

Central Asian Technology  
Entrepreneurship Program

CRDF Global

# TECHNOLOGY VALUATION

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# Why are You Here?

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# If You Came to This Seminar...

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## ● You Are Entrepreneurial !

- You are looking for something **new**
- You thinking about **promotion** at your current job
- You are looking for a **job**
- You want to **advance** your own company
- You want to **start** your own company
- You want to **meet** people like you

## ● There are advantages at each point

# If You Start Your Own Company

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- You become your own **boss**
- You will have a greater possibility of achieving significant **financial** rewards
- It provides the ability to be involved in the **total operation** of the business, from concept to design and creation, from sales to business operations and customer response

# If You Start Your Own Company

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- It offers the **prestige** of being the person in charge
- It gives you the opportunity to build **equity**, which can be kept, sold, or passed on to the next generation
- You will have an opportunity to make a **contribution** to help local economy or through the innovations – contribute to the society as a whole

# Opportunity

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- *Strong desire to start a business, combined with a good idea, careful planning, and hard work, can lead to a very engaging and profitable endeavor*

# The Advantages of New Technology for Businesses

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- **Cutting-edge technology can create high benefits for businesses that are willing to be early adopters**
- **Create barrier to entry - will give you the first-to-market advantage**
- **Revolutionize operations – grow out of old concept: cell phone is not only a cordless phone, its also has an organizer, access to your email, shows you maps**
- **Radically reduce costs - Skype, for example, provides an inexpensive service that replaces both international phone calls and videoconferencing**

# New Technology

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- ① *New Technologies* are contemporary advances and **innovation** in various fields of technology
- ① New technologies come in many forms: **product innovation, process innovation**
- ① One of the common form is **technological convergence** - previously separate technologies share resources and interact with each other, creating new efficiencies. Example: **voice+data+video**
- ① Let's pretend you have a new technology



# What Exactly is Your New Technology?

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- New product, new/improved process, new composition of things: **disruptive technology vs. incremental change**
- Type of technology. Industries, companies, processes where it can be **applied**
- Is your technology **legally protected**? Does your technology require new type of **regulations in applied industries/companies?**
- Are you **competing** against another solution? How much **power** do you have to compete?

# Exercise

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- What is your personal goal to achieve using new technology?
- What is your innovation? (product, process, application)
- Is your technology disruptive or incremental?
- How do you protect your idea?
- What is your starting asset? (Idea, people, physical infrastructure, legal, finance)

# Optical Science as an Emerging Technology

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- New optics: Optics, Photonics, Electra-optics, or Optoelectronics
- Invention of laser in 1960 enabled applications in fiber-optics communication, optics data storage, laser surgery, and material processing
- Optics is enabling technology applied to:
  - Telecommunication equipment
  - Medical devices
  - Scientific instruments
  - Semiconductors
  - Imaging and reproduction
  - Defense and security
  - Retail logistic

# Technology Valuation

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# Transaction in Market Economy

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- ◉ Deals take place where the goods bought are **equal** to what is given to obtain them
- ◉ In technology transfer, the goods being sold are **intellectual property** – ideas that can be legally protected (patents, trademarks, copyrights)
- ◉ To make a deal you **measure** your idea in value of things that matters to you (not always money)

# How To Measure the Value of Idea

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- How well your technology meets a **buyer's criteria**
- Think: what makes your idea/product **desirable**
- **Metrics to consider:** price, performance, ease of use of a technology, aesthetic (consumer goods – cell phones)
- The more your technology is perceived as *desirable*, you are more likely to be able to charge a **premium price**
- The **cheaper** your technology, the more likely you are to sell it

# 3 “Never” to Value a Technology

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- **Never** value a technology on why it is desirable to you. The party to which you want to sell (company or customers) only care why the technology might be attractive to them (Utility)
- **Never** value technology on its development cost – even the smartest people wasted money during developing the technology
- **Never** value a technology above its substitutes unless you have brand loyalty. Brand loyalty changes the equation because it enables you to price above substitutes for the same product

