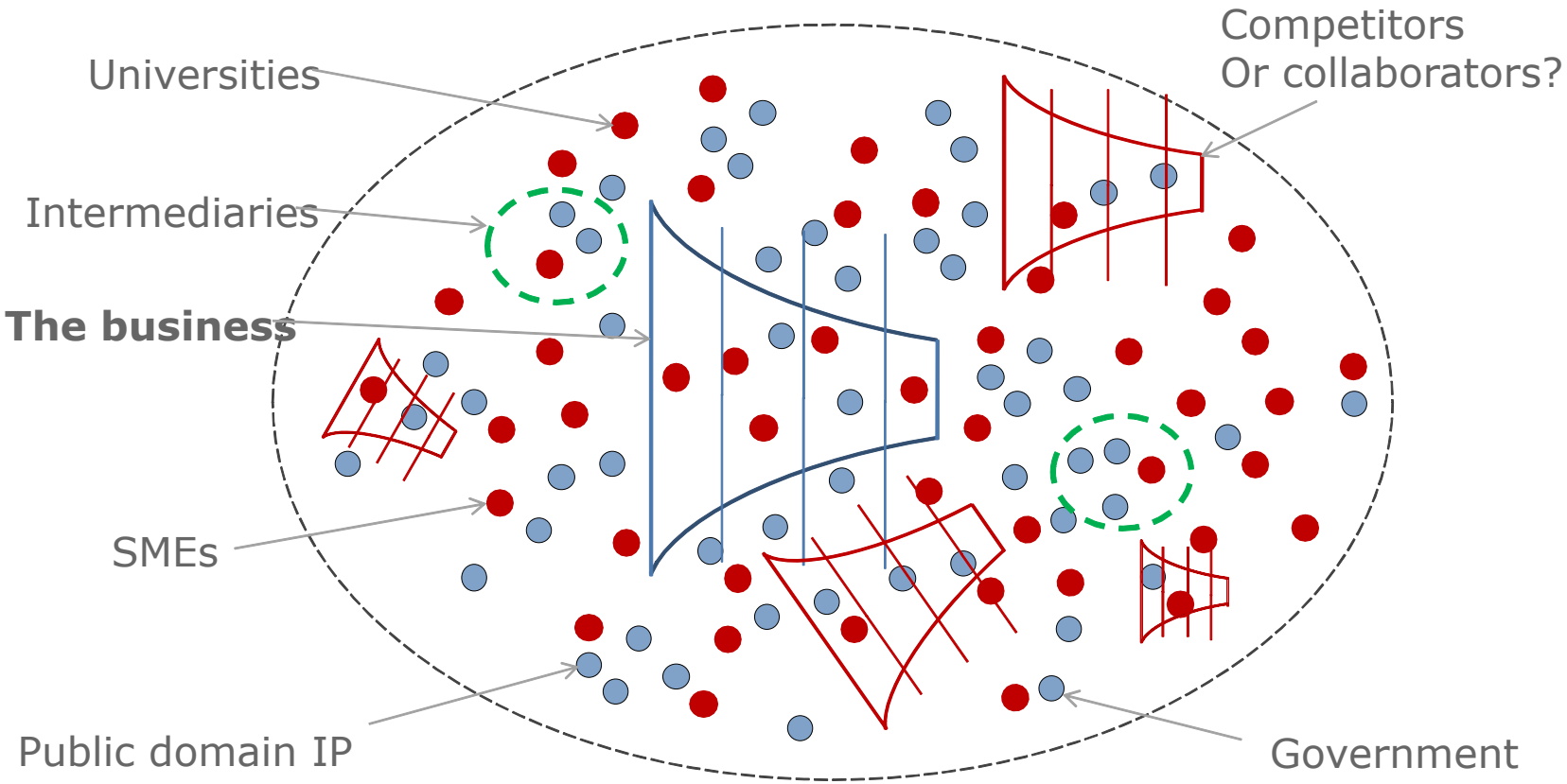


Prof Henry Chesbrough UC Berkeley, Open Innovation: Renewing Growth from Industrial R&D.

…allowing flow of ideas and IP in and out.

Open innovation

Open innovation considers the business as part of a…



…'universe' of potential technology and IP opportunities.

Industry-academia relationship *(The conventional model)*

Academia

- Teach
- Predominantly fundamental research
- Publish papers

Industry

- Focussed applied research
- Secretive
- Value creation
- Business sense
- NIH syndrome

However, this is changing across the globe.....

