INNOVATION: 
the 4th factor 
of production 

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Some time ago I noted that R&D was getting incredibly expensive.
And it was becoming incredibly expensive in other fields as well.
We Learned in the 90’s that the Open Model is the Right Model
New Development Paths

• A Business Model for R&D
• Social Media and Science 2.0
The Return On Invested Capital Business Model: What’s Wrong With ROIC?

• The numerator, **Return**, is hard to raise
  – This is especially true for the financial side of the organization
  – Entails the risk of developing new strategies and products
    • Something the financial side abhors and has little control over.

• It’s much easier to lower the denominator: **Capital**.
  – You can variablize it
  – Leads to fab-lite strategy
  – Which leads to outsourcing strategies and loss of National Competitiveness in Technology
ROIC ignores the inherent Value of R & D

• R&D are the Seeds of Differentiation
  – Problems are markets
  – Solutions are products
• Research enables Development
• Development enables Differentiation
• Differentiation enables pricing power
  – It’s the only way to Raise Return
A New Financial Metric to Drive Revenue Growth: RonR

• RonR: Return on n years of R,D, & E
  – A year’s Return divided by Cumulative R&D over n
  – n equals the length of the Development Life Cycle.

• Examples:
  – Each semiconductor development node is 2 years
  – A electronic design is about one year
  – Pharmaceuticals are > 10 years
Attrition is the Name of Game

~100 Discovery Approaches

High Risk Process
12-15 years, $1 Billion

1 - 2 Products

Discovery
Early Development
Full Development

Phase I
Phase II
Phase III

0 5 10 15

Idea
12 - 15 Years
Drug

weSRCH.com
VLSIRESEARCH.com
ChipHistory.org
RonR: Return on n years of R&D in 2008

- First Solar: 2042%
- Apple: 802%
- Google: 313%
- Intel: 77%
- TI: 44%
- Pfizer: 14%
- Micron: -198%
So, how do you improve RonR?

In a systematic and manageable manner.
Maximizing Research Assets

- **Application**
- **Profit**
- **Discovery**
- **Loss**

Risk, Value, & Time To Answer

Simple & Easy  VS  Complex & Difficult

Research Management is about Driving the Discovery Curve out.
RonR, RoS and the chain of Differentiation

RD&E → Innovation → Customer

SG&A

More Money
R&D: The Old Model

Lord of the Conference
RD&E

SG&A the Rainmakers

The Customer
The History of Corporate R&D is pretty incomprehensible

• Edison started the 1st Corporate Research Lab
  – Idea was that product came from innovation
  – Innovations come from research

• AT&T, a regulated monopoly, created Bell Labs
  – Need to burn money defocused research from customer
R&D: The New Model

Research

Universities

Consortia

Development

Engineering

OPI

weSRCH.com
VLSIresearch.com
ChipHistory.org
R&D: The New Model

Innovation & Total Alignment of Purpose

RD&E  SG&A  Customer

More Money

weSRCH.com
VLSIresearch.com
ChipHistory.org
People make it all Possible

• Ideas only come from people, which are the result from the viral effects of . . .
  • Community
  • Collaboration
People make it all Possible

• Small teams are important . . .
  • Throwing money at research does not spur innovation
  • People are less competitive in large groups
  • Large groups result in
    – More group think
    – More challenge to out-of-the-box ideas
    – More conformity to peer group pressure
What Tools do we use?

• Conferences
  – Before 400 BC?
• Scientific Journals
  – 17th Century?
• Telephones
  – 1876
• e-mail
  – 1971
The calculation for science

Rhoten’s Law

(Moore’s Law + Scientific Complexity) \times \text{Digital Culture} = \text{Science 2.0}

- Diana Rhoten, Program Director
  Office of Cyberinfrastructure,
  National Science Foundation
New tools: Social Media/Science 2.0

- **Google**
  - 1999

- **LinkedIn**
  - 2003

- **Twitter**
  - 2006

- **weSRCH**
  - 2007

Reid Hoffman
Also: Allen Blue
Jean-Luc Vaillant
Eric Ly
Konstantin Guericke

**weSRCH.com**
**VLSIresearch.com**
**ChipHistory.org**
Why is Twitter Important?

• Not Spamable
  – You control who can talk to you

• It’s Mobile:
  – 3 things you always have nearby:
    • keys, wallet, & cell phone

• Actively searchable

• Keyboard diarrhea not possible
  – Only 170 characters
Twitter, I don’t get it?

• Largest user base is 35-45 year olds
  – Then 25-35, then 45-55
• Some things you need to know:
  – Listen first, talk later
  – RT: retweet
  – TinyURL
  – Tweetdeck
  – Twazzup

Follow me on Twitter @WildPhotons
Why is weSRCH.com Important?

Easy Access to Each Professional Field

Available in 7 Languages

Fast & Easy Login for Members

Video Interviews with the Key Thought Leaders

Meet and Contact Peers
Why weSRCH? Because it’s directly relevant to your career

- Find Jobs
- The most relevant content distilled to their specialty from multiple sources
- Read & Upload technical papers, press releases + a great news search & display engine
- Search our Data Wiki for 3D decision making
- Find the relevant conferences
- Create brainstorming communities
Member’s Personal Spaces

- **myPROFILE** is a place to manage their resume and give it full visibility for career-marketing.
- **myCONTACTS** is for networking directly with peers.
- **myALBUM** is for storing & managing photos.
- **myweSRCH** is a place to manage their uploads.
- **myLIBRARY** is for storing & managing the content they need to refer to again and again.
- **myNEWS** is for storing & managing the news links to which they need to refer.
- **mySEARCH** is for storing & managing searches they’ve made.
- **myALERT** let’s them make a search active. They get an e-mail alert whenever search criteria finds something new. myALERT also stores & and lets them manage alerts.
Do professionals really use weSRCH?

**Visitors**
- Thousands per Month: 72
- Thousands of Unique IPs: 20
- Return visits per month*: 9

**Stickiness**
- Minutes per visit: 19
- Page views per visitor: 56
- Return visitor minutes per month: 168
Large Number of Advanced Degrees

weSRCH's Visitor Distribution
(Distribution of Registered Users)

- Ms/Mrs 18%
- MD or PhD 17%
- Mr 65%

weSRCH's Visitor Distribution
(Distribution of Registered Users)

- PhD 65%
- MD 35%
We Clearly have our Challenges

• But, we are up to it
• All we need to do is make R&D more productive
• Apply a proven business model
• Use the new tools available to us