# Basics

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- You cannot do valuation until you know what you are going to use it for
- Valuation is science and art
- You have to make assumptions – make sure your assumptions are realistic. It is better to stick with conservative assumptions
- Doing valuation you are NOT calculating absolute value, but expected value



# Discounted Cash Flow

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- You calculate expenses and revenue based on predicted values reflected through discount rate (covered in another presentation)
- Revenue – Expenses = Cash Flow
- Estimate current and future investment (+% for unknown/risk + inflation)

# 5 Approaches to Valuation

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3 “smart” + 2 “stupid”

1. Market approach
2. Income approach
3. Auctions

# 1. Market Approach

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- The value of a technology is represented by its market value
- Use as a benchmark sales for similar products
- Forecast your revenue by using the benchmark adopted for your technology
- Do two **SWAT** analyses to compare your benchmark technology and its market penetration with your new technology

# SWAT Analysis



## 2. Income Approach

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- Determine the income generating potential for a new technology – the value of a technology is a **residual** in an analysis of how a firm uses its assets to generate net cash flow in its on-going operation
  - Select your “typical” firm
  - $\text{Net Cash Flow} = \text{Economic Performance} = X(\text{Physical Assets}) + Y(\text{Financial assets}) + Z(\text{Intangible Assets})$
  - You know X and Y; need to determine Z\*

# Value of Intangible Assets (Z)

- Calculate your ROI(real) (net income/net assets)
- Find industry's average ROI (ind)
- Find your company's ROI(hypot) if you would be on a level of the average of your industry (industry av. ROI\*company's tangible assets)
- Calculate company's excess ROI (exc)  
=ROI(real) – ROI(hypot)
- Your excess ROI is due to intangible assets

# \*7 Steps How to Determine the Value of Intangible Assets (Z)

- (1) Calculate av. pre-tax earnings for 5 years (from company's income statement)
- (2) Take the av. year-end tangible assets for that period from company's balance sheet

(3) Calculate ROI=net income/net assets OR:

$$ROI = \frac{[Net\ Income + Interest\ Expense(1 - tax\ rate)]}{Total\ Assets}$$

- (4) Find industry's av. ROI
- (5) Calculate company's excess ROI=industry av. ROI\*company's tangible assets – pre-tax earnings
- (6) Subtract the av. Income tax rate \* excess ROI
- (7) Calculate a current value by using company's weighted average cost of capital

## Still on Z

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- Not all intangible assets can be attributed to intellectual property (- reliability of suppliers, experience of staff)
- The residual is for ALL intellectual property

**Bottom-line: Big Headache and Black Art**



# 3. Auctions

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- Only if a seller of a technology has a bargaining power
- Only if you can have many buyers
- Only if the process has “integrity” – can be trusted

**Bottom-line: If enough players bid an auction will build a market place**

# Stupid Methods (4 and 5)

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- **Cost approach:** what it would cost to replicate the technology. “Replacement value” is usually below the original cost of developing idea (“leakage” of knowledge)

*Not relevant to a buyer who cares only about net utility of a good – what it creates for me*

- **25% rule:** a rule of thumb – IP asset’s value is around 25% of the gross profit, before taxes, from the operations in which the asset is used

*Your technology maybe not an average technology*

# Risk

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- Risk affects value. To maximize the value of technology, you need to minimize risk.
- Three types of risk:
  - **Firm-specific** (under your control) – bad choice of your team
  - **Technical** (under your control) – more mature technology has less risk to yield desirable outcomes
  - **Market** (NOT under your control)

# Absence of the Market

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- ◉ Find experts in the narrow technological field – scientists know (!) Ask their expert opinion
- ◉ Find the major companies in this technology domain and study their patent profile (emerging technologies)
- ◉ Try to market your technology: trade shows, publications
- ◉ Before the word is going out – get a good lawyer and talk about different options to protect your IP