Opportune time for a stronger relationship

Returning the benefits back to the society and improving the way we live

Academia

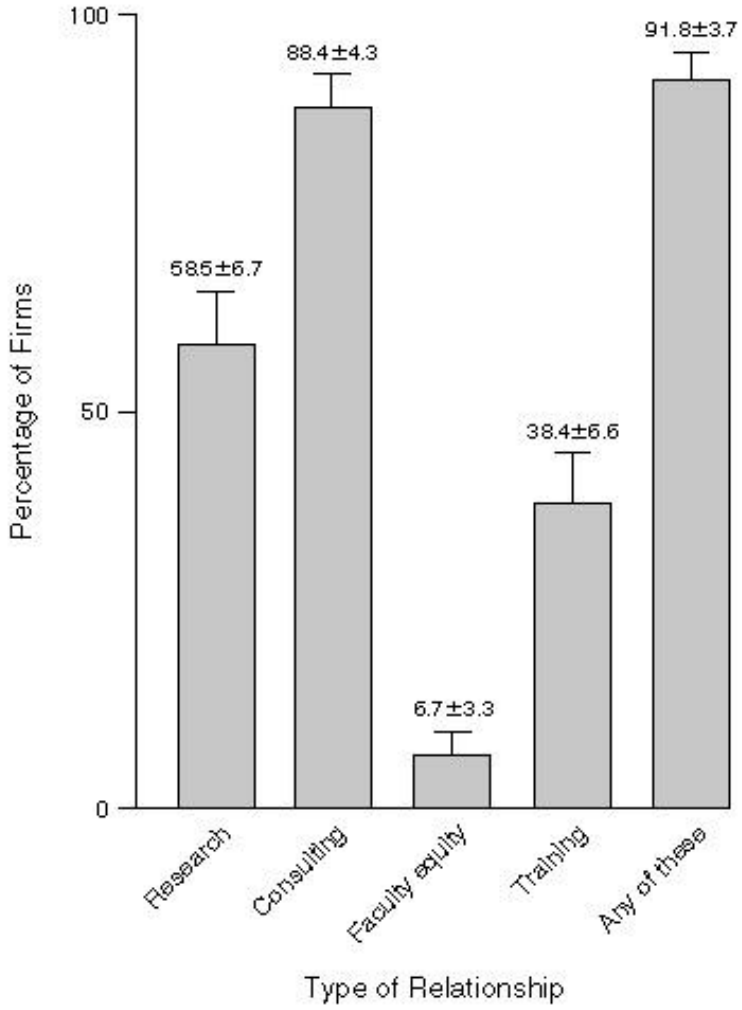
- Pursuing both applied and basic research
- Improved understanding of advantages of translation of research (TTOs)

Industry

- R and D closures
- Maintaining diversified research labs in-house unsustainable
- New products in the market (improved performance and efficacy at lower cost)

A targeted impetus could be provided to accelerate the participation on both sides.

Example and types of collaboration



Over 90 percent of life-science companies in the United States had some relationship with academia:

- Consultants
- Support university research
- Training by supporting the education of students and fellows through grants, fellowships, or scholarships
- Investment
- Support activities such as clinical trials along with other research

David Blumenthal, M.D., M.P.P., Nancyanne Causino, Ed.D., Eric Campbell, Ph.D., and Karen Seashore Louis, Ph.D.
N Engl J Med 1996; 334:368-374February 8, 1996

In summary

The central idea behind open innovation is that in a world of **widely distributed knowledge**:

- Companies cannot afford to rely entirely on their own research, but should instead buy or license processes or inventions (i.e. patents) from other companies.

- In addition, internal inventions not being used in a firm's business should be taken outside the company (e.g. through licensing, joint ventures or spinouts).

A minority sport

- NIH syndrome – hence ignored
- Developing an 'external learning focus' (intelligence, knowledge, ideas)

- Competitive (& protective) not collaborative cultures
- Tendency to protect rather than share knowledge & IP

- Poorly developed networks – with universities, start-ups/ spin outs etc.
- Capability to manage external relationships (the language, culture and distance issues)

- Not too many examples to cite

A few examples

NESTA's Corporate Connect programme report

Procter & Gamble estimates that only one in a hundred good ideas makes it to market whether they come from within or outside, but external ideas will often have greater potential.

NATS, the UK market leader in air traffic control services, has adapted McLaren's race control computing software, to aid the management of aircraft on the ground. This venture into Airports-Collaborative Decision Making (A-CDM) products could significantly enhance air-traffic efficiency and has strong potential to be marketed on a global scale.

Structural Genomics Consortium

The SGC (Structural Genomics Consortium) is a not-for-profit, public-private partnership with the directive to carry out basic science of relevance to drug discovery.