# Emerging Technologies: Optics

Bio-optics startups.pdf - Adobe Reader

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Tools Comment

Bio-optics startups LensX, AOptix, and BiOptix raise >\$38 million total <http://www.bioopticsworld.com/articles/print.html?id=358558&tbPool...>

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## Bio-optics startups LensX, AOptix, and BiOptix raise >\$38 million total

APRIL 7, 2009--Three companies have recently raised more than \$38 million among them to fund further development of their bio-optics and biophotonics products. LensX Lasers (Aliso Viejo, CA), maker of [cataract surgery lasers](#), has raised \$22.36 million in Series B funding, while [iris recognition](#) developer AOptix Technologies (Campbell, CA) recently closed a \$12.9 million financing round. Meanwhile [biomolecule detection](#) company BiOptix Diagnostics (Boulder, CO) has raised \$3 million in a Series A round.

**LensX Lasers Inc.**  
According to a regulatory filing, Versant Ventures was joined by return backers InterWest Partners and SV Life Sciences to raise LensX Lasers Inc.'s \$22.36 million Series B funding round. The LenxX founding team is the sale group that

Middle

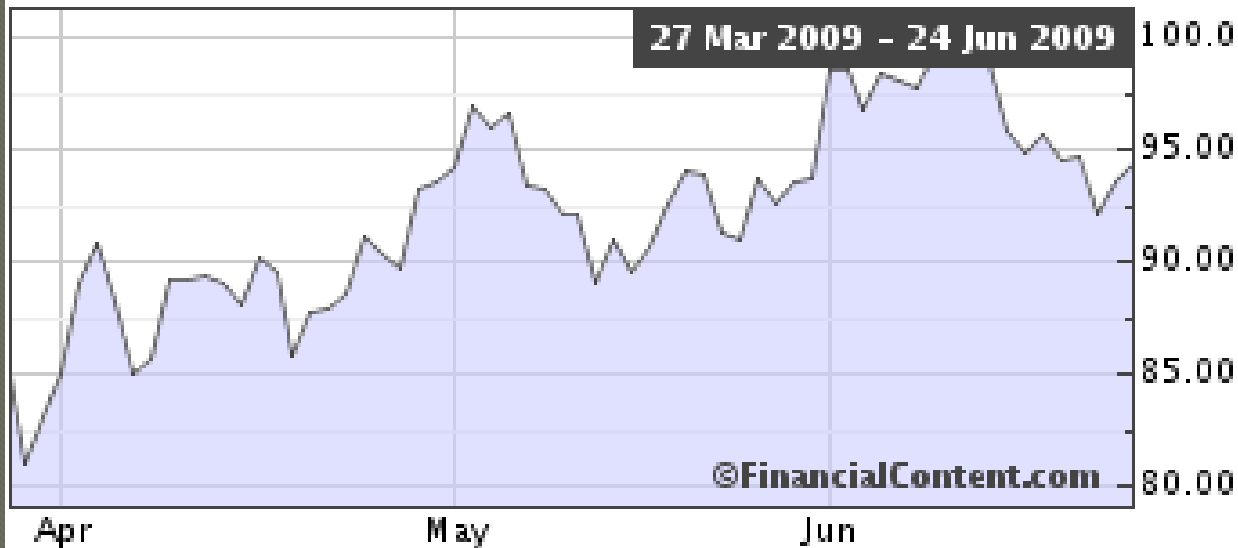
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# Lightwave Optical Index (: \$LGTWAV) 24 companies

Index Quote		Index Data	
Last Price	94.23	Day's Range	93.53 - 96.01
Change	+0.76	Week's Range	91.57 - 96.01
Change %	0.81%	YTD Range	67.16 - 100.96
Open	94.38	52-Week Range	67.16 - 142.33
Previous Close	93.47	Week Change %	-0.37%
Symbols in Index	24	YTD Change %	-31.31%

■ Lightwave Optical Index (LGTWAV)



Company	Symbol	Last	Change	Week Change	Volume
<a href="#">AGILENT TECHNOLOGIES, Inc.</a>	<a href="#">A</a>	19.01	2.48%	0.64%	3,898,995
<a href="#">ADC TELECOMM</a>	<a href="#">ADCT</a>	7.46	2.33%	-3.24%	3,508,471
<a href="#">ALLIANCE FIBER OPTI</a>	<a href="#">AFOP</a>	1.02	0.00%	-9.73%	17,987
<a href="#">BELDEN, Inc.</a>	<a href="#">BDC</a>	16.61	-0.30%	-5.79%	317,125
<a href="#">CIENA</a>	<a href="#">CIEN</a>	9.73	0.21%	-8.29%	2,411,985
<a href="#">CISCO SYSTEMS</a>	<a href="#">CSCO</a>	18.61	0.22%	-1.64%	47,140,833
<a href="#">COMMSCOPE, Inc.</a>	<a href="#">CTV</a>	24.72	3.43%	-0.28%	2,809,328
<a href="#">Digital Lightwave, Inc.</a>	<a href="#">DIGL</a>	0.06	0.00%	0.00%	20,100
<a href="#">EMCORE</a>	<a href="#">EMKR</a>	1.22	-4.69%	-8.96%	1,312,714
<a href="#">EXFO ELECTRO-OPT SV</a>	<a href="#">EXFO</a>	3.27	1.24%	-2.97%	7,261
<a href="#">FINISAR</a>	<a href="#">FNSR</a>	0.58	-1.69%	-6.45%	2,474,321
<a href="#">CORNING INCORPORATED</a>	<a href="#">GLW</a>	15.42	0.59%	0.78%	10,761,888
<a href="#">HARMONIC</a>	<a href="#">HLIT</a>	5.61	-6.34%	-11.79%	4,482,106
<a href="#">Intel</a>	<a href="#">INTC</a>	16.1	1.83%	0.56%	53,327,417
<a href="#">JDS UNIPHASE</a>	<a href="#">JDSU</a>	5.44	0.37%	-7.33%	3,308,404
<a href="#">MOLEX INC</a>	<a href="#">MOLX</a>	15.03	1.69%	-3.72%	1,056,096
<a href="#">MRV Communications, Inc.</a>	<a href="#">MRVC</a>	0.43	3.61%	7.50%	978,554
<a href="#">OPLINK COMMS</a>	<a href="#">OPLK</a>	11.09	1.46%	-14.63%	232,990
<a href="#">SYCAMORE NETWORKS</a>	<a href="#">SCMR</a>	3.09	0.00%	-4.92%	259,079
<a href="#">SIEMENS AG</a>	<a href="#">SI</a>	67.93	0.18%	-4.04%	472,172
<a href="#">Sunrise Telecom Incorporated</a>	<a href="#">SRTI</a>	0.94	0.00%	-0.53%	0
<a href="#">TELLABS</a>	<a href="#">TLAB</a>	5.71	3.07%	-1.21%	5,859,436
<a href="#">IXIA</a>	<a href="#">XXIA</a>	6.91	3.13%	7.47%	184,382
<a href="#">ZHONE TECHNOLOGIES</a>	<a href="#">ZHNE</a>	0.32	-9.68%	-15.50%	217,672

# Patent Definition of Optics: USPTO

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- U.S. patent classes:

- 3 major optics classes (3%)
- 28 secondary optics classes (19%)
  - 22% of all patents