- Current funders of the SGC include GSK, Eli Lilly, Pfizer, the Novartis Research Foundation, the Wellcome Trust, and Canadian granting agencies.

- Recently, these organizations together have committed greater than US$50 million to the consortium to sustain another four years of operation

Man/AHL and Oxford

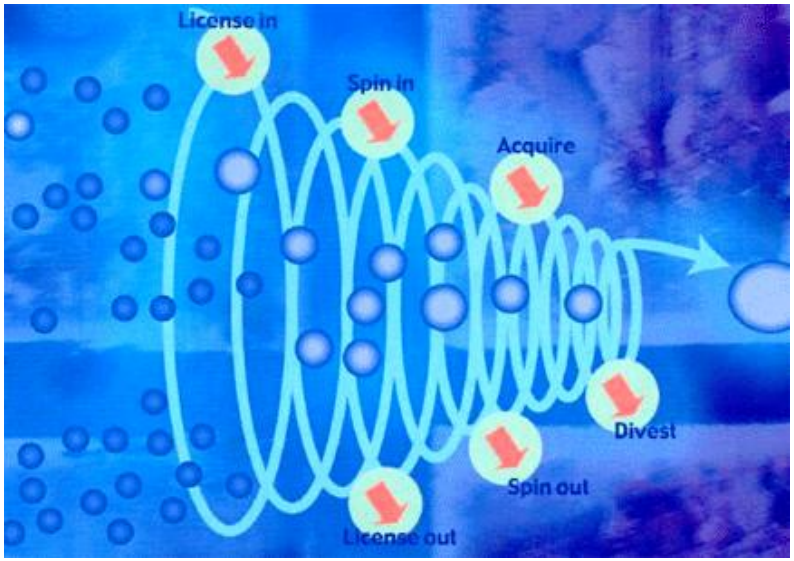
Man is a world-leading investment management business and has been in business for over 200 years

3 business groups: **AHL** - Systematic Investment Management Group

- One of the largest and most experienced research teams in the industry (Man Research Laboratory)
- Association with Oxford via Oxford-Man Institute of Quantitative Finance http://www.oxford-man.ox.ac.uk/man

Organizational challenges – open innovation

- Requires increased IP management capability and capacity
- Licensing resource & expertise (corporate venturing)
- Connected & networked: universities, research centres, start-ups/ spin outs etc.
- The development of the new role of 'innovation broker'
- Different role for R&D, broader skill base, more 'centre stage'



Questions ?

Entrepreneurship

According to a leading economist **Israel Meir Kirzner,** entrepreneurship is all about spotting an unnoticed profit opportunity.

Entrepreneurs do it, whilst many walk past without noticing it.

Entrepreneurship

"Every body stumbles across a golden opportunity at least once in a lifetime. Unfortunately most people just pick themselves up, and others dust off and walk away from it" (Winston Churchill)

Entrepreneurship

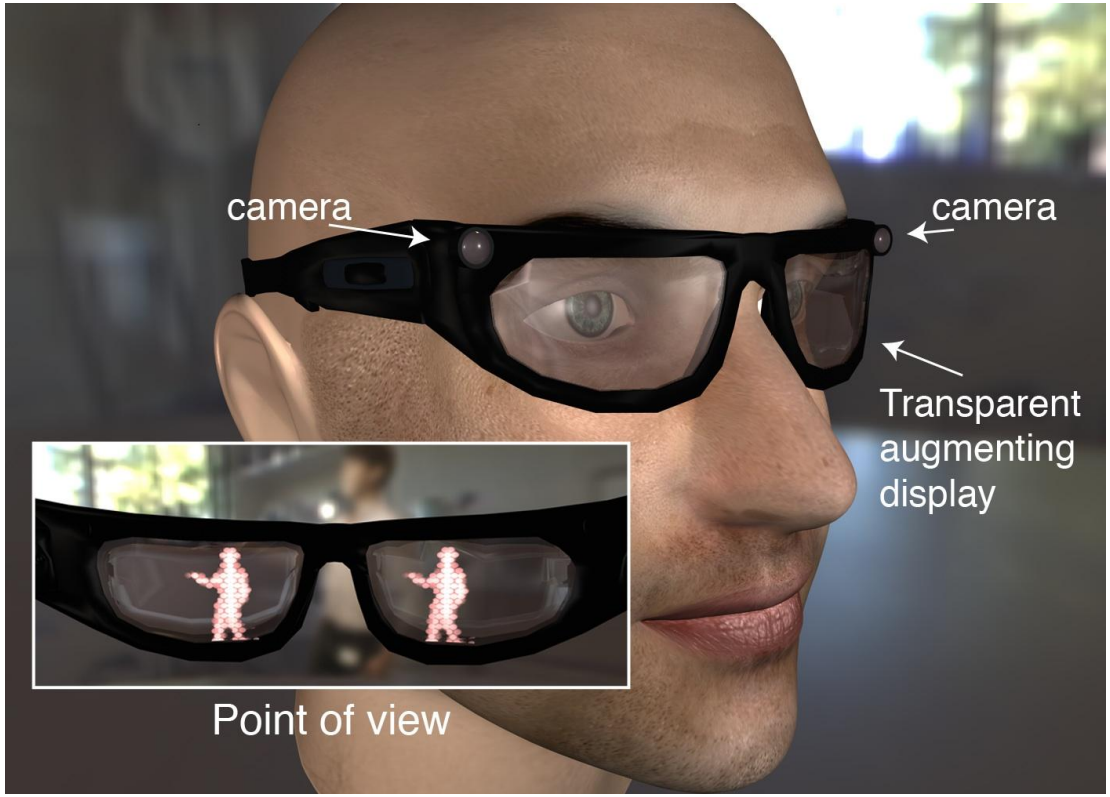
Entrepreneurship is the act of being an entrepreneur, which can be defined as "*one who undertakes innovations, finance and business acumen in an effort to transform innovations into economic goods*".