Too narrow or too broad

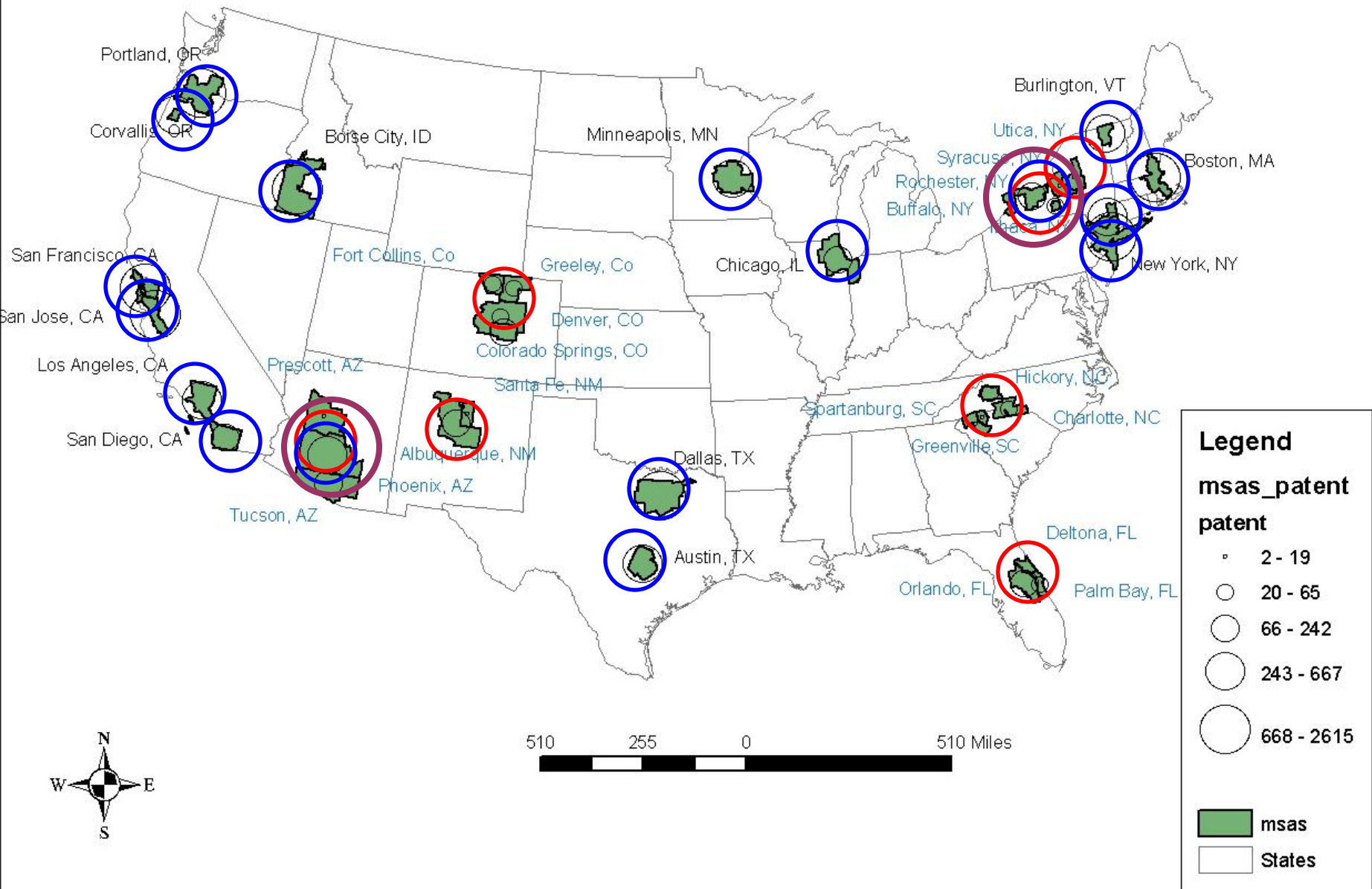


# The Optics Society of America (OSA)

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- The oldest optics society, 90th anniversary in 2007
- Publishes 11 journals ranging from theory to practice
- OSA corporate membership is based on the payment of fees (\$645 to \$3,255)

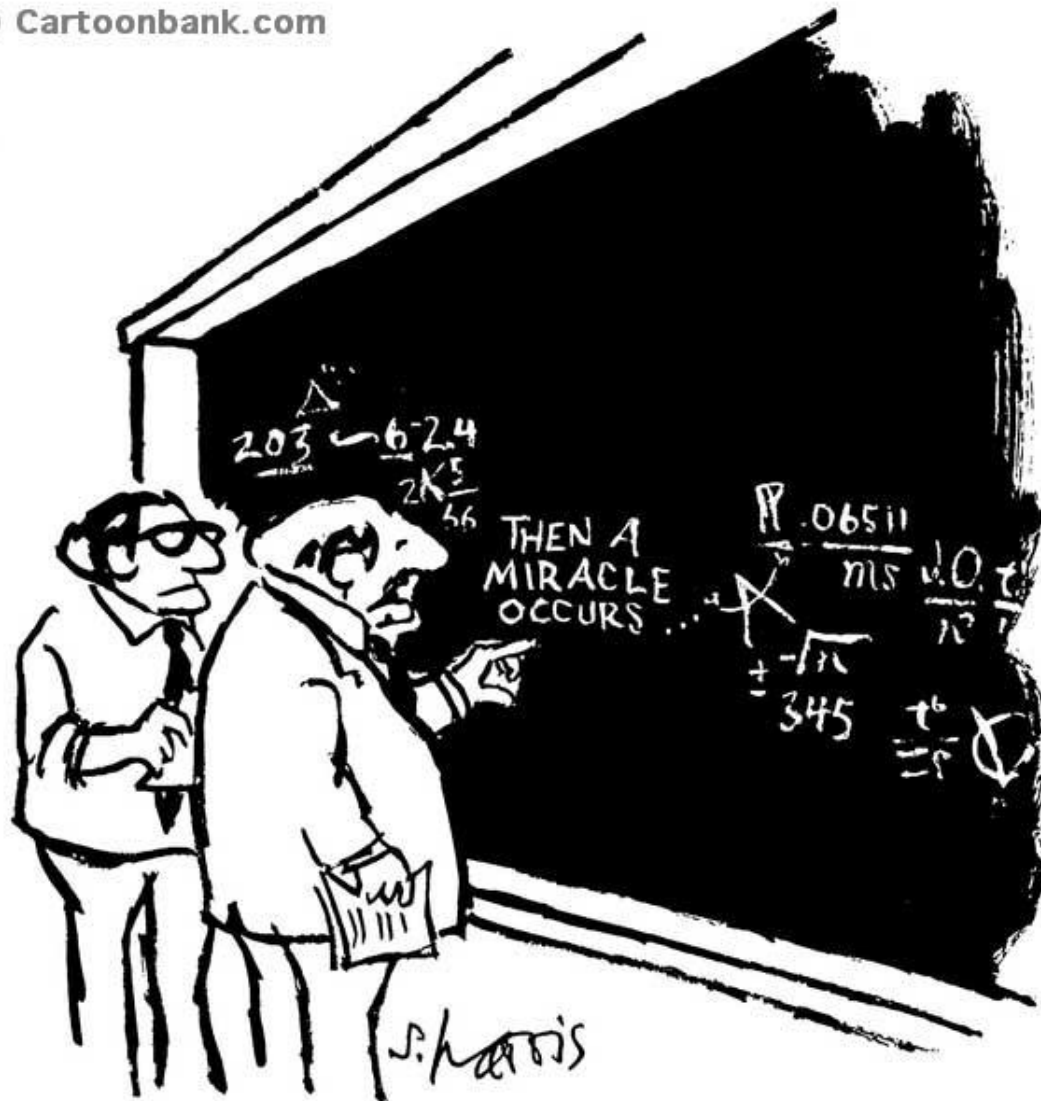
# Seven Self-Identified and 17 Largest Producers of Optics Patents: Total Number of Patents and Applications, 2004-2007



# CONCLUSION

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- ◉ Keep it as simple as possible – its still a black art
- ◉ Do market-based valuation is possible: make sense and cheaper
- ◉ Do/order market research of emerging technologies in your field
- ◉ Mitigate as much risk as possible



# *Still Art and Science*

**"I think you should be more explicit here in step two."**

# Questions?

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