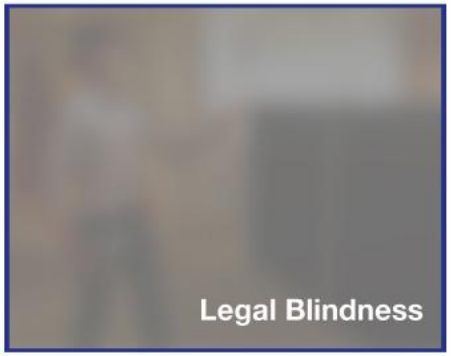
- Business Entrepreneur
- Political Entrepreneur
- Knowledge Entrepreneur
- Social Entrepreneur

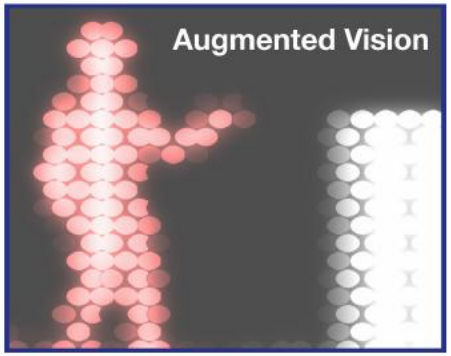
While a business entrepreneur typically measures performance in profit and return, a social entrepreneur focuses on creating social returns

Oxford Bionics

A visual aid that helps the "blind" brain process visual information







285 millions are vision impaired

Entrepreneurship for growth

How is Entrepreneurship good for economic growth?

- Entrepreneurs create new businesses
- New businesses create jobs
- Increase level of disposable income – economic development

- New businesses intensify competition
- Intensified competition may improve quality – new technologies
- New businesses may increase productivity through technological Change

- Successful organisations
- Improve brand reputation
- Offer customers & society new benefits

Entrepreneurship for growth

Entrepreneurs create new businesses, and new businesses in turn create jobs, intensify competition, and may even increase productivity through technological change.

High measured levels of entrepreneurship will thus translate directly into high levels of economic growth.

However, the relationship between entrepreneurship, corporations, and economic development is complex.

A nation's economic development depends on successful entrepreneurship combined with the force of established corporations especially governments

Entrepreneurship for growth

Several evidences - An increase in the number of entrepreneurs leads to an increase in economic growth

Necessity Entrepreneurship which refers to having to become an Entrepreneur because you have no better option. Being pushed into Entrepreneurship (self-employment) because all other options for work are either absent or unsatisfactory can even lead to under development.

Opportunity Entrepreneurship which is an active choice to start a new enterprise based on the perception that an unexploited or under exploited business opportunity exists.

While it is easy to see that starting a new business to exploit a perceived business opportunity would lead to economic development, it is also possible that necessity entrepreneurship may not lead to economic development.

Activity (10 minutes)

What do you see in this video?

What support you would require when thinking of commercialisation?

Support

- Financial support (access to Equity Capital, access to Loan Finance)
- Government policies and programmes
- Reducing the red tape

- Matched funding, Tax Code
- Education and Training –IP etc.
- Research and Development

- Adaptation of cultural and social norms
- Access to physical infrastructure (managed workspace) - commercial and professional infrastructure

- Stimulating innovation and R&D in small firms
- Administrative burdens
- Access to markets (bid or tender priority)

Good luck!

Thank you for your attention!

Questions?